CONSTRUCTION
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URBAN TRANSFORMATION
Compact roadbuilding machines
p17

BUILDING BETTER
The story of ESG financing
p36

CONNECTED CONSTRUCTION
CE talks tech with Hexagon
p38

CUTTING EDGE TOOLS
TBMs and tunnelling projects
p23

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CONSTRUCTION europe

FROM THE EDITOR

An industry fit for the future

At the end of 2021, we see a construction industry that has become increasingly complex, but also increasingly contradictory.

The built environment is one of the greatest examples of civilisation, allowing us to travel globally, experience education, enjoy our leisure time and be generally comfortable.

Now, though, it's also making us a little uncomfortable – standing out as one of the most significant threats to our very existence.

I have lost count of how many times in the past year I have read that 'the built environment is responsible for one third of global greenhouse gas emissions' or that 'buildings use 40% of Europe's energy'.

The coronavirus pandemic caused us to be still for a while, during which time we took stock of such things; we also saw emissions fall and air quality rise. A breath of fresh air, you might say.

In this moment of clarity, we are seeing the sense in shaking things up and making significant positive changes in the construction industry.

The European Union had already laid out its plans to become carbon neutral by 2050, but this year saw the emergence of the 'Fit for 55' package, containing proposals aimed at cutting emissions by 55% by 2030.

To make this happen, we in construction must get on board with the principles of cutting emissions, waste reduction and the circular economy.

We have a vast array of tools at our disposal, such as new building materials produced with low carbon, materials that capture carbon, even materials that can generate electricity.

Technology is also key, giving us better opportunities to 'cut once and cut right', saving time, energy and waste.

This is all good news for construction in 2022 and, as more news comes to us of inspirational ways to build better, we will do our best to pass it on to you.

Mike Hayes, Editor

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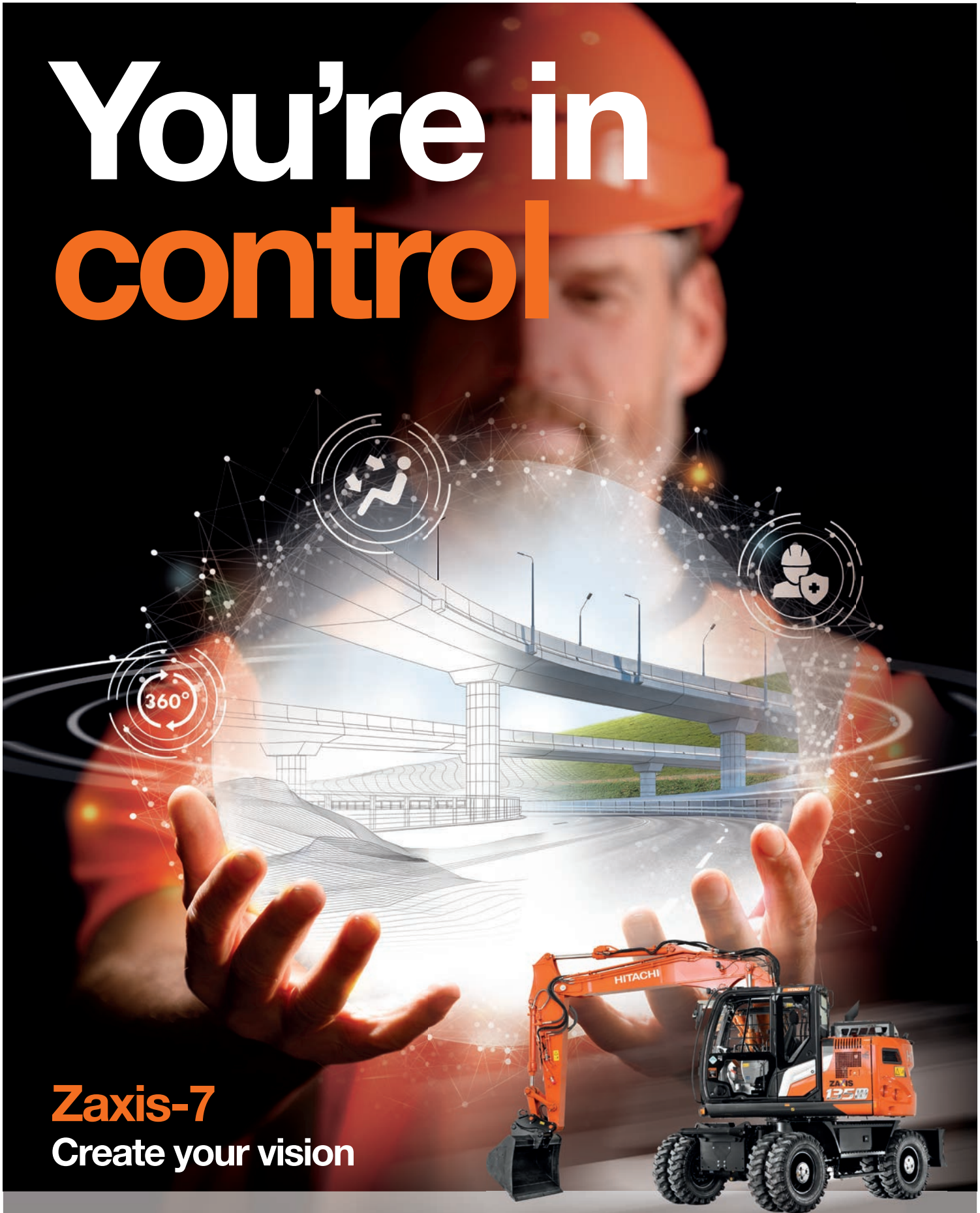

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IN THIS ISSUE

REGULARS

ON THE COVER
Raiseboring, traditionally used in mining, is one of the tunnelling methods now becoming popular on major infrastructure projects

FEATURES

EVENTS DIARY

2022

UK Construction Week
May 3-5, 2022
London
UK
ukconstructionweek.com

GIC-Concrete Days
April 28-30, 2022
Piacenza
Italy
www.gic-expo.it

Hillhead
June 21-23, 2022
Buxton
UK
www.hillhead.com

Bauma
October 24-30, 2022
Munich, Germany
www.bauma.de

EUROPE

EU set to loosen its Belt

Bloc's Global Gateway plan to invest €300bn in global infrastructure projects

The European Union (EU) has announced a multi-billion-euro plan to support construction and climate projects, in what is being seen as an alternative to China's Belt and Road Initiative.

The Global Gateway plan, to be published this week, will reveal a €300 billion investment fund, to be rolled out between now and 2027.

The European Commission (EC) said the plan "will focus on physical infrastructure – such as fibre optic cables, clean transport corridors, clean power transmission lines - to strengthen digital, transport and energy networks."

Ahead of the plan's publication, the EC said "The EU will offer its financing under fair and favourable terms in order to limit the risk of debt distress."

The money to support the plan is expected to come from the governments of member states, the EU's financial institutions, development banks and the private sector.

"Without proper transparency, good governance and high standards," said the Commission, "projects can be badly chosen or designed, left incomplete or be used to fuel corruption. This not only stunts growth and deprives local communities but it ultimately creates dependencies, which can limit countries' ability to make decisions." ce

PICTURE COURTESY ADOBE IMAGES

The EU aims to forge new links beyond the bloc

GLOBAL

Coal to be 'phased down' in COP26 agreement

The climate pact that emerged at the end of a tense final day of COP26 included an agreement to "phase down" the use of coal.

While interventions from India and China saw the wording watered down from "phase out" at the 11th hour, the UK Prime Minister Boris Johnson – whose government hosted the Glasgow climate conference – nevertheless called it "a game-changing agreement".

It's fair to say the move is significant and more than 25 countries have now pledged to end new financing for all fossil-fuel-based projects by the end of 2022.

Critics are saying governments didn't go far enough to ensure global warming is limited to a 1.5C rise above pre-industrial levels by the end of the century, yet almost 200 nations have now agreed to take significant action to mitigate the worst impacts of climate change.

For the first time, a full day at COP26 was devoted to the built environment, with the World Green Building Council arguing the topic should be "elevated to a critical climate solution". ce

'Significant' move on coal at COP26 conference

ROMANIA

Uzbekistan reveals €2.2bn gas-chemical project

The government of Uzbekistan has announced details of a €2.2 billion gas-chemical project based on MTO technology.

The project is expected to commence operations in the fourth quarter of 2023 and will provide Uzbekistan's domestic industry with olefinic hydrocarbons, a vital raw material for the country.

The MTO technology, which is core to the project, has no direct competitors in the CIS region. The plant will seek to minimize the project's impact on the environment. Environmental standards compliance will be monitored and confirmed by consultancy Mott MacDonald.

When completed, the complex will have a production capacity of 720,000 tonnes of finished polymer products - enough to satisfy all domestic demand. The facility will produce diverse products from the core inputs of ethylene and propylene, which will substitute various raw materials currently being imported.

Italian construction giant Webuild has announced that its tunnel boring machine (TBM) Serena has completed its 14km dig, creating the exploratory tunnel on the Italian side of the Brenner Base Tunnel.

The task took Serena - a double shield TBM built by Herrenknecht - three and a half years and equates to a little over 80% of Webuild's excavation work on Lot Mules 2-3.

The current project is one of four that Webuild has secured on the tunnel, set to be the world's longest rail tunnel and a major high-speed connection between Italy and Austria.

The tunnel will run for 64km, between Fortezza in Italy and Innsbruck in Austria, and will reduce travel times by 69%, from 80 to 25 minutes.

When completed, the Brenner Base Tunnel will form a significant element of the Scandinavian-Mediterranean Corridor of the Trans-European Transport Network (TEN-T), connecting destinations as distant from each other as Helsinki in Finland and La Valletta in Malta.

IMAGE COURTESY THE ARDERSIER PORT AUTHORITY

An impression of the new energy transition facility at Ardersier Port

UK

Energy transition facility underway

Project will turn disused oil rigs into floating offshore wind farm foundations

Work has begun on Europe's first fully circular energy transition facility located in Ardersier Port, Scotland. The project will repurpose disused oil rigs to make floating offshore wind farm foundations, as well as establishing a €350 million 'green steel' mill and a concrete production plant – these will be powered using resources from the facility.

The site marks the UK's largest brownfield port at over 162 hectares and with more than a kilometre of quayside. Under the project's first phase, 2.5 million m^3 of sand will be dredged from the site in a nine month operation costing €23.5 million, with the collected sand then used as aggregate in the concrete production plant.

Steve Regan, Ardersier Port owner, said, "The UK has set a world leading net-zero target to build back better, support green jobs, and accelerate our path to net zero. At Ardersier, we can lead the UK's Green Industrial Revolution by using circular economy practices to deliver new, low-carbon infrastructure, built on the by-products of our oil and gas past. This is a once in a generation opportunity to create a world-leading industrial and offshore wind manufacturing facility here in the UK." ce

GERMANY

Züblin in for Frankfurt skyscraper

A consortium of Züblin and Dobler Metallbau has been commissioned to build a new 205m-tall skyscraper in Frankfurt.

Precise details on the price of the contract have not been released, but Strabag, Züblin's parent company, said it would be in the mid-three-digit-million-euro range.

The Central Business Tower is being developed by banking organisation Landesbank Hessen-Thüringen (Helaba).

Designed by architect KSP Engel, the tower will comprise 52 floors above and five below ground. A base building of five storeys will include a historic façade, with construction of the façade to be carried out by a team from Dobler Metallbau.

Demolition work to remove existing buildings at Neue Mainzer Strasse will begin in November, with the entire construction process expected to last six years.

Züblin will utilise its 'teamconcept' strategy on the project, in which open tools are used to give project stakeholders access to a joint project-specific information platform, including data, plans and documentation. It also features what the firm calls "the transparent representation of the construction costs during all phases of the project". ce

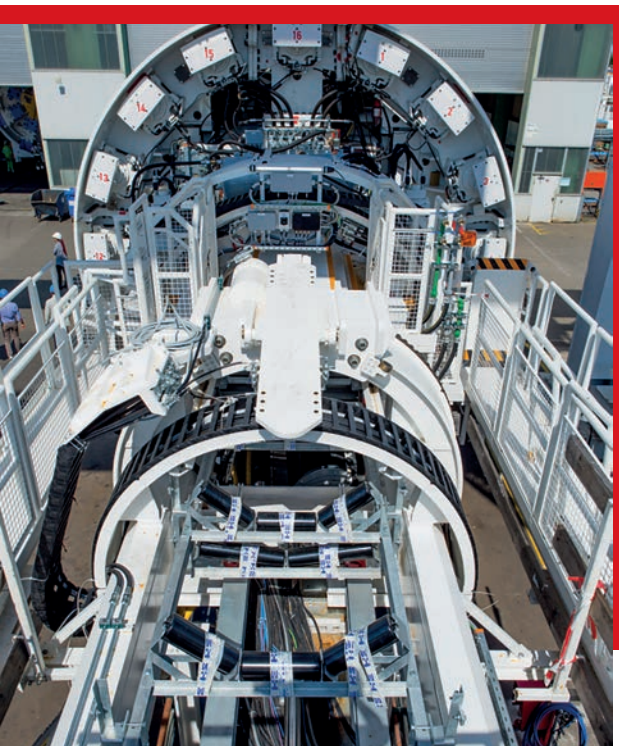

IMAGE COURTESY KSP ENGEL

An impression of the Central Business Tower in Frankfurt

NEWS IN BRIEF

SWEDEN CEMENT CRISIS AVERTED

The Swedish Government says it will allow cement producer Cementa to continue its limestone mining activities on Gotland island until 31 December 2022. Cementa has been operating out of the Slite limestone quarry for a number of years and its cement products account "for 75% of all cement used in Sweden". The ruling was made by the Swedish Government in a bid to avoid a nationwide cement shortage, that could result from the ongoing mining rights battle between Cementa and the Swedish Land and Environment Court of Appeal.

NORTH MACEDONIA €270M SOLAR PROJECT LAUNCHED

The government of North Macedonia has revealed plans for a new photovoltaic project with a capacity of between 350 to 400MW and a value of around €270m. The facility will be built in Stipion by Paris-based Akuo Energy via local firm Ostro Solar, according to the North Macedonian government. Outgoing Prime Minister Zoran Zaev confirmed in September that Akuo is among the foreign investors that expressed interest in large energy projects in the country.

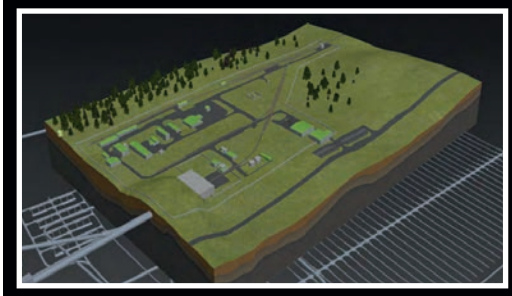

IMAGE COURTESY SÚRAO

CZECH REPUBLIC JACOBS WINS MAJOR NUCLEAR CONTRACTS

Jacobs has been selected by two Czech Republic authorities, to undertake projects incorporating radioactive waste management. The US engineering firm will treat and solidify 250 million tonnes of radioactive sludge, before transporting it in drums to a long-term storage facility. It will also undertake safety assessments on four sites shortlisted for use as a new underground storage facility for radioactive wate.

An impression of the Pimorsky port facility, showing the extent of the project

RUSSIA

€2bn Baltic deep-sea port project planned

Complex to handle 64 million tonnes of cargo a year and boost Russian exports

A new RUB170 billion (€2 billion) transhippment seaport is to be built on Russia's west coast, on the Baltic Sea.

Said to be the first deep-water complex in the region, the development of the "Primorksy UPK" facility will enable Russian to increase the amount of foreign trade cargo it exports.

Construction of the port, located north of St. Petersberg in the coastal town of Primorsk, will be carried out by Primorsky Universal Transshipment Complex.

The company signed the deal for the seaport with the Federal State Unitary Enterprise (FSUE) Rosmorport just last week, at the Transport Week 2021 Forum in Moscow.

Spanning an area of around 760 hectares, the transshipment complex will have port facilities that can accommodate cargo vessels with a capacity of up to 150,000 tonnes and contrainer ships with up to 200,000 tonnes of capacity.

This, along with digitalised processing and management systems for loading, storage and transshipment, will allow large amounts of Russia-produced goods to arrive at the port by train and be processed quickly and efficiently.

"All bulk cargoes we will work with — coal, mineral fertilizers and grain — will be processed in a closed way. From the approach of the railway wagon to the unloading station," said Anatoly Savkin, First Deputy General Director of the Primorsky universal transshipment complex

"The station is closed. Then it goes to the inner galleries to the warehouse. And then it will go through the closed gallery to the ship. Noise and dusting are eliminated. Environmental monitoring will be mandatory."

At its peak operation Primorsky UPK will be able to handle around 65 million tonnes of cargo a year. ce

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2022 IPAF summit

iapa 2022 International Awards for Powered Access

Prestigious access awards event heads for London, UK

The International Awards for Powered Access are to be held in person on March 10, 2023

Taking place at the Millennium Gloucester Hotel, Kensington, in London, UK, on 10 March, the 13 IAPA award categories provide opportunities for companies directly related to the access industry, as well as those connected through components, safety equipment or other items that they supply to the powered access sector.

New for 2022 is the Sustainability Award, which is open to companies that have taken a leap forward in environmental engagement, whether it be through a product, service or other type of initiative. This new category forms part of a trio of awards that celebrate the cutting-edge of technological and safety advancements, which also includes The Technology Prize and the Digital Development award.

Organised by Access International and IPAF, the IAPA awards are held on the same day as the IPAF Summit. IPAF will also hold a networking event at Illuminate, based at London's Science Museum on the evening prior to the Summit and IAPAs. A site visit, planned for 11 March, the day after the IAPAs, will be confirmed shortly.

The overall theme of the IPAF Summit, powered access site visit and the IAPAs judging panel will be announced shortly.

■ Please visit **www.iapa-summit.info** for more details and announcements, including awards categories and to register as a delegate.

EUROPE

European markets 'back to pre-Covid levels'

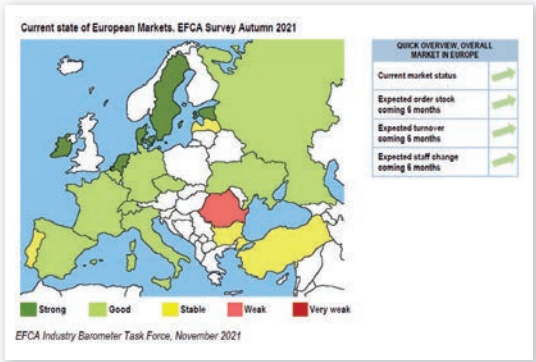
Engineering markets in Europe have recovered from the Coronavirus crisis, according to a survey from the European Federation of Engineering Consultancy Associations (EFCA).

Carried out by EFCA member associations for their respective countries, the Industry Barometer survey shows the biannual trends and expectations amongst consulting engineering companies in the region.

The Autumn 2021 survey revealed that companies' order stock, turnover and profitability had all increased on the levels seen over the past 18 months.

Henrik Garver, CEO of the Danish Association of Consulting Engineers and Chair of EFCA's Industry Barometer task force, said, "Although COVID-19 is still challenging the business environment, and European society at large, the impact on the consultancy and engineering industry in Europe has been reduced significantly, compared to the situation 6, 12 and 18 months ago."

However, EFCA warned that staff shortages were still a major challenge for the consultancy and engineering sector. ce



EFCA's map offers an overview of the current state of construction in a number of European markets

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WORLD IN BRIEF

AUSTRALIA

A technologically advanced tunnel-boring machine (TBM) has been commissioned for the development of the Snowy 2.0 pumped-storage scheme, the largest renewable energy project in Australia. Built specifically for Snowy 2.0 by Germany's Herrenknecht AG in collaboration with Webuild, the TBM, named after Australian astrophysicist Kirsten Banks, will work on a project that is said to be underpinning Australia's transition to a renewable energy future. The project involves linking two existing dams, Tantangara and Talbingo, through 27km of tunnels and building a new underground power station.

MEXICO

Global infrastructure company Comsa has been awarded a contract to rehabilitate the tracks and systems of Line 1 of the Mexico City Metro for a value of approximately US$90 million. The project, which sees Comsa continue to expand its presence in Latin America, is scheduled to begin in the second quarter of 2022. It includes the renewal of 39km of track and ballast, as well as 17 escapes and 12 turnouts, all included in the section that runs from Pantitlán to Observatorio, both on main and secondary tracks and shunting areas.

SOUTH KOREA

It has been announced that, following the purchase earlier this year of Doosan Infracore by Hyundai Heavy Industries Group, an intermediary holding company called Hyundai Genuine (HG) has been set up to oversee both firms. Doosan Infracore has been renamed Hyundai-Doosan Infracore and both it and Hyundai Construction Equipment will operate as subsidiaries of the newly created HG group. However, they will continue to operate under their own management systems, competing as sister companies within the global equipment market. HG says it will provide support to both businesses and help facilitate cooperation.

Allianz report points to post-Covid growth in construction

GLOBAL

Infrastructure and sustainability to drive construction's growth

Bright future for construction but supply chain challenges are set to get worse

The global construction market is set for a sustained period of strong growth post-Covid-19, driven predominantly by government spending on infrastructure and the transition to a net zero society, according to a new report from Allianz Global Corporate & Specialty (AGCS).

The strong growth outlook for the sector is based on a number of factors, such as rising populations in emerging markets and significant investment in alternative forms of energy, including wind, solar and hydrogen power, as well as power storage and transmission systems.

Buildings are not only expected to improve their carbon footprint, but will also require improved coastal and flood defences and sewage and drainage systems in response to more frequent extreme weather events.

At the same time, governments in many countries are planning major public investments in large infrastructure projects to both stimulate economic activity after the pandemic crisis and drive the low carbon transition.

However, the report cautions that this move to more sustainable buildings and infrastructure and the adoption of modern building methods will add to the pressure on supply chains, shortages in materials and labour, and increased costs. ce

AUSTRALIA

Initial works contract for US$6.6 billion Australian rail link

Contractor Laing O'Rourke has been awarded the US$357 million Initial Works and Early Works package for Suburban Rail Loop (SRL) in Melbourne, Australia.

It will prepare sites ahead of tunnel boring for the 26km eastern section of the SRL, set to link six new stations.

SRL has been called a "once-in-a-generation opportunity to shape the future liveability, productivity and connectivity of Melbourne."

The contract is part of a large package of works that the government of Victoria state, where Melbourne is located, is providing to boost transport links. The state is providing new funding of A$9.3 billion (US$6.6 billion) to build SRL East, which it aims to open for operations in 2035.

Work starts next year and will create 800 jobs and 14% of total hours will be undertaken by trainees and cadets.

Victoria Premier Daniel Andrews, said, "We told the Victorian community we will get this project started – and we're getting on with it. ce

Route of Melbourne's proposed Suburban Rail Loop

US

Majority of US areas add construction jobs

Most metro areas saw an increase in construction jobs, despite pandemic

Nearly two out of three US metro areas added construction jobs between October 2020 and October 2021, according to analysis conducted by the Associated General Contractors of America of government employment data.

Construction employment increased in 236 or 66% of 358 metro areas over the last 12 months, declined from a year earlier in 72 metros, and held steady in 50.

Association officials noted that the job gains would likely have been larger and more widespread if firms weren't dealing with the challenges of both supply chain problems and labour shortages.

Ken Simonson, the association's chief economist, said, "While it is heartening that construction is recovering from the lows of 2020 in much of the country, the pandemic is still causing major supply-chain problems and is keeping some workers from seeking employment. Those impediments threaten to limit construction employment gains in many metros."

Association officials urged the Biden administration to continue working to reduce tariffs on key construction materials, and to take additional steps to ease supply chain problems at ports and other shipping facilities. ce

Construction firms are struggling to employ enough workers

COURTESY ADOBE IMAGES

CHINA

Government takes over Evergrande stadium

A government body has taken over China Evergrande Group's soccer stadium with a view to selling it, an insider told Reuters, as the debt-laden property developer scrambles to meet liabilities.

Evergrande, which has been struggling to meet repayments on over US$300 billion in debt, is also considering selling money-losing Guangzhou Football Club, said a source involved with the project.

Construction on the 12 billion yuan (us$1.86 billion) Guangzhou Evergrande Football Stadium began in April last year for completion by the end of 2022, when it was set to be the world's largest soccer venue by capacity.

However, Evergrande has halted construction due to a lack of capital and has ceded control to authorities which plan to sell the stadium, or – in the absence of buyers – acquire it via state-owned Guangzhou City Construction Investment Group, the source said, who did not wish to be named. ce

An aerial view shows the construction site of Guangzhou Evergrande Football Stadium, a stadium for Guangzhou FC, developed by China Evergrande Group

©REUTERS/THOMAS SUEN/FILE PHOTO

WORLD IN BRIEF

GHANA

The Ghana Water Company has awarded a €70 million contract to Strabag to design and build a water treatment plant. The facility will provide clean drinking water for the twin city of Sekondi-Takoradi, which has an estimated population of around 500,000 people. Thomas Birtel, CEO of Strabag SE, said, "The Strabag Water Technologies business field, which has been successfully operating in Ghana since 2012, is strengthening its market presence with this order and paving the way as a reliable contract partner for further sustainable projects in the drinking water sector both in Ghana and throughout West Africa."

KENYA

Holcim has announced Africa's largest 3D-printed housing project in Kenya, Mvule Gardens. The project was made possible by the company's proprietary ink, TectorPrint, giving the walls structural function to bear the load of the building. Jan Jenisch, CEO of Holcim, said, "We are excited to be building one of the world's largest 3D-printed affordable housing projects in Kenya. With today's rapid urbanisation, over three billion people are expected to need affordable housing by 2030. This issue is most acute in Africa, with countries like Kenya already facing an estimated shortage of two million houses."

GLOBAL

A report from global consultancy HKA has revealed the total value of claims and disputes for capital projects is US$73 billion and together it represents delays of 750 years. The fourth annual CRUX report from HKA showed that capital projects are losing billions each year to recurrent and often avoidable claims and disputes. The report, which analysed data from 1,400 projects in 94 countries, found that the main causes of claims and disputes are: changes in scope, conflicting interpretation of contracts, design failures, and mismanagement of subcontractors.

Austria's first 3D-printed building

Construction group Strabag and scaffolding manufacturer Peri are constructing Austria's first 3D-printed building in Hasuleiten.

The project is an approximately 125m² office building. The pure printing time for the building extension is roughly 45 hours.

Peri are experienced in 3D concrete printing and are using a special dry mortar for the construction called 'Tector Print' which is being supplied by Lafarge.

"3D construction printing brings an important innovation impulse for the construction industry and is an exciting addition to other construction methods," said the Strabag board member responsible for digitalisation and innovation, Klemens Haselsteiner.

"With this practical test, we want to further develop 3D construction printing together with our partners Peri and Lafarge. In Hausleiten, we were already able to achieve important findings for future use during the joint planning."

Thomas Imbacher, chief innovation and marketing officer at Peri AG, said that, "At Peri, we see great potential in the still young technology of 3D construction printing. Just under a year ago, we printed Germany's first residential building with a BOD2 printer from our Danish partner COBOD."

Peri will be using the COBOD BOD2 gantry printer supplied from the Danish manufacturer COBOD. With this technology, the print head moves over three axes on a permanently installed metal frame meaning it can move to any position within the construction and only needs to be calibrated once.

Including this printing project in Hausleiten, the PERI 3D construction printing team has successfully completed five printing projects in one year. The first ever printed house in Germany, the first multi-family house and largest printed building in Europe (Wallenhausen), its first printed house in the US, an apartment building extension in Lindau, Germany and the project in Hausleiten.

These are not research projects, but real houses that have gone through all the building code approval processes, are rented out and occupied, or in which people work.

3D printer in operation in Austria

Representation of the Canada Water masterplan from British Land

Digital twin created for €4.7bn London development

Sensat develops 'golden thread' for Canada Water project covering over 20 hectares

Sensat, a developer of collaboration software for civil infrastructure, has created a digital twin of a new 21 hectare development in Canada Water, London.

Created in partnership with development and investment company British Land and information management firm Amodal, the visualisation of the entire site is intended to be part of a 'golden threat' of connected data - giving planning teams the opportunity to coordinate processes over the length of the €4.7 billion project.

Sensat says stakeholders will also be able to visualise site conditions remotely, aiding collaborative decision-making and contingency planning.

Under the auspices of Southwark Council, the project's scope encompasses the creation of a new town centre for Rotherhithe, including 4,500 new homes and 35,000m² of additional retail space.

Sensat CEO, James Dean, said, "A masterplan of this cost and scale could easily become fragmented, falling foul to misaligned incentives, behaviours and objectives, as well as delayed delivery timetables due to unreliable data, but we have helped overcome this and accelerate planning.

"It's only when you see comprehensive information on existing assets, above- and below-ground utilities and infrastructure, as well as surveys and inspections, visually in one place that you can support collective problem-solving and mitigate the risks. We look forward to continuing to be a key enabler for smart planning to help partners build better and see the wider knock-on benefits this will have on other stakeholders linked to the masterplan." ce

ConTech investment hits record levels

Investment in the construction technology ecosystem reached a record level of approximately €4 billion in 2021, triple the amount of money invested in 2020, according to information released from Cemex Ventures.

According to the company – which has just released its annual listing of the world's top 50 construction startups – the previous record was set in 2018 with around €1.6 billion.

Camera tech to benefit site safety

Soletanche Bachy, a foundations and geotechnical engineering specialist are collaborating with SimplyVideo to improve health and safety.

Field operatives are using RealWear Assisted Reality headsets from SimplyVideo – the worker collaboration platform for extended reality, which connects them to offices around the world.

This allows site visits and inspections to take place without travel and means operatives can join sites on the ground virtually.

"With global travel restrictions being imposed last year, the pandemic exacerbated the issues related to health & safety," says Stuart Brooks, Health, Safety, Security and Environmental Manager (HSSE) for Soletanche Bachy International Major Projects.

"Ultimately, SimplyVideo was the only platform that offered what we considered to be a workable solution – we needed more than just a remote expert tool; we needed a cross-reality collaboration platform and that's what SimplyVideo does so well."

Soletanche Bachy are using head-mounted devices that incorporate a microphone, display and speakers for total hands-free working.

According to Brooks, one device has been a game-changer; the RealWear HMT-1 head-mounted Android tablet. The unit can survive drops onto concrete and provides easy voice-based operation.

The display in the boom appears to the eye as a 7-inch screen, offering multi-language speech recognition and 4G connectivity. The head-mounted tablets utilise Assisted Reality (AR) technology – a subset of Extended Reality (XR). The technology can also record content as well as being able to refer to the display for documentation or schematics.

SimplyVideo has also created a virtual mentoring tool allowing onsite training of less experienced workers. Those with greater expertise can join virtually and help.

"The beauty of the SimplyVideo solution is that we can bring more expertise together; something we simply couldn't do before. The platform gives us a clear visual representation of what's really happening on site."

Komatsu developing tech for construction projects in space

Komatsu will contribute to Japan's research and development of construction activities that could take place on the moon

Construction equipment manufacturer Komatsu has been selected by the Japanese government to work on developing autonomous construction equipment that can operate in space.

As part of the aim of producing construction equipment that could operate on the moon, Komatsu is using digital twin technology to recreate site conditions and machines.

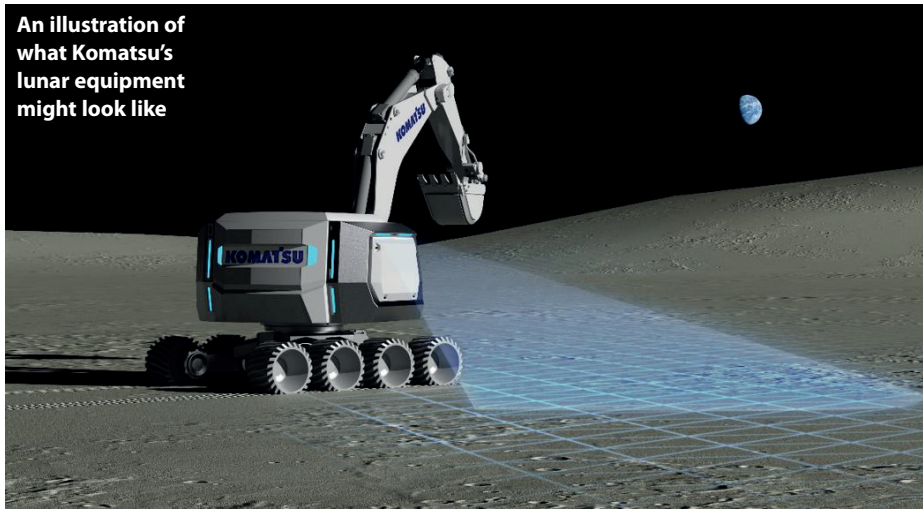
Komatsu says that digital twin technology is essential in precisely recreating site conditions and machines and the company is conducting a feasibility study to verify the possibility of developing high-precision digital twin technology.

Komatsu will create and operate a hydraulic excavator in cyberspace, using digital twin technology, and compare its movements with actual equipment on Earth to verify the simulator's precision.

The ongoing three-year, mid-term management plan, is scheduled to be completed in the fiscal year ending March 31, 2022.

The overall name of the project is 'Promoting the Development of Innovative Technologies for Outer Space Autonomous Construction' and it is lead managed by Japan's Ministry of Land, Infrastructure, Transport and Tourism with collaboration by Japan's Ministry of Education, Culture, Sports, Science and Technology.

Komatsu's proposal of the Development of Digital Twin Technology for Lunar Construction Equipment has been selected as an eligible target of Technology related to Autonomous Construction (Automation and Remote Control). ce



An illustration of what Komatsu's lunar equipment might look like

In the 'Top 50 ConTech Startups 2021 list' there were more companies offering the industry sustainable solutions than ever before.

"As we predicted last year, sustainable solutions saw a spike in investment from leading companies and investors," said Gonzalo Galindo, Head of Cemex Ventures.

"We will continue seeing this trend in 2022, as well as more companies betting on solutions that help deal with the supply chain hurdles that the industry is experiencing. Supply chain management had been struggling pre-pandemic and with Covid-19, the challenges increased."

From the selection, North America and Europe are the leading regions and the US is the country with the most companies in the Top 50 ConTech Startups 2021.

Other regions in the list include Latin America, the Middle East and Asia-Pacific, with UK, Germany, and Israel having more participants selected in the list as these countries are driving significant investment for the ConTech ecosystem.

Latest figures from Cemex Ventures show ConTech investment is soaring

A fairly chilly

There may be little movement overall, but the contractor index takes hit

This article will assess the period for listed contractors, equipment manufacturers and material producers from week week 44 to week 49 of 2021 (29 October to 3 December, 2021).

While two of the CE indexes have made positive moves over the review period – Equipment nudging up by 0.4% and Materials up 3.2% – the Contractors list has taken a hit, with a drop of -6.5%.

While this might not look too promising, the average across the three indexes is only negative by 0.1%, which is ahead of all other major financial indexes (eg Dow = -3.6%, FTSE 100 = -1.3%, Nikkei 225 = -3.0%). This perhaps says something positive about construction, in the face of yet another variant of Covid looking to dampen our festive spirit.

EQUIPMENT MANUFACTURERS 0.4% ⓘ

Company	Currency	Price at start	Price at end	Change	Change (%)
CEE INDEX		**500.0**	**501.9**	**1.9**	**0.4%**
Astec Industries	US$	53.38	62.75	9.4	17.6%
Atlas Copco (A)	SEK	551.80	562.80	11.0	2.0%
Bell Equipment	ZAR	12.20	12.74	0.5	4.4%
Caterpillar	US$	204.01	196.73	-7.3	-3.6%
CNH Industrial	€	17.11	16.86	-0.3	-1.5%
Deere	US$	342.31	347.87	5.6	1.6%
Doosan Infracore	WON	10,500.00	7,470.00	-3030.0	-28.9%
Epiroc (A)	SEK	182.50	181.60	-0.9	-0.5%
Haulotte Group	€	5.00	4.95	0.0	-1.0%
Hitachi CM	YEN	3,625.00	3,405.00	-220.0	-6.1%
Hyundai CE	WON	40,250.00	38,150.00	-2100.0	-5.2%
Kobe Steel	YEN	670.00	568.00	-102.0	-15.2%
Komatsu	YEN	2,966.50	2,701.50	-265.0	-8.9%
Kubota	YEN	2,422.50	2,471.50	49.0	2.0%
Manitou	€	29.45	27.30	-2.2	-7.3%
Manitowoc	US$	21.43	19.27	-2.2	-10.1%
Metso Outotec	€	8.68	9.12	0.4	5.1%
Palfinger	€	38.20	35.00	-3.2	-8.4%
Sandvik	SEK	217.50	231.70	14.2	6.5%
Tadano	YEN	1,241.00	1,083.00	-158.0	-12.7%
Terex	US$	44.80	42.76	-2.0	-4.6%
Volvo (B)	SEK	199.92	198.58	-1.3	-0.7%
Wacker Neuson	€	28.36	26.14	-2.2	-7.8%

Period: Week 44-49, 2021

CONTRACTORS

Looking more closely at the Contractors index, we see that of the 28 companies listed, only ten have remained in the black, with 18 falling over the five-week period.

Spain's OHLA group sits at the top of the index, with a 10% gain. The company, renamed from OHL earlier this year, is renowned a supplier of EPC services to mining. Madrid based, the company has a global reach, with a total portfolio of close to €6 billion.

The new company currently boasts a strengthened balance sheet structure after reducing its overall debt and boosting its equity capital to around €195 million.

Three UK companies also make it into positive figures on the index (Kier: 7.5%, Morgan Sindall: 6.8% and Taylor Wimpey: 6.5%). One might think Kier is looking in good shape, having secured projects on the UK's enormous

MATERIALS PRODUCERS 3.2% ⓘ

Company	Currency	Price at start	Price at end	Change	Change (%)
CEM INDEX		**238.1**	**245.8**	**7.7**	**3.2%**
Buzzi Unicem (Ord)	€	20.17	18.75	-1.4	-7.0%
Cemex (CPO)	MXP	13.24	13.15	-0.1	-0.7%
CRH	€	41.48	43.40	1.9	4.6%
Ferguson	UK£	109.95	116.90	7.0	6.3%
HeidelbergCement	€	65.14	60.44	-4.7	-7.2%
Holcim	€	43.29	42.90	-0.4	-0.9%
Kone (B)	€	58.96	59.96	1.0	1.7%
Saint-Gobain	€	59.56	58.40	-1.2	-1.9%
Schindler (BPC)	CHF	234.80	241.60	6.8	2.9%
Schneider Electric	€	148.90	161.48	12.6	8.4%
Titan Cement Int. (Common)	€	15.08	13.48	-1.6	-10.6%
Vicat Group (Common)	€	36.85	34.80	-2.1	-5.6%
Wienerberger	€	30.62	32.70	2.1	6.8%

Period: Week 44-49, 2021

CE BAROMETER 2021 bows out with a slight dip in business confidence

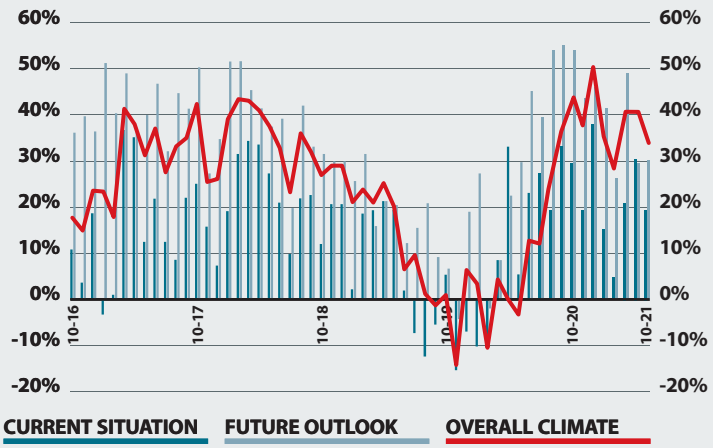
The October 2021 barometer survey was undertaken during the first three weeks of November.

We are getting used to confidence waxing and waning in construction, as one hiccup after another prevents recovery really taking off.

As this barometer summary is written, the Omicron variant of Covid is making the headlines; it remains to be seen what effect this will have on the industry.

This month, the balance figure (the difference between those reporting positive and negative movement between September and October 2021) stands at 19.0%, down almost 12% on the previous survey.

The number of repondents reporting growth in the past month dropped by just over 3%, but those who saw business holding steady last month fell by almost 6%, pushing down the balance figure.



year-end

HS2 high-speed rail project. Yet so have the Keller Group (-0.1%) and Balfour Beatty (-5.9%), which have not enjoyed such growth on the index.

In the lower reaches of the index, we find three quite diverse companies with double-digit negative results. Spain's infrastructure and concessions specialist Sacyr (-13.8%), Finland's YIT, which specialises in infrastructure projects in central and eastern Europe (-14.1%) and the French construction giant Bouygues (-14.5%).

> "The average across the three indexes is only negative by 0.1%, which is ahead of all other major financial indexes"

EQUIPMENT

Again, on the Equipment index, the majority of companies have fallen, but of the seven companies to have posted positive figures there is one outstanding good news story; that of US-based Astec Industries (17.6%).

The company recently benefitted from pricing initiatives, higher sales and manufacturing efficiencies, all of which helped it offset inflation, supply chain disruptions and labour challenges. The company's bottom line improved 163%, which could explain its position at the top of the index.

At the other end of the index, we see Doosan Infracore (-28.9%), a company that, it appears, is yet to see the benefit of being acquired by its giant compatriot Hyundai Heavy Industries. Sister company Hyundai Construction Equipment has certainly fared better (-5.2%), while failing to achieve the top half of the table.

Swedish firm Sandvik, known for its expertise in mining and rock cutting technology, sits in second place on the index, with growth of 6.5% over the analysis period.

Having stated that a shift to more sustainable practices should be seen as a business advantage for Sandvik and its customers, the company's CEO, Stefan Widing, said, "We have a solid platform to start from. Now we shift to growth."

CONTRACTORS -6.5%

Company	Currency	Price at start	Price at end	Change	Change (%)
CEC INDEX		**265.5**	**248.1**	**-17.4**	**-6.5%**
Acciona	€	164.60	154.10	-10.5	-6.4%
ACS	€	22.63	21.40	-1.23	-5.4%
Balfour Beatty	UK£	2.54	2.39	-0.2	-5.9%
Bam Group	€	2.51	2.69	0.2	7.2%
Bauer	€	11.24	10.26	-1.0	-8.7%
Bilfinger	€	30.36	28.82	-1.5	-5.1%
Bouygues	€	35.00	29.93	-5.1	-14.5%
Eiffage	€	88.96	84.10	-4.9	-5.5%
FCC	€	11.02	10.12	-0.9	-8.2%
Ferrovial	€	27.26	25.58	-1.7	-6.2%
Hochtief	€	66.70	67.28	0.6	0.9%
Keller Group	UK£	9.17	9.16	0.0	-0.1%
Kier	UK£	1.06	1.14	0.1	7.5%
Morgan Sindall	UK£	22.75	24.30	1.6	6.8%
Mota Engil	€	1.35	1.23	-0.1	-8.9%
NCC (B)	SEK	150.00	155.00	5.0	3.3%
OHLA	€	0.70	0.77	0.1	10.0%
Peab (B)	SEK	107.70	108.30	0.6	0.6%
Porr	€	12.40	12.86	0.5	3.7%
Sacyr	€	2.46	2.12	-0.3	-13.8%
Skanska (B)	SEK	218.00	212.10	-5.9	-2.7%
Strabag SE	€	37.10	35.05	-2.1	-5.5%
Taylor Wimpey	UK£	1.54	1.64	0.1	6.5%
Tecnicas Reunidas	€	7.82	7.20	-0.6	-7.9%
Trevi Group	€	1.02	0.98	0.0	-3.9%
Veidekke	NOK	121.60	127.60	6.0	4.9%
Vinci	€	92.37	85.79	-6.6	-7.1%
Webuild (formerly Salini Impregilo)	€	2.14	2.03	-0.1	-5.1%
YIT	€	5.10	4.38	-0.7	-14.1%

Period: Week 44-49, 2021

MATERIALS

With an even split between companies moving up and down on the Materials index, we see only one company achieving double-digit movement; unfortunately, it is a negative move for Greece's Titan Cement (-10.6%).

Looking for reasons for Titan's fall is not simple; Greece has suffered a good deal of economic hardship through the pandemic, but has seen something of an economic rebound in recent weeks.

Also, a number of Titan's core markets have improved, leading to increased profits.

In fact, patterns are hard to find in the Materials index as a whole. France's Schneider Electric sits at the top of the list, with a gain of 8.4%.

Others posting healthy results include Austria's Wienerberger (6.8%) and the UK's Ferguson (6.3%). ce

KEY INDEXES -0.1%

Index	Beginning of period	End of period	Change	Change (%)
CEE (Equipment)	**500.0**	**501.9**	**1.9**	**0.4%**
CEM (Materials)	**238.1**	**245.8**	**7.7**	**3.2%**
CEC (Contractors)	**265.5**	**248.1**	**-17.4**	**-6.5%**
CET (Total)	**324.8**	**324.4**	**-0.4**	**-0.1%**
Dow	35,820	34,530	-1,290	-3.6%
FTSE 100	7,238	7,144	-94	-1.3%
Nikkei 225	28,893	28,030	-863	-3.0%
CAC 40	6,830	6,799	-31	-0.5%
DAX Xetra	15,689	15,261	-427	-2.7%

Period: Week 44-49, 2021

CE OCTOBER SURVEY RESULTS

Comparing business today with a year ago, things are a little more positive, with 63.5% still seeing improvement (although this is still 5.6% down on the previous survey result).

Looking a year ahead, confidence remains steady, with (47.6%) anticipating improved business levels – down just 2.4%. Equally, the number expecting a worsening of the situation in 12 months has declined (down 3.1%), moving the balance figure up by 0.8%.

It's the last barometer before Christmas; we'll be ho ho hoping for more positive news in the New Year.

TAKE PART

The survey, which takes just one minute to complete, is open to all construction professionals currently working in Europe.

■ See **www.construction-europe.com/ce-barometer** for more info.

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Dynapac has developed techniques to protect the sensitive components of its CC900 e roller from the effects of vibration

Topcon's survey tech for paving

Topcon Positioning Group has launched new surveying instruments that aim to improve the accuracy, efficiency and productivity on curb and gutter paving applications.

The new self-leveling LN-150 robotic layout navigator and the GT-1200 robotic total station are designed to help paving teams overcome challenges such as foliage canopies, large buildings, tunnels and overpasses, and to ensure curbs and gutters are laid with accuracy.

Both products also use LongLink communication to ensure GPS coverage issues are minimised.

Brian Lingobardo, Topcon business manager, said, "Although Millimeter GPS has become the gold standard for efficient, accurate, curb and gutter work, situations do arise in which that solution is simply not available.

"In such cases, temporarily turning control of the paver over to a robotic instrument will still ensure that production is maintained."

According to Topcon, which recently announced the latest release of its Magnet 7 software suite, its new instruments, "offer support for a prism solution" by allowing a quick switch between millimetre GPS and LPS (local positioning systems) concrete paving systems.

They're not big, but they are clever

As urbanisation grows, so roadbuilding equipment shrinks, with the popularity of compact machines capable of operating in built-up areas booming. Mike Hayes **reports**

More than 70% of people in Europe are now living in cities, with rapid growth set to continue in the coming years.

Seeing conurbations as being at the forefront of innovation, productivity and economic growth, the European Union is keen to ensure spaces within them are as ergonomic, attractive and liveable as possible.

With this in mind, many urban spaces are being redesigned, with roads at the heart of major cities being transformed into sprawling pedestrian areas, and some central and arterial roads being taken underground.

In the European Commission's 10-year strategy from 2020, it states, "Healthy, compact and energy-efficient cities are key to green growth in Europe. Many European cities are currently developing or expanding their networks for sustainable transport, waste management, district heating and green infrastructures."

All this means a steady stream of progressive projects coming through for contractors operating in European cities. That said, inner-city construction projects have always come with specific challenges and they are only set to become more restrictive.

As the authorities driving these projects have strict reporting rules, contracts will tend to be won by the lowest bidder. This can make bidding on a project extremely difficult, given the numerous opportunities for disruptions, as well as the challenges of space limitations and logistical complexities.

Selecting the right equipment is also key and can make the difference between a successful outcome and simply a drain on

>

Low temperature, low emissions

The reorganisation of the centre of Karlsruhe in south-west Germany has been ongoing since 2019, with one major element being the construction of a 1.6km road tunnel.

Working under the auspices of the client, KASIG (Karlsruher Schieneninfrastruktur-Gesellschaft), the Kriegsstrasse Tunnel consortium of Schleith and Zublin, instructed Martin Paschmann Asphaltbau as contractor on the paving project.

With health and safety measures for the construction workers high on the agenda, only rollers and pavers with diesel particulate filters were allowed to work in the tunnel.

Vögele and Hamm machines undertook the paving work within the two tunnel bores.

The use of low-temperature asphalts was also specified, as their paving temperature is approximately 30°C below that of hot asphalts, significantly reducing the paving team's exposure to pollution, emissions and high temperatures.

The work was undertaken by two Vögele pavers of the Super 1800-3i type and three Hamm rollers: a DV+ 90i VT-S-type combination roller, a DV+ 70i VV-S tandem roller and an HD 14i VO compact roller.

A number of specific challenges were faced on the project, due to the low-temperature mix of the asphalt; it hardens the instant a critical temperature is undershot, so the mix had to be paved and compacted as quickly and smoothly as possible. The smaller window meant the roller needed to work particularly close to the paver and in short, regular runs.

"This allows the rollers to generate a great deal of compacting power in the short amount of time available," said Dr Axel Mühlhausen, application expert at Hamm, adding, "it is also possible to compact reduced-temperature asphalt homogeneously across the whole carriageway in dynamic form, ie, using vibrators or oscillation."

On completion of the paving, Christian Riede, senior construction manager at Schleith, said, "Paving reduced-temperature asphalt is still new to a lot of people, so there is a lack of experience-based values – especially with regard to material characteristics during compaction, which was why we continuously checked density using an isotope probe.

"Both the measurements and the laboratory examinations carried out subsequently confirmed that we produced a high-quality, homogeneously compacted carriageway using Vögele pavers and Hamm rollers."

resources and the bottom line.

ELECTRIC DREAMS

One of the biggest concerns for projects taking place in busy cities and urban areas is that of emissions and, certainly in European cities, low emission zones (LEZs) are rolling out at a tremendous pace.

The introduction of electric equipment is one obvious answer for contractors; these machines tend to have no local emissions and come with the additional benefit of low noise pollution, meaning work can often progress beyond 'sociable' hours.

A decade ago – long before it became a generally accepted option for construction equipment – compaction specialist Dynapac developed an electric roller prototype.

Ahead of its time, Dynapac was forced to put the development on the back burner but is now weighing in with its CC900 e electric roller.

The machine has been developed to deliver the same linear load, amplitude, frequency, and travel speed as the diesel-powered model upon which it is based, but, even with its years of experience, Dynapac admits perfecting the machine was not without its challenges.

The company's compaction application specialist Fredrik Åkesson says, "Vibration is a known enemy of finely-tuned electronics. A machine like a mini excavator or a skid steer loader will experience a degree of vibration. But on a tandem roller like the CC900 e, vibration is its very purpose.

"We use electro-hydraulics to deliver the vibratory motion required to compact the material. This allows us to isolate most of the vibration from the electric motors."

At the same time, there are benefits to using electric equipment that perhaps go beyond the obvious. Åkesson says, "Even though a double-drum vibratory roller in this class does a full working day, that doesn't mean it is continually compacting. This type of roller is often left idling while asphalt is raked into position. The machine may then travel on to the next pothole repair where it may stand idle again. On a diesel-fuelled machine, that is wasted energy, wasted money and it carries a significant environmental impact."

A MODULAR FUTURE

Another company that is no stranger to electric equipment is Wacker Neuson, which first put its battery-powered construction equipment on the market in 2015, and has steadily built its portfolio to include compaction equipment such as vibration plates as well as excavators, dumpers and wheeled loaders.

The company says reductions of up to 93% in CO_2 emissions can be made through the use of these electric machines, compared with a conventional model of the same class.

Impressive noise reductions of around 20 decibels also mean inner-city night construction can be undertaken.

Most recently Wacker Neuson introduced its zero tail-swing excavator EZ17e. with an >

Batteries on the charge… a Wacker Neuson DW15e dumper operates in a town centre with the new EZ17e excavator

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Volvo Construction Equipment

Looking to the future

Following in the modular footsteps of companies like Wacker Neuson, Weber MT is launching a range of five battery-powered compaction machines, powered by an interchangeable battery.

The company specialises in rammers, small rollers and vibratory plates, and the new range of electric machines will be powered by batteries and motors developed by Honda.

Unfortunately, Weber's step into electric has been set back somewhat by the ongoing global supply chain problems.

Honda is not currently able to supply the battery/motor combinations in sufficient qualities for the product line to roll-out, so potential customers will have to wait until the second quarter of 2022 to see the full range.

As a taste of things to come from Weber MT, however, the image shows the model CR 2 DC, which the company says is the first reversible soil compactor of its type on the market.

integrated lithium-ion battery, the machine can operate plugged or unplugged, charging at power sources from 100 to 415 volts.

The company says the excavator can operate unplugged for an entire working day, with no loss of performance, compared with a diesel-powered equivalent machine.

For compaction work in sensitive environments, Wacker Neuson offers three battery-powered vibratory rammers and six vibratory plates.

The basis for all models is a lithium-ion rechargeable battery, designed to be rugged. The modular battery can be used on all compaction machines and can simply be swapped between them.

As well as the motor being maintenance-free, all typical maintenance requirements on conventional vibratory rammers, such as on the carburettor, do not occur with the battery-powered rammer.

Alexander Greschner, sales director of the Wacker Neuson Group, is in no doubt that electrification of equipment is the way forward, when it comes to urban environments. He says, "We can offer our customers an electric alternative for a variety of applications, meaning that the emission-free construction site in the inner city is today already a reality. We took this step as one of the first in the industry, and the increasing demand confirms that we should pursue this further and expand the range."

Bobcat has moved into the light Compaction segment for the first time, in collaboration with the Ammann Group

LOW EMISSION ZONES

It should be said that not all European countries are ready to roll out low emission zones. Furthermore, few contractors are in a position to sell off perfectly good diesel machines and pay hefty upfront costs to replace them with electric models.

Moreover, modern diesel engines run extremely clean, and even engine manufacturers working hard to develop alternative power are quick to admit that diesel still has a healthy future.

Earlier this year, Bobcat confirmed the rollout of its new Next is Now light compaction range for soil and asphalt, launched in collaboration with Swiss mechanical engineering company Ammann.

The Next is Now range – a new entry into the compaction product category for Bobcat – will ultimately comprise 37 models, from vibratory rammers weighing 29kg, up to 2.6 tonne tandem rollers.

The company has launched vibratory rammers and plates, as well as hydrostatic plates, designed for heavier compaction work in civil engineering and road construction.

The rammers line-up comprises six models – the R30, R60, R68, R60P, R68P and R70D – ranging from 29kg to 89kg, and useful for road maintenance due to their compactness and ease of transport.

Bobcat's new walk-behind rollers are primarily designed to compact bituminous material. The WR65 model, available in two versions with a choice between Hatz or Yanmar engines, is equipped with dual drums for maximum compaction.

Cat's new stage V-compliant CB2.7GC tandem roller promises optimum uptime and simplicity of use for operators

SIMPLICITY IS KEY

Cat recently upgraded its compaction offering with the introduction of three new tandem and combination utility compactors, promising increased productivity, combined with simple operation and easy maintenance.

The CB2.5 GC, CB2.7 GC and CC2.7 GC rollers, all in the 2 to 3 tonne class, are designed for applications including car parks, urban streets and small construction sites and each is powered by an engine that meets Stage V emission standards without the need for aftertreatment, lowering service costs.

Advanced hydraulics and exclusive power management software help deliver equivalent performance with the smaller engine. Their new auto idle shutdown feature helps to conserve fuel and machine hours.

Cat says operator controls feature simple rocker switches and what an easy-to-read display.

Compaction widths range from 1,000mm to 1,300mm, with drum diameters of 720mm and 14mm drum shells adding to the compactive effort.

A simple rocker switch controls vibration frequencies, with an auto vibration control, which ceases vibration when the travel lever is in neutral.

Another upgrade feature of the GC range is a water tank gauge and improved nozzles on the spray bars, which improve water coverage on the drum to prevent material pick-up.

Standard on-board technology includes ProductLink, which captures operating data to boost fleet management efficiency. An optional extra is Remote Troubleshoot, which analyses real-time machine data, potentially avoiding service trips to site and unnecessary downtime. ce

KOMATSU

Creating value **together**

Komatsu PW180-11

On big or small job sites, for digging, trenching, landscaping or site preparation, the Komatsu PW180-11 can efficiently carry out any task your business requires. Productivity is further boosted by options and a range of innovative features, such as the Komatsu Integrated Attachment Control (KIAC) or the new trailer hitches. A premium seat and an adjustable steering joystick offer top-of-the line operator comfort.

komatsu.eu

Breaking new ground

With spending on infrastructure set to result in more major tunnelling projects right across Europe, Leila Steed **reports on the industry's latest (not) boring projects**

Personnel from Kolin Construction and Robbins celebrate the breakthrough of a Crossover XRE TBM after it completed Turkey's Esme-Salihli Railway Tunnel

Of all the activities encompassed within the construction sector, tunnelling is known for being among the most technically complex, expensive and dangerous of undertakings.

While the demands and challenges inherent in the sector means the actual building of tunnels is a notoriously slow process – as evidenced by the daily progress of tunnel boring machines (TBMs) usually measured in feet and inches rather than metres – the most recent tunnelling projects across Europe are breaking new ground in more ways than one.

RAISEBORING

Take Master Drilling Europe's (formerly known as Bergteamet Raiseboring Europe) recent work on the West Link infrastructure project in Gothenburg, Sweden, for example.

Also known as "Västlänken", the project includes the construction of a 6km long underground railway tunnel and three new train stations, which upon completion will connect commuter routes throughout the city.

Joakim Furtenback, Managing Director at Master Drilling Europe

In October of this year, Master Drilling completed the excavation of a 66m long vertical tunnel for the city's new Haga Station, using the raiseboring method – an unusual choice of method given that the shaft measured 6.6m in diameter.

"Here is the thing, this shaft is actually very big. Traditionally raiseboring is not done so big," says Joakim Furtenback, General Manager at Master Drilling Europe.

While raiseboring has been used in the mining sector for a long time; to create tunnels typically measuring between 2m and 4m, it is rare for the method to be used for urban infrastructure projects – and even rarer for the construction of such a large tunnel.

The process saw the company install a raiseboring drill rig on a concrete pad at surface level. With the rig surrounded by fences equipped with soundproofing, Master Drilling began by drilling a pilot hole down from the surface into a newly excavated tunnel below.

Once the pilot bit had penetrated the >

The Robbins Crossover TBM set multiple records which have made it the fastest machine over 13m in diameter

Sea tunnels

The proposed Stad Ship Tunnel in Norway

While projects like the Brenner Base Tunnel, HS2 and the Ankara-İzmir tunnel aim to improve Europe's railways, the proposed Stad Ship Tunnel at the western tip of Norway intends to help ships navigate the most exposed stretch of sea on the country's coast.

After years of debating the possibility of a tunnel through the mountains of the Stad peninsula the Norwegian government has now provisionally allocated NOK2.7 billion (€265 million) towards a tunnel project based on a revised plan put forward by the Norwegian Coastal Administration (NCA) in 2017, CE's Mike Hayes reports.

The proposed tunnel will measure 1.7km long, 37m high and 26.5m wide – large enough to be safely navigated by ships the size of a coastal steamer.

The cross-sectional area of the tunnel will be 1,661m^2, and the total volume of rock expected to be removed is approximately 3 million m^3 – equivalent to some 8 million tonnes of blasted rock.

Construction of the tunnel is likely to be undertaken using conventional blasting methods, utilising underground drilling rigs and pallet rigs.

roof of the tunnel below, the company then removed the pilot bit from the rig and connected a 6.6m diameter, 44.2 tonne reamer head equipped with cutters.

With the reamer head pushed up against the ceiling of the tunnel and, using a rotating motion, it carved out the tunnel as the rig pulled it up through the ground to the surface.

"All the debris will just fall down by gravity between the wings so it will come down to the bottom of the tunnel and all the loading will be done at the bottom of the tunnel," explains Joakim.

"It's quite impressive actually. It's a lot of tonnes – just the weight of the reamer and the weight of the rods, and then on top of that the pressure you need to apply to the rock… It's hundreds of tonnes of force."

Joakim says, "A lot of people have seen this in the infrastructure business – I mean contractors around the world are asking us 'why did you use this method? Why did you not use the conventional drill and blast - or use excavators with rock breakers?'

The simple answer is that the raiseboring method offered several advantages over other tunnelling methods.

"Typically the shafts that are being developed at stations like this on construction job sites are, most of the time, top-down demolitions of the shaft, using excavating or even using explosives sometimes," says Joakim.

"But in the city centres the noise level – also the cracks that you get in the building and the rock when you do blasting is not the preferred method. And also you have dust, vibrations…all those things."

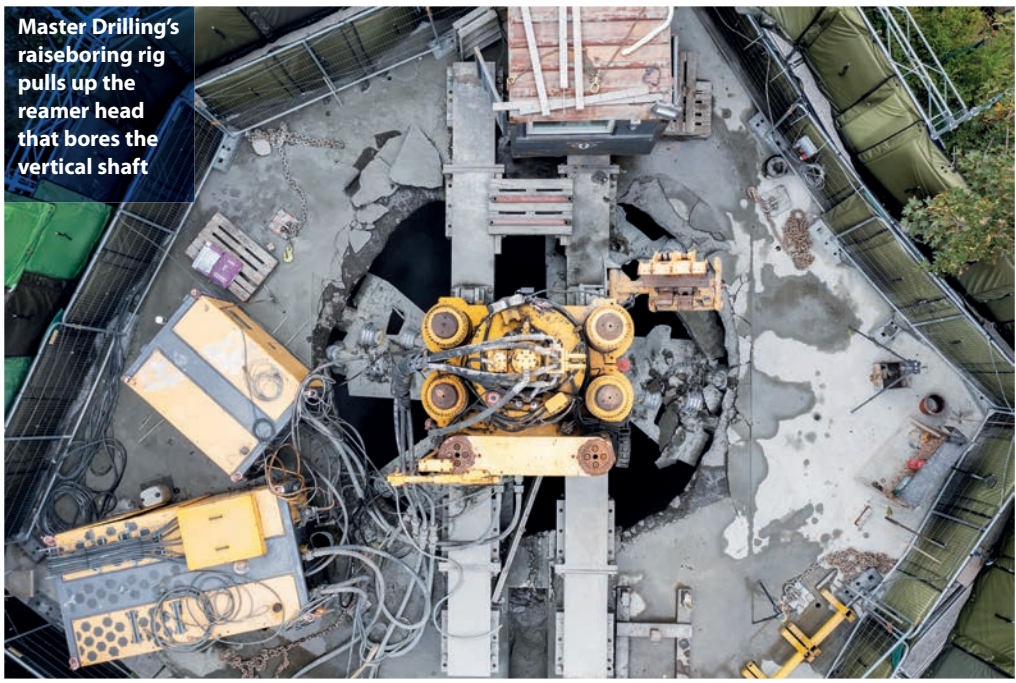
With the construction site being located less than 75m from a number of apartment blocks and less than 100m from a nursery school, the raiseboring method enabled the company to excavate the tunnel without any noise or percussion.

Joakim says, "When you start the piloting, as soon as the pilot bit is maybe one or two metres underground then there is just rotating and water."

"There is no percussion. So there is basically no noise level and the machine itself operates from electricity on the surface.

"And even when you start from the bottom with the reamer, you start at 70m deep and you pull the reamer up to the top, so again there is no vibration and no noise at all from this method, which is a great advantage in city centres."

The 66m long vertical tunnel was completed in less than three months, and while Master Drilling was not looking to break any speed



Master Drilling's raiseboring rig pulls up the reamer head that bores the vertical shaft

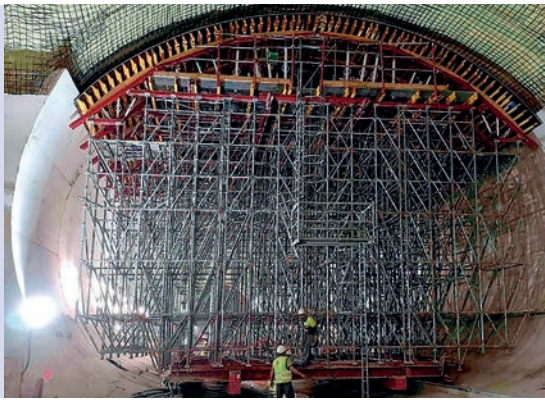
©MASTER DRILLING/KASPER DUDZIK

Tunnel formwork on a grand scale

When it came to the construction of the Benta Berri Metro Station for the Lugaritz-Miraconcha section of the new San Sebastian Subway in Spain, contractors chose to use a method of stabilisation normally used in mining. The new Benta Berri Metro Station in the city of Donostia-San Sebastian, which is located on Spain's north-eastern most coast near the Andorran border, comprises a cavern station with two lateral platforms situated 25m underground.

Due to the oval-shaped cavern's dimensions, which come in at 16m wide by 12m tall with a total volume of 14,500m^3, its construction required the used of 3,200m^2 of formwork.

To enable the onsite technicians to pour the concrete for the cavern, which had to be carried out in three separate stages – for the inverted vault, side walls and vault, global formwork pecialist Alsina was contracted to



Master Drilling's 44.2 tonne reamer head is equipped with cutters and pulled up by the raiseboring rig, situated above ground

©MASTER DRILLING/TOMMY HVITFELDT

important reason for achieving fast advance rates is that we have an experienced and qualified team.

"Such a team allows us to anticipate the malfunctions and to go to the solution in a very short time.

"In addition, all necessary maintenance is carried out on time, and the appropriate consumables are selected to increase the performance," Kansu adds.

BRENNER BASE TUNNEL

Similarly, Italian construction giant Webuild also recently celebrated the breakthrough of one its TBMs working on the 65km Brenner Base Tunnel, which is currently under construction beneath the Eastern Alps of the Brenner Pass between Fortezza in Italy and >

records, others in Europe have.

TUNNEL BORING

Take the TBM deployed on the 3.05km long Esme-Salihli Railway Tunnel in Turkey for example.

Manufactured by US-based specialist Robbins, the 13.7m diameter Crossover XRE TBM recently set new records for the most amount of tunnel bored in a single day, week and month.

It excavated distances of 32.4m on its best day, 178.2m over the course of its best week and achieved a best month distance of 721.8m, beating the records it had previously set in May and June.

Designed to work in ground that comprises a mixture of hard rock, soft soils and boulders, Robbins says the machine's large diameter enables both a screw conveyor and belt conveyor to remain in place.

This allows it to operate in different modes according to the ground type and to quickly change between modes.

The excavation of the Esme-Salihli Railway Tunnel, which forms part of the new 508km long Ankara-İzmir High Speed Railway being built by Turkish State Railways on the country' west coast, began in March 2021.

It saw the Crossover XRE TBM bore through sandstone, gravelstone, claystone, quartz and siltstone, before breaking through its end point just last month.

While this has led the TBM to be dubbed the fastest in the world for this diameter class, Onur Kansu, TBM manager for project contractor Kolin Construction, says, "The most

provide a formwork system commonally used in mining.

Alsina provided a combination of products for the works, including its Multiform, Circular One-sided Wall, and high-bearing-capacity scaffolding.

To enable workers to build the arch of the inverted vault, Alsina supplied "climbing equipment that could adapt to any position with circular formwork". This allowed 30m^2 sections of concrete to be poured each day.

It took Sweden-based Bergteamet Raiseboring Europe 48 days to bore the 6.6m diameter shaft

©BERGTEAMET RAISEBORING/KASPER DUDZIK

Innsbruck in Austria.

The TBM, which was built by German manufacturer Herrenknecht and is named Serena, completed the excavation of a 14km exploratory tunnel on the Italian side of the Brenner Base Tunnel.

It took the double shield machine three and a half years to complete the task, which represents just over 80% of Webuild's excavation work on Lot Mules 2-3.

Adding to its work on the project, last month Webuild and its Swiss subsidiary CSC also won the contract for Lot H41 Gola del Sill-Pfons on the Brenner Base Tunnel.

Valued at €651 million, the contract is for a section of railway tunnel on the Austrian side of the Alps. The works will see the construction of two 7.3km long parallel tunnels – including auxiliary tunnels – using traditional methods, as well as the excavation of another 16.5km tunnel using TBMs.

Webuild and SCS will use two TMBs with diameters of over 10m to carry out the works, which include the lining of the completed tunnels, the construction of access tunnels, exploratory tunnels and the building of an underground emergency stop at Innsbruck.

Prior to this latest contract award, the Italian construction and engineering group also secured a €1.07 billion contract to build the 22.5km railway line extending from the southern end of the Brenner Base Tunnel.

Commissioned by the Italian railway infrastructure management company Rete Ferroviaria Italiana, Webuild will be responsible for the design and construction of the line between Fortezza and Ponte Gardena on the Italian side of the Alps.

Taking place predominantly underground, the project will include not only the track, but also a number of underground interconnections and additional works at Ponte Gardena.

Likewise, another major infrastructure project in Europe is also speeding ahead.

HS2 UPDATE: TMB LAUNCH

Just a few weeks ago, a 2,000-tonne tunnelling boring machine named Dorothy was launched in the West Midlands region, as part of works to build the new High Speed 2 (HS2) railway in the UK.

The 125-metre-long machine, which was built and assembled by 170 engineers, set off from the north portal of the under-construction Chiltern Tunnel in Warwickshire. It is the first TBM to be launched on the Midlands section of HS2.

Named after Dorothy Hodgkin - the first British woman to win a Nobel Prize for Chemistry – the TBM will excavate a one-mile twin bore tunnel that runs under Long Itchington Wood.

Dubbed the Long Itchington Wood Tunnel, its construction will preserve an ancient woodland aboveground, which is classified as a Site of Special Scientific Interest and is home to a complex ecosystem that has evolved over centuries.

HS2 says the final section will form a 'green tunnel' - also known as a cut and cover tunnel - where a roof above will return the land to the natural landscape.

"This is yet another vital landmark in our journey towards a better connected Britain and with the launching of Dorothy today in Warwickshire, shows real progress in helping transform journeys across our country," says Andrew Stephenson, Department for Transport Minister of State for HS2.

TBM Serena has now completed her three and a half year bore on the Brenner Base Tunnel

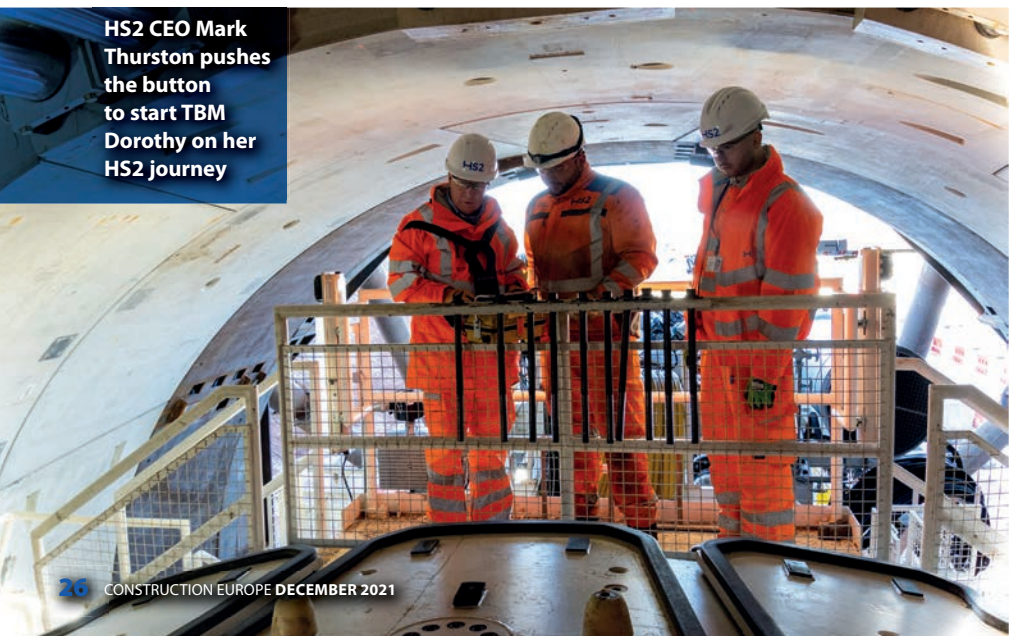
Dorothy will be in continuous operation for the next five months and, manned by an "expert tunnelling team" working 24 hours a day in two shifts, she will remove a total of 250,000 cubic metres of mudstone and soil.

The TBM, which was built by Herrenknecht, is currently scheduled to break through the Chiltern Tunnel's south portal next spring.

After completing the first bore, Dorothy will be disassembled and taken back to her launch site by road, where she will then be reassembled before setting off on the second bore for the twin-tunnel, which is due to be completed in early 2023.

Dorothy is not the first TBM to be launched for the high speed railway project, but with just 1 mile of tunnel to excavate beneath England's soils, she will be the first to complete her bore.

Her launch comes seven months after that of 'Florence' - the largest TBM ever used on a UK rail project - and six months after the launch of Florence's twin sister machine, Cecilia.



HS2 CEO Mark Thurston pushes the button to start TBM Dorothy on her HS2 journey

While European tunnelling projects like HS2 will be ongoing for a number a years, increased infrastructure spending by governments to stimulate economic growth in the face of Covid-19 – not to mention the growing need for mass transit systems that can help Europe meet net zero carbon emissions - means the tunnelling sector will likely grow over the next few years. ce

Tunnel lining

Italian company William Mosconi is currently using a Magni telehandler to carry out waterproofing works to the underwater section of the 55km long Brenner Base Tunnel. The demolition and waterproofing specialist was contracted by Webuild to hermetically isolate the tunnel section, which runs under the Isarco river, using waterproof PVC membranes to prevent water seepages.

William Mosconi, technical director of William Mosconi, says, "This work must be performed at height and once the ribs supporting the vault have been installed. After taking into account different players of the lifting sector, Mosconi decided to entrust Magni with this special project."

The company selected Magni's twin energy RTH 5.21 SH model for the project, which will see parts of the ground beneath the river frozen to allow construction of the tunnel. The telehandler, with an electric mode for operation in environments with poor ventilation, was connected to an external electricity supply.

The telescopic model is fitted with a 15kW electric motor and a 90-litre piston pump, and has a maximum lifting height of 21m and an outreach of 15.5m.

Equipped with two platforms, Mosconi says using the telehandler allows workers to safely reach the height of the vault to install the PVC sheaths.

An overview of Nikola Tesla Airport in Belgrade, Serbia, showing the proposed extension to the terminal and new boarding bridges

Taking on an airport project is daunting enough without Covid measures and sustainability being thrown into the mix

Flights of

As the Omicron variant of Covid threatens to set back air travel once more, it's certainly an anxious time for companies with airport construction projects on their books.

It's also a difficult time for airport owners to consider multi-million or multi-billion-euro builds or expansions. Yet there are still a good number of high-profile projects going ahead.

INNOVATIVE EXPANSION

In Serbia, the government announced plans this year to develop not one but two new international airports to bolster the existing Nikola Tesla Airport in the capital, Belgrade.

One of the airports will be located near Dobanovci, approximately 10km west of Nikola Tesla Airport.

This airport will have an area of about 1,100ha, with three runways, two passenger terminals and two freight terminals.

The second new airport, Novi Sad, will cover an area of approximately 300 hectares and be located some 15km southeast of the capital, with rail services nearby to offer freight and multimodal opportunities.

As these projects move ahead, so the Nikola Tesla Airport will expand, potentially to its fullest extent, given space restrictions.

Vinci Airports, which operates the airport, says it will complete modernisation works within three years.

With works including a 40,000m^2 extension of the passenger terminal, 11 new boarding bridges and gates, plus the construction of a new runway, the ultimate goal is to create a new airport hub in South-East Europe.

Vinci says the ongoing work will enable a total capacity of 10 million annual passengers by 2023 and 15 million by 2043. Alongside this, the company aims to improve the airport's environmental performance, with the construction of a 1MW solar park, a wastewater treatment plant and a new natural gas power plant to replace heavy fuel-oil.

With air travel still significantly down on pre-Covid levels, it would be easy for companies like Vinci to put major projects such as this on hold. Yet, Nicolas Notebaert, CEO of Vinci Concessions and President of Vinci Airports, prefers to take a more optimistic and long-term view of the situation.

He says, "As Europe prepares for the recovery of tourism, creating a smart and sustainable new airport hub in Belgrade will support Serbia's perspectives ahead."

FROM TEAMWORK TO TAKE-OFF

This summer, with Covid still a huge problem for the UK aviation industry, a major extension to Terminal Two of the country's Manchester Airport was completed, four years after breaking ground.

The £1 billion (€1.17 billion) project – the largest taking place in the north of the country – involved more than 140 businesses and contractors, including the main construction partner Laing O'Rourke, airfield works contractor Galliford Try, architects Pascall+Watson, and programme management and design consultancies Arcadis and Jacobs.

More than 8,000 tonnes of steel went into the structure of the extended terminal, which now has an area of 81,000m^2.

Beyond the terminal extension, Laing O'Rourke's scope of work included the construction of a new aircraft pier, a multi-storey car park, baggage hall and associated external works.

Gareth Jacques of Laing O'Rourke, said,

An impression of T5 at the long-delayed Brandenburg Berlin Airport in Germany

The impressive interior of Manchester Airport's newly-extended terminal, built at a cost of almost €1 million per day over the course of the four-year project

fancy

"We're delighted to see the new Terminal Two open at Manchester Airport. Laing O'Rourke is proud to have played a role in its construction and created a world-class piece of infrastructure that will bring significant economic benefit to the North."

Jacques added, "Constructing a high-quality, modern airport for 30 million passengers required detailed planning so close collaboration with our supply chain and design partners was key. By harnessing our experience of digital engineering, modern methods of construction and creating an effective work environment with our engaged workforce, we were able to deliver the programme on time and within budget."

Manchester Airport's MD Karen Smart said, "More than 1,500 jobs have been created, including 150 apprenticeships, and tens of millions of pounds have been spent in the regional supply chain. We are also immensely proud to be created an AeroZone education facility as part of the project, which will inspire young people for years to come about a career in aviation."

A TURBULENT JOURNEY

It's worth noting that not all airport projects run as smoothly as those so far mentioned…

These projects are by necessity large and complex and can easily run behind schedule and over budget. Things went to the extreme, however, in the case of the Berlin Brandenburg Airport, which opened at the end of last year – 10 years behind schedule.

The initial proposal to build a new airport in the German capital came soon after the country's reunification in 1991, with a decision made on the location in 1996.

Schönefeld, south of Berlin, was selected, even though it had already flagged as an unsuitable location for an airport required to host up to 30 million passengers a year.

The project moved ahead with a ground-breaking ceremony in September 2006 and an estimated opening date of October 2011.

Even at this stage, however, the 260,000m^2 gross floor area terminal had been flagged by industry insiders as too small to meet the passenger demand. Project managers called for more work on the masterplan, but contractors were instead offered bonuses for upping the pace of construction.

Finally, a decision was taken to extend the south and main piers and add a mezzanine floor to increase capacity by 12 million passengers, up to 27 million a year.

As the original opening date approached, word leaked out about building and security technology issues, as well as flaws in the fire protection measures.

Problems continued through to 2012, when it was revealed that construction was still less than 60% completed and was riddled with some 120,000 defects, including major fire safety and structural issues. Perhaps most worryingly, 170,000km of installed cable was found to be defective.

From this point on, the project's completion date was regularly pushed back, with project leads coming and going on a regular basis.

Early in 2016, the developers decided a second terminal was required, and, in the same year, a 1,000-page report was published detailing errors made during the past decade of construction.

The current bill for the ongoing airport project stands at €7 billion. A further €2.3bn could be required for the terminal in 2030. >

Airport expansion goes green – literally

As part of its expansion programme, Schiphol Airport in Amsterdam is utilising construction materials made from grass.

Within the scope of the work will be the construction of a new pier and terminal, which will include operational and commercial spaces.

Many of these spaces will include ceilings, walls, furniture and flooring built using panels made from compressed grass cuttings from the airport itself.

The company producing the panels is ECOR, which has been tasked with providing some 100,000m^2 of them each year.

Promoting sustainable construction, the company has stated that the grass, cut from the 10km$_2$ of grassland around Schiphol's runways, will be cleaned and pressed without the use of chemicals. In this way, with the grass maintaining its solid form, the CO_2 stored within it will remain captured.

The airport, which has been developing its plan with ECOR for some years, has stated that the panels are "certified, fire-resistant and have the same level of quality as the well-known MDF panels".

The panels will initially be produced at ECOR's manufacturing facility in Venlo in the Netherlands, but the airport said it hopes to relocate production to a site "at or near Schiphol" in the future.

Back to the drawing board…Charles de Gaulle Airport in Paris will not be extended until a more sustainable plan can be agreed

BETTER BY DESIGN

A happier story is playing out in Vantaa, Finland, where Helsinki Airport's €1 billion terminal expansion and infrastructure project has been ongoing since 2014.

This month, the extended terminal 2 will open and, where the deadlines of the Berlin project were constantly pushed back, Helsinki's work has stayed largely on track and on budget.

The project, undertaken by operator Finavia, included increasing the area of the terminal by 45% or 103,000m^2, giving the new-look terminal an area of 250,000m^2.

Beyond this, the number of bridge gates was to double from 8 to 16, with a 50% increase in baggage handling and passport control capacity.

Environmental values and decarbonisation were at the heart of the planning, with the terminal 30% more energy-efficient than officially required.

Energy savings have been achieved through the good thermal insulation of the building envelope and efficient heat recovery. Smart lighting dims and turns off depending on how much natural light enters through the terminal's windows. And in the new P1 Premium/P2 parking garage, vehicles are charged with solar power.

As well as a stunning roof, finished in Finnish spruce, the building possesses impressive green credentials, covered with solar panels.

Earlier this year, the airport's development programme won Project of the Year in a competition held by Project Professionals Finland. The project's director Martti Nurminen said, "The first three phases of the development programme have now been successfully completed, and it is gratifying to receive recognition from professionals in the project sector."

One of the aspects of the project that most impressed the judges was the way work proceeded within an operating airport. They noted the fact that the passenger experience remained at a high level, even as construction work was carried out.

The coronavirus pandemic did hamper construction during 2020, with the opening of the new building rescheduled to the end of this year, but the result of the work has been generally praised, both for its aesthetic properties and the efficiency of the build.

Henri Hansson, senior VP for technology and sustainability at Finavia, said, "The terminal, its facilities and services have been designed as a new business card for Finland. For many, Helsinki Airport is their first contact with our country. Terminal 2 is mostly Finnish high-quality work of which we can be proud."

An impression of the stunning new roof, made with Finnish spruce, extending from the entrance to Helsinki Airport's Terminal 2 building

FLYING THE GREEN FLAG

While there is general acknowledgement of a pent-up demand for the wholesale resumption of air flight, there is also an understanding that things will – and should – never be the same again.

Between passenger and freight flights, aviation is responsible for some 2.5% of all CO_2 emissions. And this figure is unlikely to be reduced by airport expansion projects.

There is a clear need for the industry to tackle its less than spotless emissions record.

In France, following a court's ruling that the state had failed to take sufficient measures to halt climate change, the government cancelled plans to extend Charles de Gaulle Airport in Paris with a new terminal, boosting its capacity by 40 million passengers a year.

Barbara Pompili, France's environment minister, told Le Monde newspaper that boosting the airport's capacity was not in keeping with efforts to fight global warming.

She said the government had asked airport operator ADP – in which it owns a majority stake – to scrap the current project "and present a new one, more consistent with its objectives concerning climate change and the protection of the environment.

"We will always need planes," she said, "but we must move towards a more reasonable use of air travel and reach a reduction in the sector's greenhouse gas emissions." ce

Ferrovial reveals Vertiport plans

Ferrovial Airports has announced plans to deploy a network of more than 25 vertiports across the UK. The initiative is another step in the company's bid to develop infrastructure for safe, high-speed, zero-carbon aviation. To develop the design and engineering components of the vertiport infrastructure, Ferrovial has partnered with international architecture practice Grimshaw and engineering, management and development consultancy Mott MacDonald. It follows the recently announced agreement to develop a network of more than 10 vertiports in Florida, US. Vertiports are designed to provide infrastructure for the landing, recharging, and taking off of all-electric, vertical take-off and landing (eVTOL) aircraft, such as those being developed by Lilium and Vertical Aerospace. They are integrated into communities and adapted to the surrounding environment, reducing noise impact and improving energy efficiency through innovative design.

Kevin Cox, CEO Ferrovial Airports' vertiports business, said, "The partnership between vertiports and eVTOLs will provide high speed, affordable, emissions-free travel to millions of people."

FAGIOLI

SINCE 1955

Transport and Installation of sections (up to 12,000 ton) of the new 3.5 km long Storstrøm bridge in Denmark, by means of a tailor-made Fagioli catamaran

Transport, lifting and Installation of a 2,000 ton bridge in Italy by means of 500 ton jack-up system, strand jacks and SPMTs

ENGINEERING AND EQUIPMENT ARE THE SOLUTION TO ALL YOUR HEAVY TRANSPORT & LIFTING NEEDS FOR THE CIVIL INDUSTRY: BRIDGES - BUILDINGS - STADIUM - TUNNELS

Tower lift & Strand Jacks - SPMTs - Jack up System - Crawler Cranes - Gantry Lifting Systems - Skid & Elevator System

S. GIORGIO BRIDGE - ITALY

Installation of sections weighing up to 2,000 ton

INTEL BUILDING - INDIA

Installation of 10 complete Floor Slabs : Strand Jacks

TOTTENHAM STADIUM

216 Strand Jacks working simultaneously

TBM

416 ton: Transport, Lowering and Installation

Getting behind

It may be a niche product within the construction industry, but the latest wheeled excavators on the market are certainly going fast. CE reports

The great advantage of wheeled excavators is their mobility and high travel speed, which can be 35 km/h or more. This is helpful in getting around large sites quickly and driving between different sites on public roads, without the extra cost and inconvenience of loading the excavator onto a trailer. This of course only applies in countries where it is legal to drive wheeled excavators on public roads.

This speed and agility, of course, comes with higher ground pressures than a crawler track, meaning wheeled excavators lack the off-road capabilities of crawler machines.

In Europe, as in the rest of the world, wheeled excavators are a niche product.

According to specialist research company, Off-Highway Research, the market in Europe stood at a little over 10,000 machines per year by the end of the 2010s. Of course, that number fell in 2020, but there was a good rebound in 2021, and sales look set to regain their former levels.

Within Europe, the appreciation of wheeled excavators is patchy. They are most popular in Germany, which accounts for some 40% of European demand, while France represents about 20% of the European total. The machines are also relatively popular in certain other countries, including the Netherlands, Norway and Sweden.

THE GERMAN CONNECTION

Many of the manufacturers that developed and popularised wheeled excavators were German, so German equipment users have a long-standing affinity with them.

A German manufacturer with a long history of producing these versatile machines is Wacker Neuson, which launched its EW65 and EW100 wheeled excavators last year.

One of the nice features of these machines is that operators can dig close to the machines, meaning a reduced requirement for repositioning. Furthermore, both machines are ideal for work in confined spaces, or along roadways.

On both models, the bucket's teeth can dig beneath the front-mounted blade, before extending forward to load the collected earth into a truck, with no need for repositioning.

Where triple booms are more usually seen on larger excavators, the configuration comes as standard on the 6.5 tonne EW65 and 10 tonne EW100 machines.

When not digging, both machines have a maximum travel speed of 30km/h, and other improvements over predecessor models include the potential for 15% more power, 30% more tractive force and a reduction of up to 20% in fuel consumption.

Wacker Neuson also increased the digging area of the machines by 20 and 25% respectively.

The Doosan DX160W-7 wheeled excavator weighs 17 t and is equipped with a 6-cylinder Doosan DL06 Stage V engine

NEXT GEN DIGGING

In July, Doosan Infracore Europe launched its new Stage V compliant DX140W-7 and DX160W-7 wheeled excavators, as part of its new generation of construction equipment.

Designed to provide improved uptime and return on investment, the new Series-7 models are said to provide "significantly higher performance in every area" than Doosan's previous generation machines.

Both machines offer four power modes and are fitted with Stage V compliant 6-cylinder Doosan DL06 engine, which provides 102 kW (137 hp) at 2000 rpm.

Doosan Infracore Europe, which recently appointed a new CEO, said: "In the new wheeled excavators, the enhanced fuel efficiency of the DL06 engine in combination with a new hydraulic main valve and the new generation SPC3 Smart Power Controls, provides increased fuel saving compared to the previous generation machines."

While the smaller DX140W-7 has an operating weight of 16.5 tonnes, the DX160W-7 weighs 17 tonnes.

Both excavators provide a maximum digging depth of 5025 mm and an over arm digging force of 10 tonnes.

The triple boom on Wacker Neuson's EW100 makes it possible for the bucket to dig beneath the machine itself

the wheeled

As well as the EWR150E (pictured), Volvo CE has launched a 130 and 170 version of the short swing wheeled excavator

JCB's PotholePro, a specialist road mending machine based on its Hydradig wheeled excavator

They are also fitted with "enhanced" operator cabs, which include a 30% larger touchscreen and a new seat for greater comfort.

Standard features of both models include the manufacturer's factory installed DoosanCONNECT telematics system, and a new Auto Digging Brake function on the control panel.

When enabled, the excavator's service brake is automatically held in position when the machine stops, "without the driver having to step on the brake pedal".

"Another standard new feature is the Fine Swing function which minimizes the shaking that a lifted object undergoes at the start or stop of a swing movement with the excavator," said Doosan.

NO SWING IN THE TAIL

Volvo CE says its EWR150E wheeled excavator bridges the gap between 14 and 16 tonne machines, with strong lifting and digging performance combined with one of the shortest tail swings in its class 1720mm), giving it the ability to work in narrow and confined spaces.

At 1,720mm, the excavator can operate efficiently in narrow single lane roads.

The machine boasts an improved load-sensing hydraulic system, which Volvo says allows maximum utilisation of available engine power, increasing controllability and responsiveness.

A Stage IV V Volvo engine with V-ACT technology provides high torque at low engine speeds to lower fuel consumption, while the intelligent ECO mode lowers emissions levels, reducing environmental impact.

From a safety perspective, Volvo has introduced rear and side view cameras as standard on the machine. Alternatively, customers can select Volvo Smart View, which offers a birds-eye view of the machine in real-time, as well as enhanced visibility of all angles.

Other design innovations include a redesign of the hose routing between the boom and arm, enhancing durability and reducing the chance of damage.

From an operator's perspective, Volvo has introduced Comfort Drive Control, allowing the machine to be controlled using the roller on the joystick for travel speeds of up to 20 km/h.

NICHE AND EASY

A demonstration of how versatile wheeled excavators can be comes from JCB, which launched its PotholePro machine at the beginning of the year, initially to deal with the UK's estimated €12 billion pothole crisis.

Based on the company's Hydradig wheeled excavator (with adaptations including enhanced hydraulics), the PotholePro has three primary attachments: a planer, fitted with an integrated dust suppression unit; a 600mm hydraulic cropper tool; and a 1.2m-wide sweeper and bucket. The latter two attachments are mounted on an X12 Steelwrist tiltrotator, which is fitted to the machine's two-piece boom.

The machine, which has an impressive maximum travel speed of 40km/h, is designed to cut down to a maximum depth of 170mm (potholes have an average depth of 40mm), before the crop tool is used to square off the edges of the damaged area. Following the cleaning and clearing of the

>

Mecalac machines on the right track

Targeting the fast-expanding global rail market, French manufacturer Mecalac is set to officially launch a new range of rail-based compact excavators, including the wheeled 156MRail and 216MRail models, early next year.

So confident is Mecalac of the success of these machines, that it has also unveiled a new division, specifically focused on the rail industry, harnessing the company's established assembly line processes to ensure it can meet demand.

The two new wheeled excavator models are based on Mecalac's MWR concept, which includes the lowering of the engine on the turret, offering enhanced visibility and a more compact machine.

The company says the cab on the new excavators is also 20% lower than on rival machines, making it easier and safter to enter and exit the machines.

Both wheeled excavators feature a patented boom, boasting improved weight distribution and the promise of best-in-class weight distribution, benefiting lifting performance.

With 360-degree direct visibility and ground-level maintenance, safety is also significantly improved.

hole, the machine moves on, with a second team tarring and compacting the area.

After a year of field-testing by specialist contractors working for the UK's Stoke-on-Trent council, JCB reported that the machine is capable of preparing up to 250m2 of roadway in a single shift, which, according to the council, equates to a productivity increase of around 700%.

When the PotholePro was launched in January, the company said it would be rolled out across Europe at some point, but at the time of writing, the first machine had just been sold to the Stoke-on-Trent council.

COOL COMFORT

Demonstrating the enduring appeal of this niche machine, Bobcat recently launched an upgraded Stage V-compliant version of its E57W wheeled excavator.

The six tonne machine's engine produces 42.5 kW of power at 2,400 rev/min and a maximum 202Nm of torque at 1,600 rev/min (200rpm lower than for the previous model's engine).

Bobcat has made operator comfort a priority on the E57W, including a pressurised cab, with improvements made in levels of noise and vibration.

Operators will also benefit from LED lights, large side mirrors and a new demisting system.

The cab features a 178mm touchscreen display and ergonomic controls including 'low effort' joysticks, and an adjustable steering wheel.

A seat heater, cab light, sun visor and side mirror are all standard equipment.

Maintenance of the machine has also been made easier, with all service and check points accessible from ground level.

THE NEED FOR SPEED

The ability to get jobs done faster than other similarly sized machines is one of the great benefits of the wheeled excavator. Released in Europe in June of this year, Cat's M320 promises to speed things up further still, with a 9% increase in swing torque.

It also features a longer wheelbase, increasing stability – as well as improving the ride for operators racing to the next job at travel speeds of up to 35 km/h.

The new machine has seen incremental gains across the board, with, for example, an improved hydraulic system making working with a range of attachments more efficient.

Cat says this advanced hydraulic system hands operators greater machine control when the need for accuracy during applications is great. The excavator also features a heavy lift mode, giving lifting capacities a boost.

Service intervals on the M320 have been extended, reducing downtime and lower operating costs, while the machine promises savings of up to 5% in maintenance parts, due to longer-lasting filters. In fact, the filter designs are said to offer a 50% longer service life than the previous models, with the hydraulic oil filter on a 3,000-hour replacement interval.

Inside the cab, Deluxe and Premium designs are available, with all controls positioned in front of the operator. Pre-set and stored machine settings can be programmed, with operators having unique access IDs, and machine functions displayed on a large (240mm) touchscreen monitor with jog dial.

The M320 is powered by a 129.4 kW Cat C4.4 stage V-compliant engine, which is capable of running up to B20 biodiesel and has been tested to operate in a range of environments, from 50 degrees C to -18 degrees C. ce

Bobcat's E57W comes with a host of new features to increase operator comfort, including noise and vibration reductions

Cat looks to up performance levels with its M320 wheeled excavator, increasing the machine's swing torque by 9%

Danfoss and Eaton promise next-gen efficiency

Danfoss acquired Eaton's hydraulics business earlier this year, giving the company a huge boost in the range of hydraulics products it can offer construction equipment manufacturers.

It's also interesting to ponder what this could mean for owners and operators of relevant excavators.

Danfoss says it has doubled its innovation capacity, extending its use of digital design tools and subsequently its ability to develop solutions that will improve productivity and reduce emissions.

It is likely we will see more compact excavators combining the hydraulics solutions of Eaton with the power solutions of Danfoss, such as displays, joysticks, pedals and remote controllers.

This is a segment of the market that Danfoss is now entering for the first time, but the company sees it as a natural next step, given the compact size of Eaton's hydraulic ground drive motes, cartridge valves and swing motors.

Danfoss also believes its digital displacement pump technology has the potential to have a huge impact in the compact excavator market, allowing real-time control of each cylinder within the pump and featuring sensors that provide data related to outlet pressure, shaft speed and crankcase temperature. In all, says the company, a combination of Eaton's hydraulics and its new pump technology could bring overall efficiency gains of up to 30%.

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Why ESG-linked loans are impacting modern construction finances

Environment, social and governance-linked loans are fast entering the mainstream. But which construction industry companies are linking their finances to 'green' targets and why? Lucy Barnard finds out

Businesses around the world are increasingly linking their loans to targets aimed at tackling the climate crisis and promoting a fairer society.

KILOUTOU'S GREEN LOAN

Environment, social and governance (or ESG) loans are becoming more common in the construction industry too. In July, French construction equipment rental giant Kiloutou arranged a €10 million banking facility, linked to its performance on sustainability goals including investment in low-emissions equipment and the representation of women in its management.

In May, UK contractor Wilmott Dixon agreed a €58 million sustainability-linked loan facility coordinated by HSBC with an interest rate which varies depending on the firm hitting a series of targets based around the firm's net-zero carbon commitments.

French contractor Eiffage agreed a €2 billion five-year ESG-linked loan with a syndicate of 20 institutions in 2019. A number of other contractors, including Skanska, are also aiming to take out ESG-linked facilities when they next refinance.

Data specialist Refinitiv, calculates that ESG-linked loans issued to the construction sector in the first half of 2021 stood at US$8.1 billion, surpassing the US$6.6 billion issued by banks to the sector in 2020 and close to the US$8.5 billion issued to the sector throughout the whole of 2019.

In fact, the number of new ESG-linked loans issued by lenders to the sector increased to 25 in the first half of 2021, already surpassing the record 23 issued internationally in 2019.

"If you'd have asked me eighteen months ago, I would have said that our work in this area was occasional, focused among large, industrial corporates, and with ESG rarely being a key driver of the company's refinancing strategy or the credit market's appetite", says Marc Finer, director for debt advisory at KPMG who specialises in plant hire financing and ESG-linked finance.

"But today, nearly every conversation we have with our clients across every sector – and with all types of lenders - involves a discussion about ESG,"

Banks argue that businesses with clear ESG strategies are generally better run and less likely to default on their loans.

'SUSTAINABLE BUSINESS IS BETTER BUSINESS'

"Our starting point has always been that sustainable business is better business," says Leonie Schreve, global head of sustainable finance at ING, which has been writing ESG-linked loans since 2017.

"We see that companies with a credible sustainability strategy and strong sustainability practices have a lower credit risk. And having lower credit risk in our portfolio means we can price it differently."

Unlike "green loans" where borrowings must be used for environmental projects or investments, ESG-linked loans have no restrictions on usage. Instead, the cost of debt is usually linked to three or four specific and measurable goals, often taken from a company's own sustainability strategy. For example, Kingspan's ESG targets comprise 12 specific targets surrounding the firm's commitment to recycling and reducing energy and carbon. Under the loan agreement, if the company manages to meet these targets, the bank agrees to reduce the interest rate on the loan slightly.

"Linking financial products to the sustainability achievements of our clients is just another way we're helping them to accelerate their sustainability agenda and really step up and make the changes they need to reach a net-zero commitment," Schreve adds.

But that is only part of the story. Spurred on by Greta Thurnberg and a new generation of activists keen to take more drastic action to tackle climate change, shareholders around the world are putting pressure on banks to do more to demonstrate their commitment to saving the environment and promoting social change.

Earlier this year HSBC committed to set targets to reduce its exposure to carbon-

Greta Thunberg and other climate activists appear to be influencing construction investors

ESG-based loans had already exceeded €8 billion by the first half of 2021

intensive assets after a group of investors filed a resolution calling for the bank to curtail its financing of fossil fuels. And last year Barclays published a climate resolution plan after around a quarter of its shareholders supported a resolution requiring it to stop providing financial services to firms not aligned with the Paris climate accord.

The result is that at the moment, banks are particularly keen to sign as many ESG-linked loans as possible, meaning that companies which can secure such lending can get better terms (although the actual interest rate discount on loans usually amounts to only around 5-10 basis points).

Pressure from customers, employees and shareholders to commit to fighting climate change is also encouraging directors to sign up for something which looks like it may well soon be incorporated into the financial mainstream.

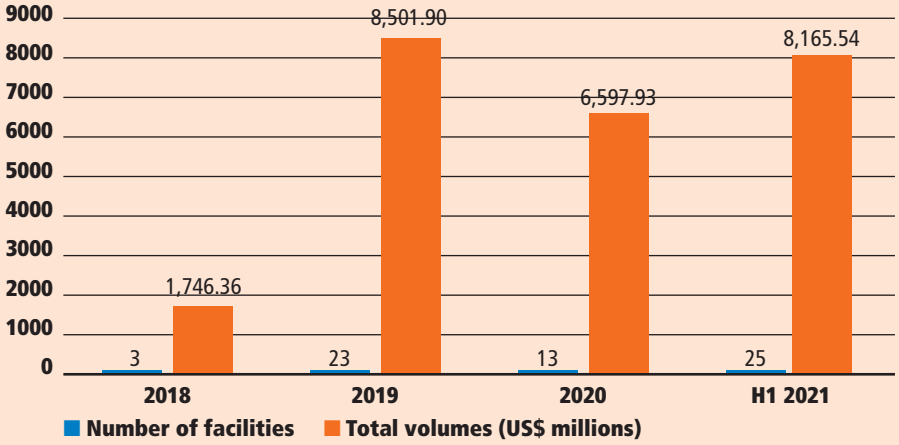
"For me, this is a business resilience issue and an access to capital issue," Finer says. "Companies are focusing on ESG not only because it's morally the right thing to do, it's because they know their business may not be resilient in the long term if they don't. Lenders are starting to prefer and target those businesses which are able to make ESG commitments. Customers, in some cases, are already preferencing products from companies that they perceive to have a better record on environmental or social issues. Employees are choosing to work for these companies and holding their employers to account on their ESG commitments."

2021 ESG-LINKED LOANS

But, without some way for banks and others to police whether or not targets have been met, critics complain that the concept runs the risk of being reduced to little more than a marketing exercise.

According to data firm Reorg, nearly two thirds of ESG-linked loans written during the first quarter of 2021 do not require a third party to verify that ESG targets have been met. And, with companies able to choose their own targets, there is a risk that they will not choose particularly stretching ones.

GREEN DEBT ISSUANCE BY YEAR



ING's Schreve agrees a lack of third party verification, but argues that it is up to the companies themselves to make sure that they take on these loans in the right spirit.

"It's critical for sustainably-linked financing structures to be ambitious and address the most urgent challenges with maximum impact," she adds. "Anything less won't contribute to the herculean task of building a sustainable economy. While 'greenwashing' is not a term we would use, there is a risk of falling standards, particularly as this type of financing becomes more mainstream."

"The credibility of the market relies on clients themselves being committed to their sustainability goals and a net-zero future," she adds. "There's always a risk that companies go for less-ambitious targets, which in turn affects the quality of the product and lessens its impact."

Moreover, to combat the perception that borrowers were being allowed "to mark their own homework," three industry associations representing bankers, law firms and underwriters in Europe, the US and Asia have revised their sustainability-linked loan principles earlier this year requiring borrowers to obtain independent external verification of their performance against the targets set.

In May a joint working group of the Loan Market Association, the Asia Pacific Loan Market Association and the Loan Syndications and Trading Association published an updated Sustainability Linked Loan Principles and accompanying guidance setting out voluntary market standards for what constitutes a sustainability-linked loan and how they should be assessed.

"The financial regulators are focusing on this area at present and looking carefully at how banks are monitoring claims to ESG credentials," says Janine Alexander, a partner at law firm Collyer Bristow who specialises in financial market disputes. "Forthcoming changes in regulation and accountability are likely to mean that in future banks will demand more proof from borrowers that they have met the criteria set out and will be more prepared to act if they do not."

"Borrowers should take legal advice before they sign up to any of these ESG-linked loans and think carefully about how they record progress against the targets/criteria set and be mindful of the reputational risk if it emerges they haven't met or can't prove they have met some of the targets they set themselves," she adds.

MARKET FOR ESG EXPERTISE

Demand for scrutiny for ESG-linked loans could spell more business for firms of external auditors which must already sign off on company accounts and loans. It is also prompting banks to take on expertise from the hundreds of ESG research agencies such as Sustainalytics and EcoVadis which help investors and consumers measure and benchmark a company's ESG performance.

And, as well as holding borrowers to account over their targets, banks, and the ESG ratings agencies they use, are also starting to demand more stretching targets in the first place.

"The quality of debate we're seeing lenders have with clients about their ESG commitments now is in a completely different zone to where it was eighteen months ago," says Finer at KPMG. "Before, the bar was arguably lower in terms of what some lenders were prepared to accept. Now these do actually have to be commitments that are demonstrably really core and stretching."

"If a plant hire company promises to remove all the plastic cups from the staff cafeteria. It's not going to cut it," he adds. "It would have to be something about the operations of that business like a commitment to transition their fleet to alternative fuel technology or to cut carbon emissions by a meaningful percentage. It has to be measurable. And it has to be benchmarkable. A bank will be looking at this plant hire company relative to five others and asking whether their commitment to cutting emissions is enough."

With demand for ESG-linked loans set to increase, more and more companies in industries often shunned by socially conscientious investors are hoping to take advantage of the financing opportunity. ce

Next-gen

Hexagon Geosystems' VP of marketing talks to CE about digital technology's current and future role in construction

Often promoted as an answer to many if not all of construction's challenges – from reducing emissions to worker safety, to increasing productivity – digital technology must still overcome the significant hurdle that is resistance to change.

In an interview with Construction Europe's editor Mike Hayes, Holger Pietzsch explains how companies like Hexagon are breaking down barriers to transform the construction industry.

We're seeing a rapid growth of digital technology within the construction space; are we also seeing construction changing, moving more towards manufacturing, as it adopts this technology?

Yes, I can see a tendency to adopt that model. But we have seen some catastrophic failures recently, with companies saying we're going to do it all offsite and just Lego it together onsite.

I think there's got to be a mix; it's going to be a hybrid model that hopefully will use the best of both worlds.

And not just manufacturing; there are agile methodologies that come from the technology world that are very appropriate for parts of the construction process.

Is it becoming easier now for construction firms to gather and analyse the data they receive from their equipment?

We've all seen a tremendous boost in, for instance, telematics recently. I call this the second generation of connectivity.

The first generation was people like you and me, connecting to the internet, ordering and buying online, working online, to a degree.

The second generation of connectivity is the Internet of Things. Now it's amazing what you can find out about your equipment, in terms of how it's being used, how eco-efficient it is.

If contractors were paid for using machines, this would be the best time they ever had.

But they get paid for moving dirt and building things, and I think what we are seeing now is that third generation of connectivity and that is really digitising the actual material under construction; did I move the dirt to the right place at the right time in the right quantity?

But how do you do that? You can't put chips in every stone on a construction site; so you need different technologies to read landscapes, and those exist. At Hexagon Geosystems, we come from that; reading topographies – mountains and tunnels and rivers – we know everything about reading material.

Now we see these things come together and, actually, people in construction have always been very good at measuring what they need to build – it's just been more manual and it hasn't been integrated with the machines in the way it can be now.

It's that part of the data subject that I actually see people getting excited about.

Can this same technology we're talking about also be used to keep people safe onsite?

Nobody says that an intelligent system on a machine can only be used to read material or drive hydraulics and do machine control.

We see increasingly that, with these systems, you can add any sensor you want to.

What we're seeing now is safety awareness, where you can start tagging objects, or you can tag infrastructures, or even people, to avoid collisions or somebody getting hurt. So, you can now start integrating objects into the construction process, so, if somebody's operating a piece of equipment, that piece of equipment senses somebody approaching and that creates this safety awareness.

I think this is going to be very important and that data you have behind it, also allows people to assess how jobsites are functioning.

In most processes I've seen, if you check them for safety, they actually become more efficient as well.

Technology is the best way to capture, share and analyse

> "Technology is the best way to capture, share and analyse information, whether it be for the safety of workers, for the efficiency of the site and also for sustainability"
>
> **HOLGER PIETZSCH, Hexagon's VP of marketing**

connectivity

information, whether it be for the safety of workers, for the efficiency of the site and also for sustainability.

How is new technology developing, to ensure it can be used throughout a project's workflow – from the architects and planners to the workers on site?

Very often you have different people in different phases of construction and also people in different locations. But construction is a collaboration; it' important that the right information flows and that feedback loops happen – the feedback loop is probably the most important thing; between the field and the office, the on machine and the off machine, the software and the hardware.

I think for this to happen, the technology needs to be easy to use, so the interface, so the way the information is being captured and being used needs to be intuitive and relevant.

Obviously, when people need to move earth, they don't want to become and chief programmer. So the ease of use, the ease of integration and adoption, are so important.

You also need to have the right standards, so between systems, they can communicate.

Finally, users need to be and feel they are in control. Nobody wants to be locked into some proprietary system, with the people in the field on one system and the people in the office on another.

If we can get all this together, I think we can overcome that traditional shift, in terms of there being some plan made in the office, that the people on the ground never see.

Is digitalisation something that needs to take place rapidly for a company, or can it be a gradual shift?

I think you can get some quick wins, just by adopting a small amount of technology.

It's also important to make sure you have the right technology partner, to ensure the training and the support are there.

I think there's an interesting analogy here with painting and sculpture. I think of manufacturing being like painting: you add more things until you have a toaster.

In construction, you need to shape the landscape; you need to move things and take things away, and that's more like sculpting.

Success means you only chisel once and you chisel right, and you don't chip off the wrong piece. In the end, success is measured by what you have eliminated and the problems you have avoided.

With technology, you have early feedback that something needs to change and the longer you wait in a project for a change to be made, the more expensive it gets. The agility that companies gain to do things right the first time, that is where most of them see the gain.

It's very unexpected and difficult to explain until someone has gone through this process, but it can start happening very quickly, perhaps with just a few rovers, then you see the information flow between the office and the people doing the build and the machines.

Is it becoming easier to sell technology into the construction industry, in terms of there being a good return on investment?

I think people see gains very quickly, in that technology brings people together.

There's often a discussion in terms of, is technology killing jobs. The fact is that people can do very different things now, with some of this equipment. They become almost collaborative robots and they can do more now, more things in the field than you would traditionally be able to do.

In terms of manufacturers, they also realise that this [technology] adds a lot of value for my customers and what they can do with the equipment. So, we're seeing a shift both on the demand side and on the supply side.

What does technology offer in terms of reducing emissions and making construction more sustainable?

Equipment is becoming more sustainable, with lower emissions, etc, but if I have better methodologies and I can do a job that would have taken me four days in just three days, then that's 25% better, and a machine that's not being used is always cleaner than one that is being used.

Again, when it comes to paving a road, you don't want to make the asphalt too thick or too thin. Using technology leads to fewer resources used in the construction process, which is always beneficial.

Perhaps, most importantly, if you build it right, it's going to last longer; you don't have to fix it, that's also more sustainable.

Hexagon has a whole division that looks into leveraging data and technology for sustainability and we think the opportunity is huge and needed.

Technology, to a degree, needs to help us to make sure our children and grandchildren have as good a life as we do. **ce**

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Mark Sugden **of Withers & Rogers looks at why so many construction innovations are first tested on mega projects**

The UK's HS2 high-speed rail project has become a testbed for the latest construction technology innovations

Infrastructure's technology testbeds

For innovators in the construction industry, mega projects such as HS2 provide a great testing ground for technology that aims to improve building processes, particularly highly technical construction work. As well as providing the potential to reduce costs and improve efficiency, innovations in the construction sector can also lower emissions, something that is particularly important with net zero on the horizon.

Given the scale of mega projects, and their importance to the UK's infrastructure, it's vital that they are delivered as efficiently as possible. To ensure this happens, continuous innovation is necessary, whether it be through new processes, materials or equipment. The complex nature of these types of projects means they're likely to encounter problems that are unique to them, but this doesn't mean that the solutions created cannot be applied to smaller-scale projects too.

Many industries use major events as a reason to boost innovation activity, for example the sports sector often becomes more active around the Olympics, and construction is no different. Budgets for mega projects tend to be high, with a focus on R&D activity, allowing new processes and materials to be developed and tested. As net zero approaches, the need to innovate is becoming increasingly pressing.

NEW DIMENSION FOR CONCRETE

Each of the following three innovations is being tested on HS2. The first is graphene-reinforced 3D-printed concrete, which is being used on HS2's London tunnels. Also known as 'Printfrastructure', this 3D printing technology will help to cut carbon on the project by up to 50%.

Developed by ChangeMaker 3D and Versarien, the process involves 3D printing the concrete structure with microscopic strands of graphene running through it. Replacing traditional steel with graphene simplifies the construction process, removing the need for cranes and – as it can be produced on-site – considerably reducing the need for delivery trucks, lowering carbon emissions.

In addition, being able to print the concrete with an internal lattice structure cuts waste and lowers the quantity of concrete required, providing further environmental benefits.

WINDS OF CHANGE

The second is an HS2 pilot project, which is swapping steel for retired glass fibre wind turbine blades to reinforce concrete. Wind turbine blades are notoriously difficult to recycle, so this solution offers a way to reuse the blades, without having to break them down. The project is being implemented by Skanska Costain STRABAG Joint Venture (SCS JV), and the National Composites Centre, with the process holding the potential to cut carbon production by up to 90%.

The third is a vacuum excavation technique for piling that is also being trialled on the HS2 project.

LESS EXCESS, MORE SUCCESS

SCS JV worked alongside Cementation Skanska to design the method, with Hercules Site Services developing the technology and providing a machine for use on-site in the Euston Approaches.

The 'zero trim pile technique' involves excess concrete being sucked out while wet using a vacuum excavator.

As well as using less concrete, this technique can also reduce the chance of health problems for workers. Traditional piling techniques require workers to break out the excess concrete once it has hardened, potentially leading to hand-arm vibration syndrome, hearing loss and silicosis. Removing the excess before it sets means this is no longer a risk.

PROTECTING R&D INVESTMENTS

These innovations, and others developed on mega projects, could massively benefit the construction industry in general. Therefore, it's vital for innovators to consider patent protection from an early stage in order to stop copycats from using the techniques created for their own commercial gain.

Patent protection provides 20 years of exclusivity rights, giving them a considerable advantage over their competitors. If an innovation gets into the headlines, as many do on projects in the public eye, then it's likely that other companies within the sector will want to invest in the technology as well. Only the patent owner can offer it to these companies, enabling them to reap the commercial rewards of their R&D activity.

A constant need for efficiency, and the approach of net zero, means innovation is more essential than ever on mega projects. For those that successfully develop techniques that could revolutionise the construction industry, seeking patent protection early on is vital to making the most of their innovations. ce

About the author

MARK SUGDEN is a senior associate in the Advanced Engineering Group at European intellectual property law firm, Withers & Rogers
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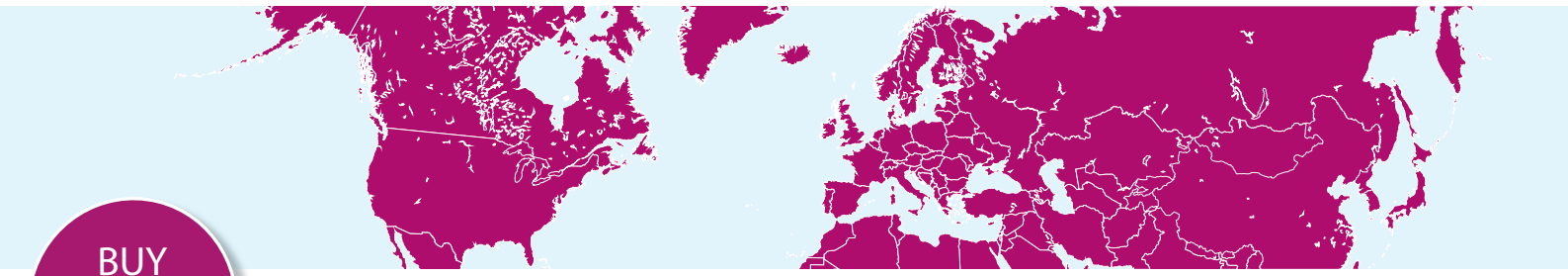

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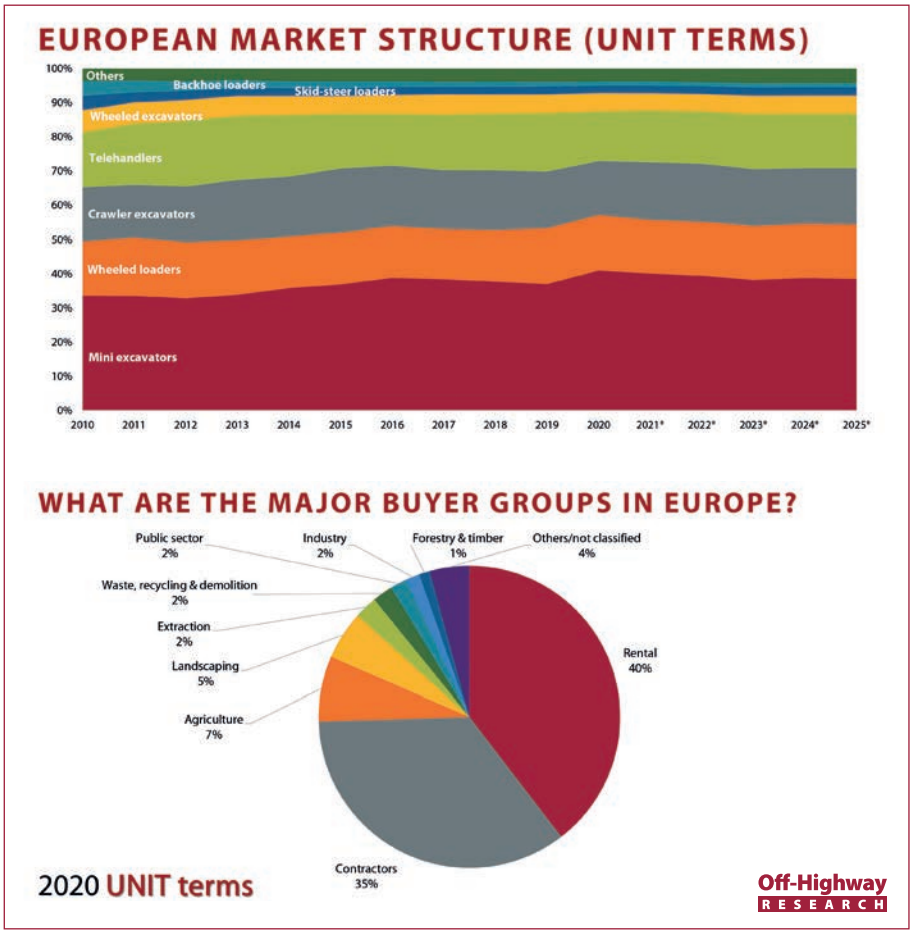
Rental companies are now buying more construction machines than contractors across Europe. Construction Europe **asks** Off-Highway Research **to explain the latest trends**



New research by specialist company Off-Highway Research (OHR) has revealed that in the last ten years, rental companies have overtaken contractors as the biggest buyers (in volume terms) of construction equipment in Europe.

According to the company's research, rental companies now buy 40% of the construction equipment sold in Europe, with contractors being the other major group, taking a 35% share. OHR's managing director Chris Sleight says this is a sea change in the position a decade ago.

"These shifts in buying patterns are very gradual," he says. "However, the data puts a figure on what has been known in the industry for many years, that there is a slow shift form contractor-ownership of equipment to rental companies. Ten years ago, contractors were still the dominant buyer, accounting for 37% of sales, while rental was smaller with a 34% share."

LOOKING AT MACHINE TYPES

But looking at sales in unit terms is only part of the story. The rental industry is particularly focused on some of the smaller machine types – particularly mini excavators and telehandlers. Examining the data in terms of the value of sales paints a different picture.

"In value terms, contractors are still by far the most significant equipment buyers. Our estimate is that they still account for some 41 per cent of the value of equipment sold in Europe, while the proportion sold to rental drops to 29 per cent," says Sleight.

But these two groups still only account for 75% of unit sales and 70% of the value of the market, so which are the other big groups buying machines?

"In volume terms, and perhaps surprisingly for construction equipment sales, agriculture is the third-largest group, accounting for 7 per cent of sales. Fourth is landscaping, which has been a growth area in the last decade," says Sleight.

He continues, "In value terms its different again. The third largest sector is extraction – mining and quarrying – which is perhaps to be expected, because that's obviously an industry which requires large, expensive machinery. Waste, demolition and recycling is also more significant in value terms than in terms of unit sales."

REGIONAL PROFILES

And what about the future? Is this shift towards rental and the other growth segments set to continue?

"Yes and no," says Sleight. "Different countries around Europe have very different profiles in terms of their buyer groups, so if a certain country has a surge in demand, that can move the needle for the who region from one year to the next. One of the things we see in our forecast is that equipment sales are set to grow most strongly in markets which are still very contractor-focused. Italy would be the most significant of those.

"That means that in the next few years, the dial will tick back towards contractor sales by a percentage point or two. But longer term, we see a shift to rental to some extent even in many traditional contractor markets… So ask me again in ten years." **ce**

Further information

OHR's analysis in these areas stems form a new product the company is offering, the Customer Group Database Service. It was also discussed in a webinar supported by CE as a media partner on 14 December.

For more information about the Global Briefing webinar or the Customer Groups Database Service, visit www.offhighwayresearch.com

Outgoing CECE president Niklas Nillroth (left), with CECE secretary general Riccardo Viaggi

Niklas Nillroth, CECE **president for the last two years, hands over the baton**

New CECE presidency is announced

Niklas Nillroth's presidency in a key European industry association was challenging and full of high expectations from various sides. Not only representing the construction equipment industry towards European institutions and policy makers, trade shows and member associations, but also facing the impact of the unprecedented Covid-19 pandemic made his presidency an outstanding time of experience.

No face-to-face interaction in a position that thrives on personal contacts required an impressive adaptability to change to exclusively remote, digital meetings. Nillroth managed this task with structured and clear communication never losing sight of his goals.

He sees the transition of the European construction equipment industry from a traditional mechanical industry to a cutting-edge innovative one where sustainability is one of the key change drivers. Electrification, digitalisation, connectivity, standardised machine languages and complete solutions with new business models supporting customers to perform their business in a more effective and sustainable way have been on his agenda.

As CECE President it was a "matter of heart" for Nillroth to spread the word about this transition and to position CECE OEMs as attractive employers, targeting the younger generation and a more diverse workforce. Attracting key talents is one of the major challenges now and in the future according to the outgoing President.

CHIEF IN ADVERSITY

Nillroth's presidency started with a degree of uncertainty caused by the Covid-19 outbreak. The industry's tough start in the first quarter of 2020 was followed by 'step by step' improvements supported by financial mitigations. Fortunately, the construction industry never really turned down. On the contrary, demand and order intake turned to a very high level accompanied by extraordinary commodity price increases, limitations in over-seas freights and certain components. A situation that still lasts on.

The sustainability and decarbonisation focus got even stronger during the pandemic, also driven by the EU Commission's 'Fit for 55' package. Nillroth, with his long-term experience in the construction equipment industry as Vice President Sustainability & Public Affairs at Volvo CE used his expertise to be a high-level contact for European politicians and decisionmakers to represent the requirements of the whole industry. New drive technology concepts like batteries, fuel cells, alternative energies are key topics that will have a big impact on the technology roadmap.

During the two-year presidency under Nillroth's leadership, CECE organised two successful and unprecedented virtual events. The CECE Congress 2020 themed '#BuildingTrust Enabling Innovation' focused on industry recovery plans, showcased the latest trends and challenges of the sector. '#WeMake2Build: Constructing the Europe of Tomorrow' was the title of the CECE Summit 2021, held in October of this year. The event took a deep dive into future scenarios of jobsites and looked at innovations in connected industries. The image of construction equipment was addressed and the roadmap for 'future-proof' CE companies was presented in a diversity and leadership discussion. Both events proved to be major successes for CECE and personally for Nillroth.

He says the new presidency as from 2022 will be "in good hands" with Alexandre Marchetta, representing CECE's French national association, EVOLIS.

"I wish Alexandre the very best for the coming two years in the 'new normal' and I am sure, he will also leave a personal footprint during his CECE presidency", said Nillroth during an interview for this article. "My own motivation a few years ago was to be part of the steering of CECE and to be able to contribute with the Swedish CE industry's perspective and key topics. The presidency came as a positive 'bonus' and has really been a key step forward in my personal leadership development, not the least by the Covid situation and the need to find solutions for remote communication and leadership."

A BORN LEADER

Niklas Nillroth was born, raised, and is still living in the South of Sweden, close to nature. Holistic understanding is something that has characterised him since he was very young. He holds a Masters Degree in Industrial Management and Engineering, combining engineering and finance courses. He has always been interested in social topics and the need for good cooperation between the public and corporate world to enable true momentum achievements. According to his statement, he is known as a structured and 'balanced' person with clear communication as one of his strengths. 'From word to action' is his personal motto. Tack och på återseende, Niklas! ce

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FIND US ON

Distortive foreign subsidies

In May, the European Commission proposed a new legislative instrument aimed at addressing the distortive effects that foreign subsidies, in their various forms, potentially have on the EU internal market. Despite several cases in recent years where foreign subsidies have been found to have distorting effects on sectors like construction, no specific EU legislation that allows for the scrutiny of state aid granted by non-EU countries is in place. As such, the Commission's proposal represents a major step and a welcome one, towards restoring a level playing field in a sector like construction.

STATE-OWNED FIRMS

In recent years, there has been an increase in the number of cases involving third country companies bidding for construction projects of all sizes across the entire EU. A major concern is the increased market presence of state-owned companies, in particular from China. These state-owned companies benefit from a captive domestic market and easy access to funds from national policy banks. As a result, when bidding for construction projects, these companies are able to offer tenders at prices that no privately owned competitors can afford. A very prominent example is the successful bid of a Chinese consortium for the Peljesac Bridge project in Croatia. These cases are possible because the loophole which allows for foreign subsidies to go unchecked has not yet been effectively addressed.

THE THREE TOOLS

In order to fill this legislative gap, the Commission proposed an instrument that introduces three tools that will enable it to investigate financial contributions granted by public authorities of non-EU countries to companies engaging in an economic activity in the EU. More specifically, the proposal provides for two notification-based tools – one concerning cases of concentrations and the other concerning public procurement procedures – in addition to an ex-officio review tool for all other market situations. Nevertheless, there appears to be room for an additional tool: market investigations. The proposal enables the Commission to conduct sector-specific investigations but, disappointingly, this might only lead to a report. This would not effectively address those problems privately-owned construction companies have been facing recently due to the existence of foreign subsidies in their market. It would be beneficial to strengthen provisions related to these investigations.

GUARANTEES MISSING IN GENERAL MARKET TOOL

The proposal also gives the Commission the power to examine information from any source regarding alleged distortive foreign subsidies at its discretion. As such, it can conduct either a preliminary review or a full investigation. The investigative powers the instrument would grant the Commission would enable it to carry out on-site inspections either in an EU Member State or even in a third country. However, the proposed tool falls short in a couple of aspects. It does not guarantee that the Commission will act if sufficient evidence is provided, nor does it outline the procedure to be followed by interested parties, such as contractors, to request a review. This threatens to undermine the effectiveness of the instrument.

European Commission's proposal for a regulation on foreign subsidies will have a significant impact on construction, says FIEC

HOW WILL DISTORTIONS BE REDRESSED?

Where the Commission acts, it should consider whether the negative effects of a foreign subsidy on the economic activity in question outweigh the positive effects and may impose redressive measures or accept commitments if that is the case. Several redressive measures are foreseen in the proposal. However, they seem insufficient when applied to certain scenarios that occur in the construction sector. When it comes to the procurement market, the effectiveness of the instrument can only be guaranteed if it leads to the exclusion from future procurement procedures. Other measures would still allow a subsidised third country company to be awarded a contract for a construction project as it would still be able to propose a more "competitive" tender than others.

PROCUREMENT: CASES GOING UNDER RADAR

When it comes to concentrations and bids in procurement, the proposed instrument involves a notification-based system of cases but only for the biggest and the most distortive ones. For public procurement, only cases where the estimated value of the procurement is at least €250 million fall under the scope of the Commission's proposal. The proposed threshold has not been well received by stakeholders across various sectors, including construction. Indeed, an overview of the number of construction projects either bid for or won by third country companies in the European procurement market suggests that many cases would slip under radar should the proposed threshold be put in place. As such, the thresholds should be reconsidered.

SUBSIDISED BIDS

According to the proposal, the Commission would be able to apply fines and periodic penalty payments can be applied by the Commission when notifications contain incorrect or incomplete information, or, when an undertaking fails to notify a financial contribution in the context of a merger or public procurement procedure. Additionally, for notifiable cases, the Commission should have the power to ban the award of public procurement contracts to subsidised bidders.

WHAT DOES IT MEANS FOR CONSTRUCTION?

The proposed regulation on distortive foreign subsidies comes not a moment too soon. It should fill a regulatory gap in the single market as, at the moment, the strict EU rules on state aid do not apply to third country companies. In recent years, construction firms have lost out on major construction projects to non-EU companies, particularly State-owned companies, offering more "competitive" bids which would not have been possible without a foreign subsidy. ce

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The best of times… the worst of times

How strategic scenario planning can enhance opportunities and help consulting engineers choose the best path to a successful future

Of all the tropes and sayings that confront us, perhaps the ones that tell us we should be better prepared in life are both the most accurate – and the most annoying! 'Fail to prepare and you prepare to fail'…but in the current economic and business climate confronting the construction and engineering world now, the need to be ready, and to be able to handle the risks and uncertainties ahead, is arguably a life and death issue.

Yet when you look at the facts on the ground, it may not be so obvious:

Economic growth is up; the huge EU Recovery and Resilience Facility, with its financial envelope of €672.5 billion, is up and running; Next Generation EU – the plan for restoring the EU's health after the Covid-19 pandemic – brings the promise of financial support for a stronger, better, greener recovery.

OPPORTUNITIES IN A CRISIS

So, as a consulting engineer looking to bounce back from the Covid crisis, the prospects should look pretty bright. There is no shortage of opportunity in the building back of the European Union.

"Yes, there will be money there," says Jeffrey Seeck, 30 years as an entrepreneur and now executive with Dorsch Group Consulting and Engineering. "The question is, how early will it be spent? And what about the recovery of the industry in that time? And then who decides on the spending of the money and what do you need to do to benefit from it? So even if the future seems bright, the question is, for whom?"

And the uncertainties for recovery are all around: a shortage of skilled labour; inflation tendencies; how sustainable is the current strong market? Which technologies will catch on, which software to employ? Where are your specific strengths? Who can you work with, who will you need to compete against?

FUTURE PROOFING

"What most companies, most managers, tend to do," says Torsten Wulf, Professor of Strategic and International Management at Philipps-University Marburg and Director of the Centre for Strategy and Scenario Planning at HHL Leipzig School of Management, "is not so much to build on hope, but rather to convince themselves that what they hope for will become reality. They tend to have a very specific view of how the future will unfold. In most cases this will be too optimistic. While in some cases, if you ask those managers who had a bad experience during the covid crisis, they might be a little too pessimistic.

"What you rarely find are managers that take into account a broader spectrum of potential developments for their industry.

"It's fair to say that if you are in an immediate crisis as was the case a year and a half ago, you do have to think "how can I stop the bleeding and get out of this? Crisis management is not the time for scenarios. But right now, while we don't see fully clearly how the world will unfold, we do see a little bit more. So now the questions is "How do I benefit from this situation?" Because any kind of crisis always offers a lot of opportunities."

SCENARIO PLANNING

Seeck and Wulf have come to share a strongly held appreciation of the value of strategic scenario planning to cover these challenges. By considering a range of scenarios – more desirable, but also less desirable pictures of the future – companies can start to take a wider range of options into account, that help them to deal with opportunities and risks, and also to know when to shift from one option to another.

Seeck says, "Opportunities to adapt to technology shifts – for example, moving into AI and reducing human labour – may work now. On the other hand, there are a lot of tendencies to want to extend the workbench into low-paid regions and areas in Europe or the rest of the world. It's a critical area and you need to consider these scenarios.

"I also believe we will see software products able to design by themselves as they are getting so smart and then you get a feeling of the disruption in one of the main value propositions within our business. So the speed of implementing technology is one of those critical uncertainties."

Other questions abound: what will be the administrative and regulatory positions in the market? How open will it be, how fast, what impact could the acceleration of processes be in terms of tendering, planning and permission? What will be the effect of instability in the market? It might actually be good for small companies.

"So you need to put these challenges into your hands; juggle them around a little bit and try to find your path through this," adds Seeck. "Every company will have its own challenges." ce

> The questions is 'How do I benefit from this situation?' Because any kind of crisis always offers a lot of opportunities
>
> **PROFESSOR TORSTEN WULF**

EFCA has published a practical guide to implementing a strategic scenario planning programme as recommended by our contributors. The EFCA Future Scenarios Report 2025 is available at www.efca.be

About EFCA

The European Federation of Engineering Consultancy Associations (EFCA) has member associations in 29 countries, and is the sole European federation representing the engineering and related services industry, which employs one million staff, the majority of whom are highly skilled in a breadth of disciplines.

European Engineering consultancies provide €150 billion engineering consulting services per year for about €1,300 billion investments in buildings, infrastructure and industrial complexes. EFCA represents FIDIC in Europe. **www.efcanet.org**

EARTHMOVING

Prototype electric excavator developed by Yanmar

The SV17e is a battery powered model in the 1.5 to 2.0 t segment, with the commercial launch at Bauma 2022

Yanmar Compact Equipment has developed its first prototype electric mini excavator, the SV17e, with the full commercial launch scheduled for Bauma in October 2022.

Described as an "important strategic step in the transformation of Yanmar", the SV17e will be aimed at European customers and is powered by an electric drive and 48-volt batteries with fast charging capability.

Cedric Durand, Director Product Management EMEA, said; "Our prototype is significant because it demonstrates our capability to bring the quality and reliability of our highly respected conventional engine technology into the arena of electrification"

"But we have gone further. As always, the operator is at the heart of this machine, and we have challenged ourselves to deliver the comfort, power, control and precision which we believe will surpass the expectations of professional operators."

Sales of the production version will start at Bauma in October 2022, with the prototype now undergoing testing in the field.

Sota Takamo, Director Engineering EMEA, said; "We are very pleased with the performance to date – as you would expect, we have a rigorous testing regime which pushes every aspect of the machine to its limit. The machine has performed very well in all these tests."

Yanmar Compact Equipment CEO, Guiliano Parodi, said; "Our transformation will embrace our entire business and will encompass new products with alternative fuel technologies.

"The SV17e prototype is a clear demonstration of our intent to build a sustainable business for our customers and dealer partners."

Yanmar launched its first mini excavator in 1968 and first zero-tail model in 1993. It has four manufacturing plants in Japan, France, Germany and the US. ce

TECHNOLOGY

Bobcat launches remote control iPhone app

Bobcat EMEA has launched its MaxControl Remote Control system for compact loaders, which allows users to remotely operate the machines using an iPhone or iPad.

Said to give "a vision of machine control of the future", the MaxControl system uses a new retrofittable hardware kit and a downloadable app.

The system is compitable with all Bobcat loaders with Selectable Joystick Controls that date back to 2004 (SJC Loaders from J to R-Series machines).

This means that owners of older loader models don't have to buy the lastest machine or invest in "costly hardware updates".

The app, which uses Wi-Fi to communicate with the loader and has an operational range of up to 100m, allows workers on construction, demolition, agriculture and recycling projects to exit the machine's cab and carry out tasks with greater visibility of the jobsite.

According to the manufacturer, this can be particularly helpful for new and less experienced operators, or when working in tight areas or performing difficult tasks.

"When lifting and carrying large loads, the use of MaxControl eliminates blind spots in front of the load and raises awareness of the surrounding environment," Bobcat said.

"Being outside the cab also allows for face-to-face communication with co-workers on site, enabling faster organization of the work."

Due to the often unpredictable nature of construction sites, the app is also said to provide site workers with a greater level of flexibility when it comes to carrying out tasks.

"Operators may never know in advance when remote operation will come in handy, but with MaxControl on the phone in their pocket, they are always ready for any challenges that can arise," the manufacturer said.

While an Android version of the app is not yet available (though it will be shortly), users of iOS devices can also remotely control their Bobcat loader while sitting in the cab of a different machine.

"For example, an operator can sit in an excavator and use a loader remotely for back-filling," said Bobcat.

Vijayshekhar Nerva, Head of Innovation and Acceleration for Doosan Bobcat EMEA, said, "The jobsite of the future is a more connected place and gamification will play a vital role.

"Changing demographics and consumer preferences are pushing our industry into categories that have been unheard of or have been poorly addressed in the machinery sector." ce

EARTHMOVING

New machines are emissions compliant and built for use in all climates

Cat's latest mini hydraulic excavators

Cat has introduced two new mini hydraulic excavators that are claimed to offer increased power and performance along with lower operating costs, for the markets of North America, Europe, Australia and New Zealand.

The new 304 and 305 CR models are the final machines to be reengineered to Cat's "next generation" mini hydraulic excavator design.

The 4-tonne Cat 304, and 5-tonne Cat 305 CR mini hydraulic excavators are designed to "deliver more power to the pumps, higher bucket breakout forces and deeper standard digging depths to increase performance by up to 20% over their E2 series counterparts," according to Cat.

Features include extended filter service life, common componentry throughout and flat, easy-to-replace side panels. The manufacturer said the units deliver up to 10% lower owner and operating costs.

The 304 machine has a narrow, 1700-mm (66.9-in) track width, 254 mm (10 in) slimmer than its predecssor the 304 E2.

Cat said the design also increases performance, balance and stability in the 4-tonne class model, supported by a reduced radius and extra counterweight option.

Meanwhile the new engine on the 5-tonne class Cat 305 CR "delivers nearly 9% greater power to increase machine performance."

"Hydraulic system improvements provide higher breakout forces – 49.2 kN (11,061 lbf) bucket, 28.3 kN (6,362 lbf) standard stick and 25.2 kN (5,665 lbf) long stick – to improve digging efficiency in hard rock applications.

"It also offers 140 mm (5.6 in) deeper dig depths than the 305 E2, giving it more application flexibility. Its compact radius swing reduces overhang when working to the side, while its 1980-mm (78-in) track width and new extra counterweight option help to optimise stability and lift performance in confined spaces."

Both models now feature an angle dozer blade option for flexibility in backfilling and finish grading applications, which offers "ample above- and below-grade travel with standard float function for easy clean-up."

The blade moves 45 degrees left or right of centre, with movement controlled by the right-hand joystick, while the left joystick handles machine drive.

Interchangeable counterweight packages are on offer, and the Cat Stick Steer System allows the operator to switch from conventional lever/foot-pedal steering controls to low-effort joystick operation. Two travel speed ranges and standard cruise control facilitate moving around the jobsite with minimum operator interaction.

Cat said the turbocharged Cat C1.7 Turbo engine delivers higher power than the previous C2.4 engine and meets U.S. EPA Tier 4 Final and EU Stage V emission standards.

Auto idle, auto engine shutdown and load-sensing hydraulics with a variable displacement pump are designed to lower fuel usage at the site for affordable operation.

Both machines feature a sealed and pressurised cab enclosure with heating and/or air conditioning for all-weather climate control. ce

EARTHMOVING

European release for XCMG's next gen excavator

China-based XCMG has launched its new generation hydraulic excavator XE260EN for the European and US markets.

According to XCMG, the 22-30 tonne XE260EN is especially designed for fuel efficiency and its controllability allows the operator to work easily under different working conditions.

Tailored for the mature European and US markets, XE260EN is equipped with the high-pressure common rail EFI engine that meets Europe Stage V emission requirements, which can achieve optimal fuel injection control, and is more energy-saving and environmentally friendly.

The excavator has a new large diameter multi-way control valve. According to XCMG, this brings more controlling options in different operating fields.

The cabin is new and has a panoramic sunroof to provide a greater wider view, while the centralised arrangement of operation buttons is said to make the driving experience a comprehensive upgrade.

In terms of electronic control system, it can achieve optimal matching control of engine speed and hydraulic pump. The operation process will be recorded at any time by remote fault diagnosis function.

The excavator is equipped with a new type of LED colour display, and has regular reminders for machine maintenance.

The price of dispute resolution

As the value of construction disputes rises, so their resolution is picking up pace, as Pinsent Masons reports

The impact of the pandemic on construction projects is still yet to fully materialise, but certain trends are starting to appear in relation to the resolution of construction disputes.

Consultancy firm, Arcadis, has recently published its annual Global Construction Disputes Report showing the key trends and developments for 2020. The report demonstrates that the average value of disputes globally increased from US$30.7 million in 2019 to $54.26m in 2020. There were sharp rises in both the UK and Continental Europe with 117% ($17.8m to $38.6m) and 122% ($24.5m to $54.4m) increases respectively.

However, globally the average length for disputes dropped for the second year in a row and is now at 13.4 months, down from 15 months in 2019 and 17 months in 2018.

The construction industry continues to stand at the forefront of the disputes world both in terms of volume of disputes and in terms of the variety of forms of dispute resolution that it utilises. Mediation, dispute boards and, in certain jurisdictions, state-legislated adjudication processes are just some of the methods of dispute resolution frequently used in support of the traditional court litigation and arbitration proceedings.

INCREASING VALUES OF DISPUTES

It is impossible to discuss 2020 without looking at the impact of the pandemic. Generally, the construction industry dealt well with the pandemic, but some sort of delay and disruption has been inevitable on almost all projects, particularly as a consequence of social distancing and similar measures restraining labour on site, supply of materials and so on.

The impact of the pandemic, however, cannot be confined to just social distancing and similar measures. In the UK alone, in the year to March 2021, there were 1,600 insolvencies in the construction industry. That is more than in the hospitality and retail sectors where the direct effects of the pandemic are much more obvious.

HOW IS RESOLUTION SPEEDING UP?

It is reasonable to assume that, as the value of disputes are increasing, they might take longer to resolve, not least because settlement may become more difficult with an increased difference between the parties' starting point. So, why is resolution of disputes generally speeding up?

In the UK, adjudication is now the third most common method of construction dispute resolution ahead of both arbitration and court litigation. With most adjudications being completed in 6-8 weeks, its increasing take up should continue to drive dispute lengths down.

However, there are other factors at play. There has been a large increase in the use of dispute boards which will often allow earlier resolution of disputes than court or arbitration proceedings and this increase has been felt particularly in Continental Europe.

Courts and arbitration bodies are also increasing the efficiency of their processes, and there is a clear trend for streamlined processes for disclosure and factual witness evidence.

Finally, there is the impact of the pandemic on disputes. Whilst technological advances and streamlining of certain processes was already underway, there is no doubt that these have been accelerated by the pandemic. Virtual hearings have become commonplace and there is no doubt that on international matters, this has undoubtedly sped up the scheduling of hearings.

WHAT NEXT?

In the first instance, it seems that there will be an increase of disputes as the effects of the pandemic on the supply chain further crystallises. Certain impacts have already begun to be realised, including:

1. **SHIPPING COSTS** – In May 2020, the cost of transporting a 40ft-container from China to Northern Europe was around $1,500, whereas in July 2021 it was more than $13,000.
2. **STEEL** – There have been seven price rises in 2021 alone.
3. **ENERGY** – Global energy prices continue to rise, which has a knock-on effect on production of certain materials, including steel.

Decarbonisation is also likely to lead to an initial rise in disputes as the renewable energy assets are constructed, with on and offshore windfarms already the subject of a number of major disputes.

However, there is reason to be positive about the volume of construction disputes in the future. Industrialising construction and the acceleration of modern methods of construction should reduce manufacture-related disputes. Collaborative contracting is on the rise globally and the dispute avoidance methods in these contracts should also support a reduction in the number of disputes.

Furthermore, there is good reason to believe that the reduction in the length of disputes will continue as the various alternative dispute resolution methods continue to grow in popularity, adjudication and dispute boards are more widely adopted, and the traditional dispute resolution methods continue to streamline their processes and adopt innovative solutions to improve efficiency.

We remain at an early stage, particularly in relation to innovation, but there is reason to be positive that disputes can either be avoided or continue to be resolved more swiftly. ce

> "Delay and disruption has been inevitable on almost all projects…social distancing and similar measures restraining labour on site"

About Pinsent Masons

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