



UK CONSTRUCTIONTM EXCELLENCE

JUNE 2017



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SIG INFRASTRUCTURE

WELCOME

from the editor

WELCOME to the latest edition of UK Construction Excellence - celebrating the very best in British building. The UK construction sector is on the up and up, it seems. According to the Construction Products Association, the industry hit the ground running in 2017, with first quarter performance riding high. The outlook is optimistic, despite uncertainties over Brexit and early election woes. The hope now

is that the industry can build on this momentum and move from strength to strength.

This month, speaking exclusively to UK Construction Excellence, Andy Allen - UK Fuel Card Sales Manager for BP - outlines his expectations for the fleet sector going forward; Dr Ana Lanham reflects on the importance of phosphorus removal during AMP6, and Andrew Zhao - Emerging

Technology Strategist at Mott MacDonald - explores the emergence of augmented and virtual reality in the UK construction sector.

All this and more can be found inside, along with contributions from guest commentators and breaking news from Great Britain and beyond.

Robert Atherton
Publications Editor

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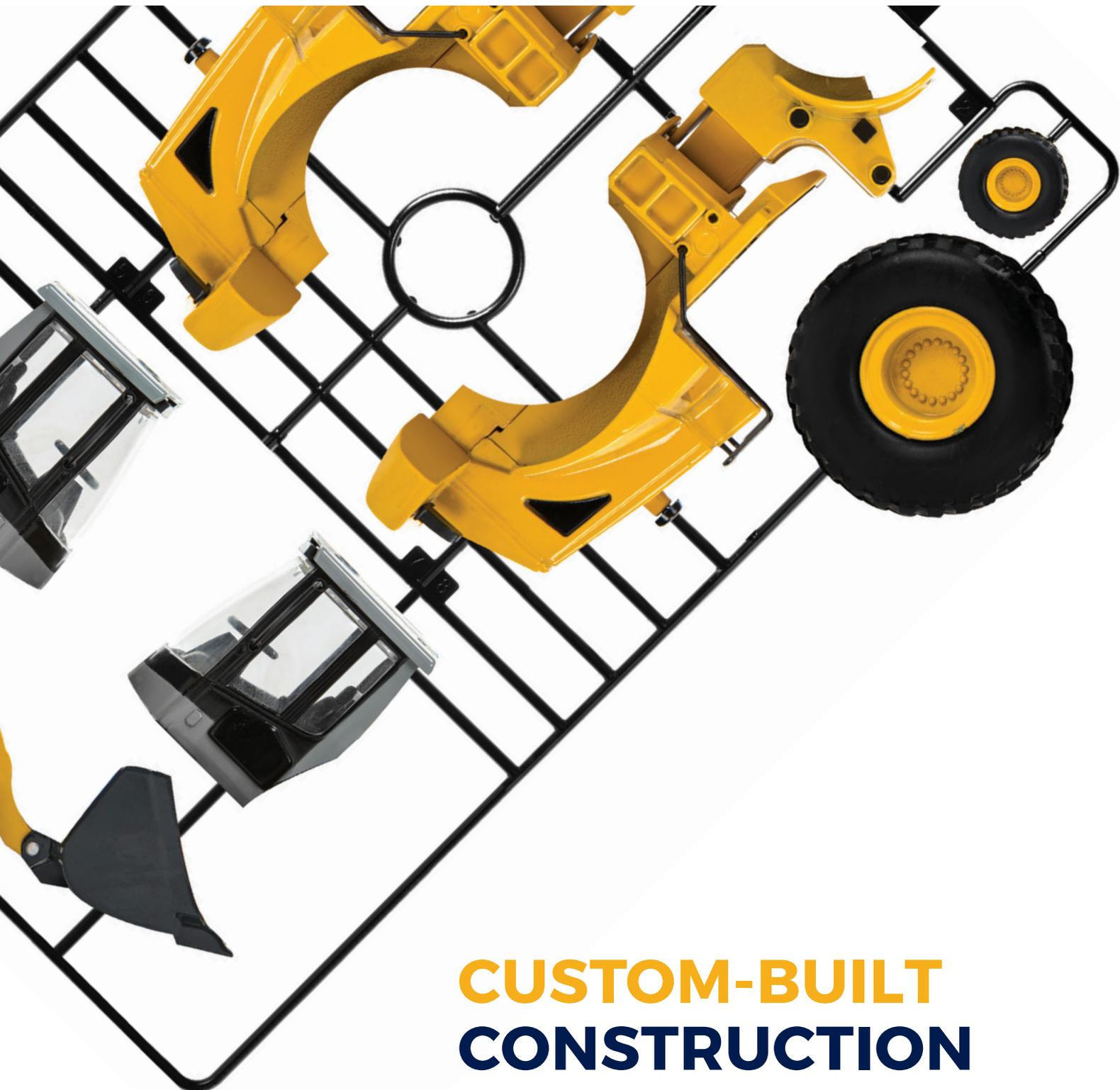
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IS TECHNOLOGY THE ANSWER TO THE CONSTRUCTION SKILLS GAP?

THE “perfect storm” of problems contributing to the construction industry’s skills gap has a solution; one which could also be interpreted as one of the culprits: technology.

On the one side, new digital-led processes means more time and money spent training the existing workforce. On the flip side, they also offer greater career longevity by lessening physical demands – a benefit which will help experienced workers stay with their work for longer.

Technology also brings with it great job diversity, appealing to the next generation who may have not previously been attracted to what they perceive as a physically demanding line of work, and have grown up in a digital age.

With major projects High Speed 2 and Hinkley Point C on the horizon, there’s no time to waste, especially when taking into consideration the amount of skilled workers needed just to fulfil the UK’s home-building quota.

Graham Edgell, director of sustainability and procurement at Morgan Sindall Group, estimates that in order to meet these home-building demands only, we need to create opportunities in the form of apprenticeships and vacancies for 5,000 people a year “just to get things underway.”

Anything which can improve the image of a sector which

faced a huge employment drop in conjunction with the 2008 financial crisis is to be explored, including highlighting the creative ways in which technology can be incorporated into the construction process, from planning right through to completion.

But the sector has some way to go to recruit and train over 180,000 workers by 2018, to try and regain lost ground caused by the recession which saw the construction industry employ 324,000 fewer workers.

Progress to build interest among those yet to enter the workforce is steady, but it is happening. Teentech is an organisation set up to show children from a young age what opportunities are open to them through STEM subjects (science, technology, engineering and mathematics), while courses such as computer programming are beginning to find their way onto the national curriculum.

This line of study is already showing its worth in the world of construction and engineering. The contractor ISG developed its own in-house app to highlight potential issues with projects, offer design alternatives and streamline project management.

At the app’s core is the Unreal game engine and 3DS Max modelling software, giving visuals gaming-like qualities which, in some instances, surpass that offered by other 3D tools available.

“It may seem like a space-age vision for another century, but with manufacturing and logistics sectors already using robotics and VR maturing in the gaming sector, this approach is accessible now”, says Jack Dearlove, BIM strategy manager at ISG and a member of the CN Next Gen Club.

Apps, 3D modelling and gaming programming all help to challenge the “old school” view of construction, which has suffered not just due to its image, but to the uncertainty following the economic problems which first unbalanced the UK almost 10 years ago.

Not only do the modern methods of construction help to attract a new generation of skilled workers, but they also broaden the scope of roles available, offering more opportunity to those with different interests, such as IT and technology.

“A lot of young people are genuinely excited about using technology and tools like 3D drawing technologies and even things like drone technology, which more and more contractors are starting to use,” says David Light, BIM consultant at Autodesk. “There are absolutely massive opportunities out there.”

**By Steve Whetham,
Director of MCM Insurance**



Pockets of growth for public sector construction

Against a backdrop of Brexit and ongoing economic uncertainty, the number of public sector construction projects in both the UK and Ireland has continued to flounder over a three year period. And yet, according to Millstream, some regions are beginning to bounce back.

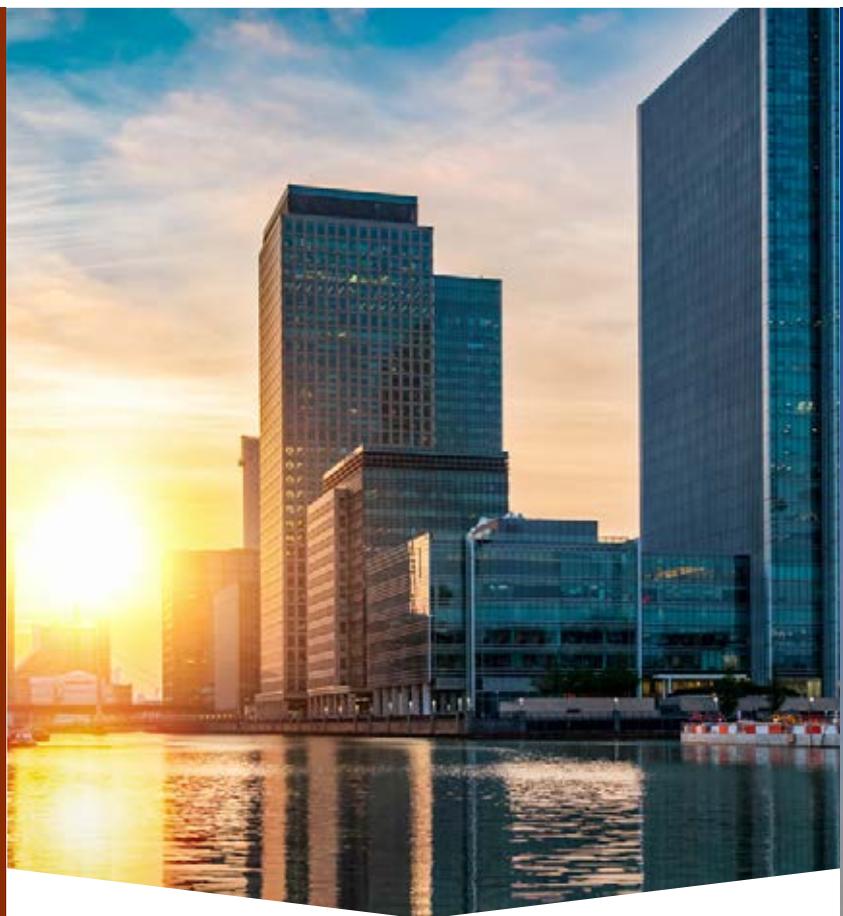
Private construction companies in the East Midlands, South West and Yorkshire are experiencing a telling rise in tenders available, all of which bodes well for the future. Millstream's statistics indicate a whopping 42% rise in public sector construction tenders throughout Yorkshire, while the East Midlands and South West have similarly risen by 19% and 16% respectively.

What's changed? Millstream say continued investment in the so-called 'Northern Powerhouse' and 'Midlands Engine' - in addition to firmer assurances over HS2 and a tranche of new City Deals - are likely to be the "key drivers" here. Public sector spending in such schemes as the Great Yorkshire Way in Doncaster, Northampton University's much-anticipated waterside campus and a new school development in Devon have each contributed to the number of tenders locally.

According to Millstream, devolved powers and investment in key infrastructure is absolutely critical if this trend is to continue.

"The significant rise in public sector construction tenders in Yorkshire, East Midlands and the South West underlines that confidence is returning to the construction sector albeit in specific areas," said Penny Godfrey, General Manager at Millstream. "It shows how important the public sector is as a target for the construction sector. There are clearly opportunities even if the wider construction environment is still in recovery mode after the hard years of the recession.

"While the national picture for public sector construction contracts may remain flat, this surge in regional confidence in the construction sector is heartening."



Strong start to 2017 for UK construction industry

The latest trade survey from the Construction Products Association (CPA) has revealed that the industry has enjoyed a strong start to 2017, while optimism remains high for the year ahead.

Encouraging first quarter performance was reported by SMEs, civil engineering and driven by increased sales, output and workloads.

There was, however, a downturn in fortunes throughout the commercial and industrial sectors as 31% of main contractors experienced a decrease in output in comparison to the same period last year.

The majority of sectors saw a decrease in future orders for both main contractors and civil engineers.

The CPA survey also reinforced one of the most pressing issues facing the construction industry as inflation continued to apply pressure to input costs.

The figures showed civil engineering contractors (84%), main contractors (86%), heavy side manufacturers (93%) and light side manufacturers (93%) all reported an increase in raw material costs.

Rebecca Larkin, Senior Economist at the CPA, commented: "Q1 was a positive opener to 2017 for product manufacturers, specialist building contractors and SME builders, continuing the momentum built up over the last four years of growth. For main contractors, however, it was only private sector house building that provided the bright spots of activity during the quarter. Falling orders in the commercial and industrial sectors also spilled over into infrastructure in Q1 and signal a broader weakness ahead.

"Furthermore, in contrast to the continued rise in costs reported during the quarter, particularly for imported raw materials, building contractors' tender prices are moving in the opposite direction. This suggests that it is margins, rather than clients, that are bearing the brunt of cost inflation."





Atlas Building to undergo 'Vital' energy works

Vital Energi has won a significant £6.7M 'Design & Build' contract with Mace to provide low carbon energy solutions for the aptly named Atlas Building at 145 City Road. Standing 152m high and 40 storeys tall, the £1Bn City Road Basin Development is set to become the largest residential building in London's so-called Tech City.

Vital Energi will be charged with the installation of the main energy centre, situated in the depths of the Atlas basement, which includes a 158kWe CHP engine, 2.8MW modular gas boilers and 1mW of water cooled chillers. What's more, Vital will install risers, laterals and a heating and cooling hydraulic interface in each of the 300+ dwellings.

Atlas' height provides its own

challenges however. A plant room will have to be housed on the 19th floor to hydraulically separate heating and chilled water systems. This will ensure the correct amount of pressure is conveyed to all apartments from top to bottom.

Rob Callaghan, Regional Director for Vital Energi, had this to say: "145 City Road is a fantastic milestone project for Vital Energi as it is the second scheme we have secured this year with the Mace Residential Team, as well as our second high-rise project we have been awarded recently. We are delighted to be working on such an iconic landmark in the newly-dubbed Silicon Roundabout district with Mace. It will be a logistically challenging project due to the location as the area is

undergoing a mini construction boom, but we are looking forward to working with the team to implement the energy centre and mechanical infrastructure for the building."

Mark Burns, MEP Senior Project Manager for Mace, added: "Mace have worked closely with Vital Energi on numerous residential projects. Vital Energi have their own in house design team which was extremely important for the award of this project. The construction delivery team through pre-construction have been enthusiastic and dependable, I am looking forward to delivering this project with Vital Energi."

Work will begin on-site in May 2017 and carry on until the end of 2018.



Crossrail milestone as new trains enter service

Crossrail has published its latest quarterly update, 'Moving Ahead' as construction progresses towards final completion. The scheme will reach a significant milestone as the first of the new trains to run on the TfL route between Liverpool Street and Shenfield enter into service. This is the first stage in the phased introduction of the new Elizabeth line service, which will open through central London in December 2018.

Crossrail say the project is now 83% complete as construction of stations continues to progress along the route. Tunnels, shafts and portals are each being fitted out with cabling, ventilation fans and communication and signalling systems. Paddington Station has seen the first of the platform screen doors installed, providing a vital safety feature separating passengers from tracks and giving safe and easy access onto trains. The project is also providing

apprentices with valuable experience through Crossrail's purpose-built training facility, the Tunnelling and Underground Construction Academy (TUCA). The Elizabeth line will boost central London's rail capacity by 10% when it becomes fully operational. The railway will serve 40 stations, with up to 24 trains per hour in each direction, giving an additional 1.5 million people greater access to jobs and opportunities in London's major employment centres.

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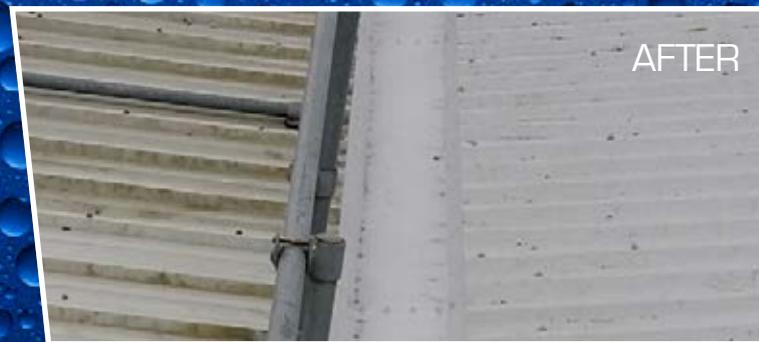


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Government policy on sustainable drainage criticised by MPs



The Government has been criticised for its approach to sustainable drainage by the Environment, Food, and Rural Affairs Committee.

According to the 'Post-legislative scrutiny: Flood and Water Management Act 2010 Report', the Government's ambitious housebuilding programme, which aims to deliver one million new homes by 2020, must be achieved without an increase in flooding.

The report states that the Government's lacklustre attitude to implementing sustainable drainage systems (SuDS) policies is putting communities at risk and calls for tougher planning rules to ensure all new developments are required to implement high quality drainage.

Environment, Food, and Rural Affairs Committee Chair, Neil Parish MP

commented: "Plans to deliver some one million new homes by 2020 must be achieved without increasing flooding. SuDS are an essential part of the solution as they provide a cost-effective, green method of removing surface water from built-up areas."

MPs accused the Government of doing little to prove its support for sustainable drainage having failed to implement a strong policy framework to encourage their use, leading to some developments having low quality installations.

Mr Parish added: "Standards for SuDS construction must be made statutory to provide a stronger basis for enforcement and make it easier for Water and Sewerage Companies to adopt SuDS."

"We call for an ending of the automatic right of new developments to connect surface water discharges to conventional sewerage systems to spur developers to develop sustainable alternatives."

City of London Corporation award £4.6M facilities management deal

The City of London Corporation has awarded Skanska a contract to carry out mechanical and electrical maintenance and take responsibility for the upkeep of the organisation's buildings.

The City Corporation's property also includes areas outside of the capital including Epping Forest, Hampstead Heath, Tilbury Docks and Burnham Beeches.

The portfolio consists of such buildings as schools, police stations, libraries and a large investment portfolio of commercial offices, retail and leisure facilities.

The contract, worth £4.6M, will begin in July 2017 for a duration of five years, with the option to renew for a further two.

Pete Collinson, Operations Group Director at the City of London Corporation, said: "We're pleased to appoint Skanska with the

demanding task of delivering a quality maintenance service to our built environment and our heritage and green spaces. Providing continued maintenance and improvement to our property and facilities for the benefit of visitors and users is an ongoing priority."

The City Corporation is a unique public body, with a large and diverse portfolio of properties.

Iconic infrastructure in the capital includes Mansion House, Tower Bridge, the Old Bailey, the Guildhall and the Barbican, together with the Smithfield and Spitalfields markets.

Katy Dowding, Managing Director at Skanska, commented: "We are thrilled to have won this contract. We look forward to working with this prestigious new customer. We'll be using lots of new ideas and innovations to deliver a first-class service."



£6M University of Huddersfield scheme now underway

Work on a £6M upgrade to the University of Huddersfield's Joseph Priestley Building is now underway, providing students with new science facilities.

The iconic structure dates back to the 1960s when it was known as the 'Z building', due to its unique shape. Over the years it has undergone numerous refits and upgrades though the University says these latest enhancements are the most ambitious yet.

Construction work will see the lowest three of the four storey structure gutted and internally remodelled.

The facade will also feature finned metal cladding in keeping with the surrounding architecture.

The facility was known formerly as the 'West Building', hosting both students and staff in Applied Sciences and the Humanities before changing its name in recognition of a local scientist famed for his discovery of oxygen.

University of Huddersfield Director of Estates and Facilities Colin Blair said: "This allows the School of Applied Sciences to grow and from next year its students will have better facilities than ever."

A link adjoining the Joseph Priestley Building to a planned new science block, currently used for car parking, will also be built.

Rick Smeaton, Bardsley Regional Manager in Yorkshire, commented: "This contract represents our first major project for the University of Huddersfield and provides our Yorkshire office with an ideal opportunity to enhance our reputation for the delivery of high quality and bespoke educational facilities."

Work on the project is due to complete by the end of the year.

Past meets present on Dover Western Docks Revival development

Work to remove a section of 19th century sea wall and pave the way for the new Wellington Navigation Channel is well and truly underway in Dover.

The works form part of the ongoing Dover Western Docks Revival (DWDR) development and mark a significant moment for marine civil engineering on the project.

A newly plotted navigational route will be opened up which will allow pleasure vessels to enter or leave Wellington Dock from the as yet unbuilt marina.

The Wellington Navigation Channel will also involve a new bascule bridge and a pedestrian footpath built behind the original seawall.

This will adjoin both the new marina

curve and marina to the seafront esplanade, bringing together new facilities along the waterfront.

Once the age-old sea wall has been removed, piling can begin at Wellington Dock to connect with the new Western Docks. Sheet pile cofferdam installation can then get underway before the reinforced concrete walls and base of the cut are built.

The £250M Dover Western Docks Revival will play a key role in the regeneration of Dover, transforming the waterfront to host shops, bars, cafes and restaurants.

What's more, a new terminal and distribution centre will further develop the cargo industry, leading to greater employment opportunities for



the wider community.

Jack Goodhew, General Manager - Special Projects, Port of Dover, said: "Connectivity is an important part of DWDR, linking old and new parts of the waterfront and the wider port estate - such as the historic Cruise Terminal 1 - to create a new destination for Dover that our community and visitors alike can explore."



'Ambitious' Olympic Legacy Park Sheffield project showcased

The Olympic Legacy Park Sheffield is being highlighted as an ambitious regeneration scheme as part of a major initiative.

The campaign, entitled #5daysofmortar, is being run by 'PwC Yorkshire and North East' in a concerted effort to promote construction and real estate in the region.

The Olympic Legacy Park Sheffield has been chosen as a prime example of regeneration - a central feature in the campaign. A fly-over video has also been released revealing what the project will look like once complete. Lee Wilkinson, Construction and Real Estate Leader at PwC for Yorkshire

and the Humber, said: "As part of the campaign, we wanted to showcase a large scale, ambitious project that reflects a key theme of regeneration, and we believe Olympic Legacy Park Sheffield is an excellent example of this.

"It offers a number of opportunities to highlight the success of the construction sector as the site is still live with construction ongoing, phases yet to launch and some areas completed. The site is also a great example of what can be achieved when the public and private sector work together."

The #5daysofmortar campaign will also feature blogs, events and

videos discussing, celebrating, and challenging the sectors - most notably the skills shortage and lack of diversity within the workforce.

Mr Wilkinson commented: "Our hope is that this campaign will raise awareness of these challenges but also point to the future, drawing on key examples such as innovation around modular housing and Artificial Intelligence."

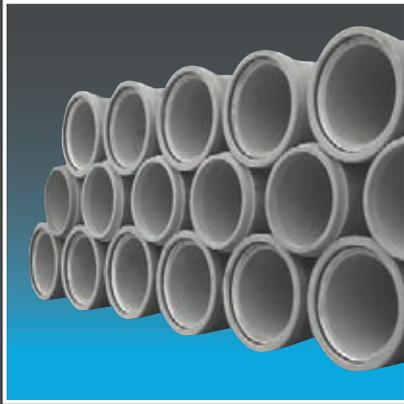
Other construction projects in the region include the expansion of high-tech research facilities around Factory 2050 and growth of the Advanced Manufacturing Innovation District, home to such companies as Boeing and McLaren.

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FTA calls on next government to support freight industry

The Freight Transport Association has urged the Government to provide support to the logistics industry as it transitions to Clean Air Zone regulations and looks to curb vehicle emissions.

In the FTA's General Election Manifesto, the association said the support must also include help in developing the alternatively fuelled vehicle market and not just a reliance on imposing heavy taxes on diesel users. The FTA claimed that such a heavy-handed approach would result in suffocating economic growth and increasing prices throughout the economy. According to Christopher Snelling - Head of National Policy at FTA, the logistics industry has taken great

strides to reduce its environmental impact in recent years but there is still much to be done.

He said: "It is vital that the next UK government continues to help and support freight and logistics operators as they work to comply with the latest Clean Air Zone regulations, and should not be using the industry as a sector for a problem which is the responsibility of all. There is no environmental purpose to increasing diesel duty on vans and lorries, as unlike diesel car drivers, operators of these vehicles currently have no realistic alternative.

"FTA members are also calling on the next government to take one simple step to boost economic performance: research by the Centre for Economics

and Business Research (CEBR) has shown that the introduction of a 3p per litre reduction in fuel duty would boost the economy and be revenue neutral for the Government, since rises in other tax receipts would offset losses on fuel duty, and the resulting additional spending would reinvigorate the economy."

Amongst the FTA's manifesto, other requests included more spending in road and rail infrastructure and free access for the UK freight and logistics industry to the EU market post-Brexit. The UK's logistics sector is worth over £121Bn to the UK economy and employs over 2.5 million people nationwide.

Heathrow use £16Bn expansion to drive off-site manufacturing

Heathrow Airport has announced plans to boost the off-site construction sector as part of its £16Bn expansion project. The airport will now look for areas across Britain to host four new logistics hubs that will manufacture and assemble the necessary components before transportation to Heathrow proper.

It is thought that the hubs will allow Heathrow to reap the benefits of an off-site approach, including greater efficiencies in time and cost, and a reduced carbon footprint.

Heathrow's announcement coincided with a report, courtesy of WPI Economics, which revealed that off-site manufacturing could result in a £15Bn boost for construction outside London before the end of the decade.

According to Heathrow, the decision not to use traditional on-site construction methods during its expansion will enable the economic benefit to spread

further afield.

For those organisations with a stake in off-site manufacturing, this decision is a welcome shot in the arm. It will help demonstrate the full capabilities of modular construction on a grand scale. Up until now, off-site construction has been relegated to a supporting role for



major infrastructure schemes. It has gained traction in the residential sector however, resulting in cost reductions of up to 25% and increased project delivery speeds of 30%.

Heathrow hopes that its faith in off-site construction will see a "step-change" for Britain's construction industry.

Heathrow CEO John Holland-Kaye said: "The global construction industry is set to be worth £15 trillion by 2025 - that's a huge prize that Britain deserves a bigger share of and Heathrow can help.

"We want to use Heathrow expansion to not only upgrade Britain's infrastructure, but cultivate a new world-leading sector and drive growth across the whole country. Boosting off-site construction will help make expansion more affordable and environmentally friendly and give Britain a lasting legacy of expertise that it can sell around the world - helping Britain lead the pack in global construction."

Sadiq Khan to establish Construction Skills Academy



The Mayor of London, Sadiq Khan, is to launch a Construction Skills Academy as part of his 'Skills for Londoners' programme, which will provide the people of London with the opportunity to obtain the skills the capital is crying out for.

The Construction Skills Academy will be created in collaboration with the housebuilding industry to help address the housing shortage in London and the chronic skills shortage in the construction sector.

The Skills for Londoners Capital Fund will provide £114M in funding to deliver improved equipment and facilities at further education colleges and other

education and training providers. A Skills for Londoners Taskforce will also be established that will feature leading figures from the world of business and employers, skills and education experts and London Government representatives. They will be charged with developing strategy for the whole of London to engage with the skills programme.

The taskforce will work closely with the London Economic Action Partnership (LEAP) to ensure that a greater number of 16 year olds move into further education.

It will also focus on equality and provide girls with opportunities to

develop their STEM skills.

The Mayor cited uncertainty surrounding the UK's access to skilled labour from the European Union following the Brexit vote as a fundamental reason to implement this strategy.

The Mayor of London, Sadiq Khan, said: "I want all Londoners to have the same opportunities I had growing up. Skills for Londoners is the first step towards making that happen. Through Skills for Londoners, we will address these problems head-on, giving Londoners the chance to train in the skills that will boost our economy and creating a pipeline of local talent and expertise for

Working at height still construction's biggest danger

Working at height remains the most significant hazard on our building sites according to a survey carried out by the Building Safety Group.

The report was based on the findings of over 2,000 site inspections carried out last year, with working at height accounting for 19% of all incidents recorded.

The total number of incidents in 2016 logged by safety officers was 24,634, with the second biggest breach of regulations coming in the shape of dust or fumes at 5%.

The results follow a similar pattern to the latest figures from the construction industry from the Health and Safety Executive (HSE), which placed falls from height as the biggest single cause of fatalities in the workplace, despite a drop in the overall numbers.

On the last five years, 97 construction workers were killed, accounting for 45% of all fatal injuries.

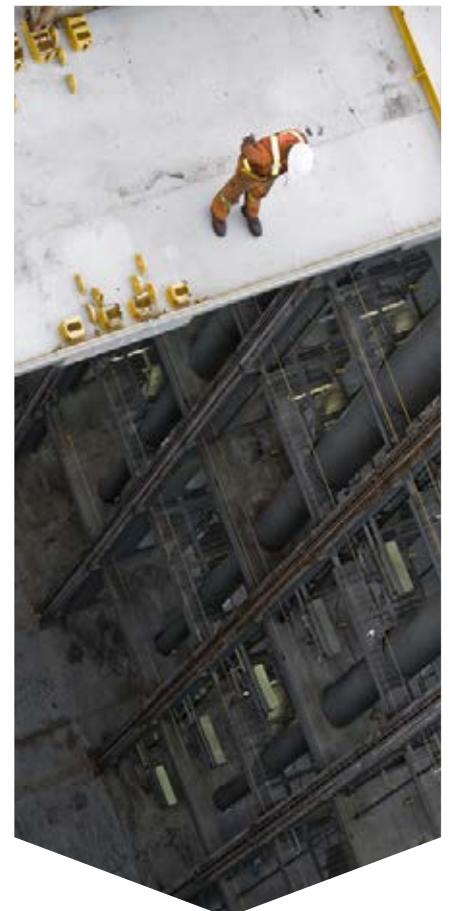
Falls from height were also the number one cause of non-fatal accident related

injury, responsible for 33% of all non-fatal injuries, including 11% of the injuries resulting in an absence of more than seven days.

The report also revealed that the three main causes of falls from height injuries and fatalities are fragile roof lights, scaffolding and ladders - all of which are easily preventable.

Building Safety Group's Technical Manager, Chris Chapman, commented: "Working at Height is clearly the most dangerous activity carried out in the construction sector. Everyone can do more to ensure that work is properly planned, supervised and conducted by qualified workers who have the required skills for the task in hand.

"To significantly reduce the dangers of working at height, construction companies should always try to complete as much work as possible from the ground, ensure safe access and egress and importantly, make certain that any equipment used is suitable, stable and strong enough for the job."



Reading Borough Council back £500M Royal Elm Park proposal

Reading Borough Council has approved plans for Reading Football Club's £500M Royal Elm Park development to be sited on land surrounding the Medejski Stadium.

A new 28,000sq m convention centre, dubbed 'The International', will be the focal point of the development and provide a venue for a wide range of events including concerts, conferences and an ice rink.

The International will have capacity enough for some 6,000 attendees making it the largest dedicated conference venue in the South of England.

The development will also see construction of over 600 homes providing a mix of two and three-bedroom homes complete with parking for residents.

The community at Royal Elm Park will also be able to take advantage of a new 18,000sq m public open space that will include retail, leisure and restaurant facilities.

The development hopes to harness

Reading's growing economic presence in the region, with a number of global businesses such as Microsoft, Symantec and 3M setting up shop in the town. Improved transport links will provide greater connectivity with Crossrail services and give new direct links to Central and East London from 2019. A new mainline station is also planned at nearby Green Park, which the club



say will provide direct rail access to local destinations, the South West, the Midlands and the North.

Nigel Howe, Chief Executive of Reading FC, described the development as a "step change" for the town. He said: "This is a huge boost for Reading, and will deliver a step change in the town's ability to host international, large-scale conferences and events, which the business community here has long sought. But the scheme delivers more than that. It delivers a new and reinvigorated destination for businesses and the Reading community, and will significantly enhance the match-day experience for our supporters, the driving force behind the club's success." Nigel Horton-Baker, Executive Director, Reading UK CIC, said the scheme would boost the local area by creating 2,000 jobs during its construction and operation phases.

The project is due to begin construction early next year and be completed in 2023.

UWE Bristol open £55M facilities for Faculty of Business and Law

ISG has delivered a £55M project at the University of West England (UWE Bristol) to create a new home for the Faculty of Business and Law. Staff and students of Bristol Business School (BBS) and Bristol Law School (BLS) have made the move to the new facilities, which form the centrepiece of a £300M capital investment programme.

The Bristol Business School Building is intended to foster formal and informal interactions between the university and wider business community, and the new

facility promises to bring lasting benefit to the regional economy. Spanning five storeys and 185,000sq ft, the building houses specialist social learning space, wherein professional organisations, judges, accountants, small business owners and start-ups can mix with staff and students alike.

Professor Steve West, President and Vice-Chancellor at UWE Bristol, said: "It is wonderful to see this flagship build fully occupied. At UWE Bristol we teach business differently. A UWE education goes beyond getting industry accreditation, important though this is. We are harnessing relationships with thousands of businesses across the region, nationally and internationally helping us to shape our courses so that our students develop the skills that are needed to help the economy thrive." Features include two showcase law courts, a city trading room, a 300 seat tiered double height lecture theatre, two Harvard lecture theatres and an incubator for the university's Team Entrepreneur course, which requires students to collaborate in teams to create and run a business over a three year period under the guidance of their

mentors.

The building incorporates flexible technology and enhanced learning spaces, IT suites, meeting facilities and parking for business, an external business engagement space, a central social space and café.

UWE Bristol is an advocate of advanced building methodologies to drive efficiencies during the construction process and into occupancy. As such, ISG delivered the project to Building Information Modelling (BIM) Level 2 maturity, with all design data beamed between stakeholders to create a computer-based model of the building. Rob Martin, ISG's Western Regional Managing Director, commented: "As a Bristol-based contractor, seeing the development and investment in UWE's Frenchay campus and across the entire university estate is incredibly positive for our city and the wider region. The new Bristol Business School has already achieved landmark building status and exemplifies how UWE do things differently - with collaboration and inclusion two of the overriding design principles of the project."





Skills shortage hampering 78% of UK contractors

A poll of over 350 contractors, conducted by ECIC, has revealed that the construction sector is struggling to meet demand amid the ongoing skills shortage. According to the survey, 78% acknowledged that their business was being impacted by the shortfall, with 56% hoping to up the use of subcontractors and plug the gap. Apprenticeship initiatives are proving successful however, with almost a third of all contractors surveyed eager to engage with apprentices and shepherd the next generation into the sector.

In its survey ECIC found that:

- 30% of respondents said that their business had been seriously impacted by the skills shortage. Encouragingly, 44% felt that impact was far less pronounced, though 4% claimed to be severely hamstrung.
- 25% intend to make full use of labour only sub-contractors in the next 12 months, while 31% will rely on bona fide sub-contractors.
- 32% of contractors surveyed propose to take on more apprentices.

Richard Forrest Smith, CEO of ECIC, commented: "It's no secret that the contracting sector, including the

UK's engineering services sector which is our key focus at ECIC, is facing a serious skills shortage which is increasing dependence on subcontractors. This is underlined in the findings of a recent survey by ECIC's parent, the ECA, which showed that labour costs had increased for five in ten engineering services contractors. Greater use of subcontractors can make the task of managing health and safety on site much more complex so it is important main contractors understand their responsibilities, not just to subcontractors but to the apprentices they employ too."

Genuine sub-contractors are responsible for health and safety procedures on-site. In contrast, labour only sub-contractors should be treated - from a duty of care perspective - as a directly employed member of staff. However, given that the principal contractor tends to remain contractually liable to the CDM co-ordinator or site owner for works undertaken by sub-contractors in their employ, ECIC advises that they should always satisfy themselves of the adequacy of their bona fide

sub-contractors' health and safety documentation.

Contractors should treat apprentices as ordinary employees, with the responsibility to ensure that the correct procedures are in place - taking into consideration the apprentices' need for extra supervision, knowledge, and ability. Richard Forrest Smith concludes: "Its vital main contractors create an embedded approach to health and safety amongst the entire workforce, from apprentices through to highly skilled subcontractors. The alternative is greater risk of accidents on site, leading potentially to liability claims, prosecutions, heavy fines and even possibly a jail sentence.

"On a more positive note, the plans to take on more apprentices is welcome news. Our parent, the ECA, has campaigned for quality engineering and technical apprenticeships and is working with partners within TESP - The Electrotechnical Skills Partnership - on a career progression project intended to upskill existing workers within the industry. Our findings suggest these efforts are starting to reap rewards."



Defending Adjudication Enforcement by Applying for a Declaration

The usual routes for resisting enforcement of an adjudicator's decision are a challenge to the adjudicator's jurisdiction or a contention that the adjudicator has not acted in accordance with the rules of natural justice. However, a further, albeit rare, route was described by Coulson J in *Caledonian Modular Ltd v Mar City Developments Ltd* (2015). It was possible to resist enforcement by having the court decide, with a different answer by way of declaration, the very question the adjudicator had decided, which in that case was whether a contractor's payment notice was valid. The defendant in that case counter-claimed for a declaration pursuant to the court procedure known as CPR Part 8. The judge was at pains in the *Caledonian Modular* case to stress that that this could only be done in exceptional cases where (1) the issue is short and self-contained and (2) requires no oral evidence or any other elaboration other than that which is capable of being provided during a relatively short interlocutory hearing.

Enforcement hearings are normally two hours or half a day.

The position may be eased by agreement, for example the claimant may be able to agree that if the defendant succeeds on the declaration, the adjudicator's decision is not to be enforced and the defendant may be able to agree that if it does not obtain the declaration, the amount decided by the adjudicator is to be paid. The parties may be able to agree what the consequences of a decision on the declaration will be for their dispute. In the recent case *Hutton Construction Ltd v Wilson Properties (London) Ltd* (2017), the same judge reviewed the authorities with an element of agreement.

Where there is no element of consent, the judge added a third requirement for this means of resisting enforcement to the two from *Caledonian Modular*: (3) the issue is one which, on a summary judgment application, it would be unconscionable for the court to ignore. The consequences of determining the issue will also need to be clear-cut (as

in the situation under discussion they would not be agreed by the parties). The judge also stated that a defendant taking this route must issue a CPR Part 8 claim setting out the declarations that it seeks or, at the very least, indicate in a detailed defence and counterclaim to the enforcement claim what it seeks by way of final declarations. A prompt Part 8 claim is the best option. Paragraph 9.4.3 of the TCC Guide, which supports a more informal approach, is now to be taken to be superseded by the judgment in the *Hutton Construction* case. The increased formality is necessary to inform the claimant as to the precise basis of the challenge and declarations sought and to inform the judge, who would be making directions as a purely paper exercise, as to what was going to be involved at the hearing. As a defendant unsuccessfully taking this route is likely to be an abuse of the court process, an order for indemnity costs against it is likely.

By Peter Sheridan, Partner, Sheridan Gold LLP



The Optimum Off-site Solution

Following several years of relatively flat growth, contractors have long been anticipating an impending rise in material costs. The most recent increase in material prices has been referred to by the associated builders and contractors as 'the calm before the storm'. This is further exacerbated by a rise in labour costs, threatening what are already tight margins. The industry is able to counteract the rise in labour costs through innovations in construction technologies. Businesses that have not yet recognised the benefits of such innovations and have not adapted to the changing environments, could potentially be forced out of mainstream construction activities. Technical change is without doubt taking place but apparently at a slower pace than in other sectors of the economy. Off-site construction, where buildings are manufactured in factory controlled environments, for on-site installation provides a viable alternative. Employment is factory based and therefore permanent and a more attractive proposition for securing and maintaining a skilled workforce. Wherever a factory is based, the local economy will thrive through the provision of long-term sustainable jobs and income. Off-site construction technologies reduce the reliance on traditional labour, mitigating the impact of skills shortages and increased wages. A study carried out by the Steel Construction Institute (SCI) on a four-storey residential building estimates that the total amount of site labour can be reduced by as much as 75% simply through using off-site

construction. This process is also significantly less weather dependent, avoiding possible setbacks to the build schedule. Fast installation reduces labour requirements and time on-site, as well as reducing health and safety risks from working at height. The factory application of coatings and bending reduces the risk of delays to follow-on trades and helps minimise the on-site construction programme, therefore making savings on labour costs. The combination of accelerated handover times combined with reducing repair and maintenance costs throughout the lifecycle of the building are two major financial advantages to off-site construction which are particularly important for public sector health, education and social housing providers. Another financial benefit gained from off-site construction is the improvement of the cash-flow for contractors and developers. Through the use of off-site technologies, a building schedule can be reduced, delivering a faster return on their investment. Buildings can be on-stream and operational or sold faster, crucial to retailers and commercial housing developers. New technologies allow lower capital requirements and deliver cost and programme assurances. Management of materials is a vital element in project planning and control. As materials now represent a growing expense, minimising procurement or purchase costs plays a significant part in the reduction of overall costs. Our approach to design and value

engineering is inclusive, working side-by-side with our clients and their designers to create a complete solution incorporating design with structural calculations. Including the supply chain in the design phase enables developers to expediently procure materials to avoid issues with lead-in periods. This allows time to substitute materials if those originally specified are at a higher cost than anticipated or cannot be secured to meet the brief or programme. Steel offers architects' greater versatility than other building solutions, particularly in terms of cost. Productivity advances have been achieved throughout the steel supply-chain and such cost saving benefits can be shared with contractors. The manufacture of steel in factory controlled conditions enhances build programmes, eradicates the risk of on-site variability, and improves on-site health and safety. These combined benefits provide more predictable outcomes. Contractors and developers that go down the route of procuring off-site manufactured steel solutions will reap these benefits. As an advanced high performance off-site solution, steel is not susceptible to shrinkage, warping, cracking, rot infestation or moisture absorption. Steel is a robust, rigid and dimensionally stable material that does not suffer from movement created by moisture related issues. In my opinion, light gauge steel is perfectly positioned to meet construction industry demands - it is future proof and future ready.

By Steve Thompson, Managing Director of EOS Facades



LOVE THY NEIGHBOURJUST DON'T GIVE HIM ANY FREE ADVICE!

My wife absolutely loves offering my services as a matchmaker, job finder and building consultant to her many friends and colleagues and yes, you've guessed it, I don't get paid for any of these favours. Now I think it is fairly clear that when I succumb to my wife's promises and I find myself looking at a wonky wall, badly plastered ceiling or dodgy extension I am not entering into a contract with these people but the current Mrs Vinden (there will be only the one, I hope) might be surprised to learn that I could still be sued if I cock up in the granting of the requested favour. Why is this?

Well, even though there might not be a contract in place,

I still owe a duty of care to anybody I have agreed to or been coerced into advising. If a loss is incurred as a result of free but dodgy advice and I am judged to have been negligent, then the person who has had the benefit of the free advice may also be able to sue me to recover any losses incurred as a consequence. Now you know where the saying "don't confuse the law with justice" comes from.

If you don't believe me, read the Court of Appeal's judgement in *Lejonvarn v Burgess* and another. The facts of the case are that Mrs Lejonvarn agreed to provide some unpaid project management services for

some garden landscaping as a favour to her friends and neighbours, Mr and Mrs Burgess. What a nice gesture. Unfortunately, it appears that things started to go off the rails. The costs of the landscaping works started to escalate and it seems that Mr and Mrs Burgess did not fully approve of the quality of work undertaken by the appointed contractor.

Consequently, Mr and Mrs Burgess decided to dispense with Mrs Lejonvarn's free project management services and brought in another consultant to complete the project. Mr and Mrs Burgess then brought an action against Mrs Lejonvarn in the High Court claiming the

If your better half volunteers you to give informal advice in a social context, it is possible, but probably unlikely, that a duty of care will arise if you offer an informal opinion and that advice proves to be wrong.

increased costs of completing the project.

The High Court decided that no contract had been formed between the parties. This was partly because Mrs Lejonvarn had not accepted payment for the project and there was no "offer" or "acceptance" to be found in the email correspondence passing between the Parties. However, the High Court still decided that Mrs Lejonvarn owed her neighbours a "duty of care" to exercise reasonable skill and care in acting as an architect and project manager and to prevent economic loss. Mrs Lejonvarn's duty of care arose because she had "assumed responsibility" for the project. In reaching his decision, the judge noted that Mrs Lejonvarn:

- agreed to and provided a series of professional services over a period of time;
- expressed a degree of confidence in her ability to manage the project and control the budget;
- performed the services "in

a professional context on a professional footing";

- and was, or should have been, well aware that her neighbours were relying on her to perform her services.

Perhaps not surprisingly Mrs Lejonvarn decided to appeal the judgement but that appeal was thrown out by the Court of Appeal.

From now on I will be telling Mrs Vinden to cease and desist from offering my services to friends and colleagues on a pro bono basis. Well, perhaps I won't go that far as the judge was careful to emphasise that the case before him did not relate to "brief ad-hoc advice" but something that started out as a casual conversation between friends at a party and quickly progressed to something which was "akin to a contract".

If your better half volunteers you to give informal advice in a social context, it is possible, but probably unlikely, that a duty of care will arise if you offer an informal opinion and that advice proves to be wrong. The fact that you have

provided the advice for free and there is no contract will not necessarily prevent a duty of care arising. Why take the chance?

So, if you see me at a party, I will be the chap wearing ear defenders, gaffer tape over my mouth, drinking through a straw with the "no free advice given" label stuck to my forehead! Only joking.

Peter Vinden is a practising Arbitrator, Adjudicator, Mediator and Expert. He is Managing Director of The Vinden Partnership and can be contacted by email at pviden@vinden.co.uk. For similar articles please visit www.vinden.co.uk.



Construction Site Safety: Does your mask pass the face fit test?

Christian McCale, CDM and Safety Consultant at safety and risk management specialist Innov8, highlights the importance of proper face fit testing for wearers of respiratory protective equipment.

Although the need for employers to take effective measures to protect the health of their construction workers and avoid exposure to airborne dust is well understood, I am increasingly coming across situations on sites where employers are either overlooking or ignoring their safety responsibilities in relation to respiratory protective equipment (RPE). This is particularly the case, for example, when it comes to face fit testing for those workers who need to wear a close fitting mask for their work. A major cause of leaks is poor fit. Tight-fitting facepieces need to fit the wearer's face to be effective. To comply with a range of workplace health and safety legislation, it is therefore a requirement that face fit testing should be carried out as part of the initial safety mask selection process for all workers and subcontractors

involved in such activities as cutting, sawing, sanding, plastering and similar work that is liable to produce dust and generate airborne particles. Importantly, it's not just those workers carrying out such activities, but those working in adjacent areas who will also need protective masks. To prevent exposure to dust the Control of Substances Hazardous to Health (COSHH), the Control of Lead at Work (CLaW), the Control of Asbestos Regulations 2012 (CAR) and the Ionising Regulations (IRR) all require the proper testing of individuals to avoid the use of poorly fitting face masks. Worryingly, perhaps because half face masks are relatively low cost and disposable, it would appear that some health and safety dutyholders have become fairly blasé about the need to test. However, it is stipulated in the legislation that face fit testing should be regularly undertaken to assess any change in equipment or the facial characteristics of the wearer that could affect the fit.

For example the effects on wearers of facial weight gain or loss, significant dental treatment or other facial changes such as scarring could impact the ability of the mask to form a close fitting seal against the face which is required to reduce the risk of exposure or airborne dust. A qualitative test can be undertaken on disposable half masks which involves a hood being placed over the head and shoulders of the individual. A solution is sprayed into the hood to test the mask wearer's sense of smell and taste to detect any leaks in the mask's seal. A more precise quantitative test is used for all masks, including re-usable filter or cartridge half masks, powered respirators and full face masks. In this test a machine is used to detect airborne particles passing through the mask and seals to provide a pass or fail result. In both cases it is a requirement of the legislation that records of testing are maintained, including the make, model and size of the mask - and the records must be available for inspection, which



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To comply with a range of workplace health and safety legislation, it is therefore a requirement that face fit testing should be carried out as part of the initial safety mask selection process for all workers and subcontractors involved in such activities as cutting, sawing, sanding, plastering and similar work that is liable to produce dust and generate airborne particles.
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means that records should preferably be held on-site rather than at a head office location.

Principal Contractors often rely on the sub-contractors to undertake face fit testing and records may be requested when the risk assessment and method statements are provided. But what about when new or additional operatives from that sub-contractor come to site, are their records also sent over?

It is also advisable to keep a record of the face fit test with a site worker's induction record. This way, it is clear which operatives have a face fit test record and which sub-contractors may not have them if they work adjacent to others.

Importantly the HSE recommends that the wearer needs to be clean-shaven around the face seal to achieve an effective fit when using tight-fitting facepieces and this can prove challenging for employers with workers on site that favour beards or designer stubble.

Ultimately, however, the employee also has responsibility under the Health

and Safety at Work Act 1974 to take reasonable care for their own and others' health safety whilst at work. In addition, workers also have a duty to co-operate to assist their employer to fulfil their legal obligations.

In the circumstances it is worth remembering that different types and sizes of mask are available to ensure that adequate protection is achieved for all workers who need protection. In those situations where the wearer retains a beard on religious grounds, for example, it might be appropriate for an air fed mask to be worn to provide adequate protection.

The key message is that in all circumstances, unless the mask is proven as fit for purpose then its use is entirely ineffective in providing the necessary respiratory protection.

On this latter point, the relatively low cost of disposable masks can encourage misuse and damage through wear and tear. Masks are often used for longer periods than they are suitable for and damage can be caused when they are folded and put in pockets - and if thrown away

replacement masks may not be chosen on a 'like for like' basis, meaning that close fitting properties can be compromised.

In such circumstances, alongside face fit testing, proper mask maintenance checks should be carried out to ensure that the RPE is providing the required levels of protection at all times.

The Health and Safety Executive (HSE) recently highlighted that an in-depth investigation showed only around half of companies inspected were effective in protecting the wearer through their use of RPE as a control.

The risk is clear - if the face fit isn't good, then you could be leaving yourself open to penalties and enforcement action.

The HSE Operational Circular OC282/28 gives advice and information on RPE fit testing methods and test results: http://www.hse.gov.uk/foi/internalops/ocs/200-299/282_28.pdf

High rate soil processi

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The continuous mixing plant has a variety of applications, perfectly suited to the remediation, geotechnical and construction industries.

The advantages of using this equipment include:

- Processing capacity of upto 600 tonnes per hour for the rapid treatment of bulk soil volumes
- A small operating footprint
- Multiple feed points allowing for complex binders to be added
- Powder and liquid additives can be used
- Complete soil homogenisation ensures robust treatment
- On-site treatment of 'out of specification' soils allows off-site disposal and import of geotechnical fill materials to be reduced
- Suitable for a vast range of soil improvement approaches

ING THE WAY TREATMENT ABILISATION



Fuelling the Economy:

An exclusive interview with Andy Allen, UK Fuel Card Sales Manager for BP



Could you first of all provide our readers with a bit of an introduction? What is your professional history and how did you come to work at BP?

I joined BP in September 1998, on a commercial training scheme actually. BP run a variety of entry level training initiatives and I worked a number of different rotations as part of that; from finance initially to credit collection, customer facing roles and so on. Mine was a three year programme and I've been with BP ever since. Historically, most of my time has been spent in Air BP; the aviation fuel division. As mentioned, I worked in a number of different roles but once I got a taste for the customer facing piece I ended up in a junior sales position as part of a team marketing to commercial

airlines. Selling jet fuel basically; very large quantities at relatively low prices all over the world. It took me to some quite interesting places over the years; some of which I'd love to go back to and others I'm not too sure I'd want to visit again. Aviation is a very interesting and dynamic industry.

I worked for around ten years in a number of different sales and marketing roles at Air BP and looked after about ten different countries across Europe; both the airlines based in those countries and the Air BP marketing footprint at specific airports. I was responsible for deciding which airlines we would supply to at which airports and setting the prices for those customers as well. From there I moved into a more global

marketing strategy role looking at the footprint for Air BP worldwide. We rewrote customer and location segmentation, deciding which airports we would market to and how we would market our fuel in those locations, and I worked on sales capability and supply best practice in those markets as well. I did this for three years before moving into my current role in the ground fuels business in April of last year.

For the uninitiated, could you explain the rationale behind BP Fuel Cards? What benefits do they afford fleet managers?

For businesses, a fuel card can be summed up in a few key points. It gives you greater control, allowing you to lock down spend to specific sites or products. Historically, businesses

Andy Allen, UK Fuel Card Sales Manager for BP, speaks exclusively to UK Construction Excellence about the emergence of the fuel card, its impact on the ground fuels industry, and the outlook ahead for fleet management nationwide.



actually the VAT receipt. We consolidate all of those transactions and the invoice we produce at the end of the week, fortnight or month actually becomes the VAT receipt. You don't have to ask every driver to hand in their receipts, tot up their expenses, and submit them as part of your VAT reclaim submission. Now, you can enter your fuel card invoice and that will summarise all of the VAT your drivers have spent across your entire fleet, reclaiming it in one fell swoop.

Security is another benefit; the ability to ensure that only those authorised can buy items. Each driver must have a PIN code to use their card. These PINs can be authorised or de-authorised through a web portal, which gives you greater control. You're able to manage fraud as well, and ensure people are not buying more than they should be. We capture the odometer reading whenever a fuel card is used, which gives people the ability to record miles per gallon figures based on the amount of fuel going into a vehicle.

Also, price discounts are another big benefit. When you buy fuel on a credit card or with cash you will always pay the pump price. What a fuel card allows you to do is negotiate a price with your fuel card provider. We will have customers who pay significantly below the pump price because they're getting a benefit of scale in terms of bringing all that product to a single brand.

What differentiates BP's fuel card brand from its competitors?

The quality of our network, in terms of the infrastructure that we have on-site and the size and breadth of the entire network. We have the largest single-branded network in the UK with over 1,300 sites; the largest number of motorway service areas in the UK - about 70 overall; and over 500 locations on strategic A roads across the UK. We've got a fantastically positioned network and there are very

few white spots where you can't find a BP.

We also have a reciprocity agreement with other oil companies, meaning you can use the BP PLUS Fuel Card not just at BP-branded sites but also at Esso, Golf and Texaco petrol stations. In total, you have access to almost 3,500 locations across the UK, roughly 40% of all petrol stations in the UK, which is pretty considerable.

How are fuel cards impacting the ground fuels business?

From a BP perspective, fuel cards predominantly allow us to create stickiness with customers and drive more volume towards BP's forecourts. We've been heavily investing in the quality of our infrastructure over the last few years - you'll see that through our cooperation with Marks & Spencer (M&S) at our company-owned sites. There's been some significant investment in the number of M&S 'Simply Food' sites, and we've been converting existing BP forecourts to add these. We've also brought in a lot of 'new to industry' sites or purchased property from other brands, razing them to the ground and rebuilding them with the Marks & Spencer offer. The historic forecourt has changed dramatically over the past ten years or so. It's almost become a convenience retail location for customers, which fits very nicely with our fuel card offer. When you look at our customers, many of whom have drivers out on the road on a daily basis, they don't always have access to everything they need when they're in their cab. The forecourts and facilities we have invested in provide somewhere to stop for a break with all the relevant conveniences you might need, in addition to a best-in-class 'food on the move' offer. We've been investing in our Wild Bean Café brand, but our partnership with Marks & Spencer means fantastic food on the go. It allows them to purchase a dinner

would implement either a company credit card or a 'pay and reclaim' type operation. What a fuel card allows you to do is manage that spend more easily. If you want a driver to be able to wash their car you need only authorise it, and if you want them to be able to buy shop goods you can do that as well. It essentially gives you complete control over what your employees are spending.

One of the biggest benefits is consolidated invoicing. In order to reclaim VAT a company has to hold its receipts. If you're offering a pay and reclaim service or a company credit card however, you don't necessarily have all of the Level 3 data on your invoice. When you use a fuel card the receipt that you receive at the till is not

that they can take home and cook later on. This all fits very nicely with the needs of what we would call our higher value customer segments; the professional out on the road. Typically, those people who are in vehicles for a good chunk of the day are fuel card users. Of these professionals, over 90% will actually use a fuel card to buy their business fuel requirements.

What are your predictions for the future? What do you see as being the key issues facing fleet management going forward?

The first issue is around the volatility of the oil price, specifically the price that you will pay for fuel from the pump in the UK. For us, that volatility is caused by two things; the underlying oil price first of all. The Brent Crude and the West Texas Intermediate prices, which are published daily, are bouncing up and down and there are a lot of environmental factors impacting that. What OPEC (the Organization of the Petroleum Exporting Countries) decides, for instance; varying demand in China and India; drilling in the Gulf of Mexico or oil sands in North America. All of these things feel very far away in terms of geography but they directly impact what happens to us here and what we pay for our fuel.

The second thing is the exchange rate. Oil is a traded commodity in US dollars and, unfortunately for us, the pound versus the dollar exchange rate has been highly volatile since the Brexit vote last year. This has had a huge impact on the underlying price consumers pay at the pump, and that

volatility is going to persist for the foreseeable future. With Theresa May invoking Article 50, we are now on the clock with a two year countdown until we exit the European Union. The volatility that will cause, for foreign exchange in particular, will create a lot of uncertainty for fleet managers.

If I were a fleet manager I'd be looking at how I might protect myself from that. BP is having a lot of conversations with fleet managers about this, certainly in terms of fixed price and capped price offers, because we're able to give people certainty over what their spend is going to be. Taking away some of that volatility is very important. Fuel, depending on the industry you're in, can account for up to 30% of a fleets operating cost. If you end up with a 17 pence per litre increase in pump prices that will have a massive impact if you're lifting a million litres a year. Managing that cost going forward will be key. Another thing happening at the moment is the push for a reduction in emissions. We're seeing this in a number of forms. There's new legislation coming into effect throughout London around diesel - almost a dieselisation tax - which is bound to impact fleets. There's also a push for company car drivers to take up petrol or electrical vehicles, which is being driven by the BIK tax.

Now, local authorities want to have certainty over the emissions that their own contractors are emitting. And, if we think about the construction space, I know there's a number of large-scale projects - with TfL in London, for example - where bidders are being

asked to comply with certain emissions or fleet management criteria. It's a changing environment and a push towards greener business practices; something that should be at the forefront of every fleet manager's mind. Over time, fuel card providers and oil companies are going to have to step up to the plate and assist fleets with this. BP has a not-for-profit organisation within its business - BP Target Neutral - which offers companies the ability to offset their CO2 emissions, either in-part or completely. This can be from their vehicle fleet or their operations as well.

You can reduce CO2 emissions from a vehicle fleet but unless you can replace those with completely emission free vehicles, which is very difficult for those operating HGVs, then you can only go so far. If you want to go further, the only option you have is offsetting. BP Target Neutral actually offset all of the emissions from the London 2012 Olympics, and we have similar agreements to offset emissions from every FedEx package globally. We work with a number of airlines and we've started working with fleets across Europe to offset their emissions. It's an attractive proposition for companies who want and need to do something around their emissions but don't have the ability, because of the kind of business they're in, to go completely emissions free.

To learn more about the 'BP Plus Fuel Card' please visit: http://www.bp.com/en_gb/bp-plus/uk.html



When it comes to commercial vehicle efficiency, the devil is in the detail

There are now many options for managing commercial vehicles, which create many opportunities to save costs and improve efficiency. However more options equal more choices, and more choices means more detail that needs to be pinned down. This is where costs can creep in, however attractive the overall package.

The funding package used to acquire the vehicles is the starting point. Some companies buy their own, but most look to a rental or leasing supplier.

If you know exactly how many vehicles you need, exactly what specification you need and exactly how long you're likely to need them for (generally three to five years), it can be very cost-effective to enter a contract hire arrangement.

However, there is no flexibility built into the agreement, so any unforeseen events over that period can be extremely costly. That's why flexible rental is increasingly popular right now given the economic and political uncertainty: vehicles with a specific rental term that can be anything from weeks to years.

Short-term hire is another option. The vehicles come from an existing rental fleet for a few days or weeks at a time to fulfil an immediate need.

As rental is now the only off balance sheet funding for vehicles that is currently available in the UK, this makes it even more attractive to businesses looking to improve their gearing ratios.

If you do choose rental, you'll still need vehicles that have the specialist conversions and equipment that you need. So look for a rental supplier with expertise in construction and infrastructure so it can offer consultancy and guidance on the best vehicles and equipment for the job.

Work closely with the supplier on the specification of the fleet to ensure it meets your requirements, budget and time scale. Seek assurances that it can offer appropriate replacement vehicles – with specialist equipment available on its regular rental fleet – to cover downtime.

It's also important to choose a partner with the financial strength to invest tens of thousands (or even millions) into the specialist vehicle assets that your company needs.

It should have a comprehensive workshop network so that vehicles can be acquired, equipped and repaired swiftly. Also, check that the supplier is prepared to work flexibly with your preferred fit-out providers or repair/maintenance network if that suits your needs better.

Another important detail involves end-of-rent recharges for refuelling and vehicle damage. That's why end of rental charges need to be discussed with your rental provider from the outset. Ensure it's signed up to a reputable body like the BVRLA that offers clear guidelines on how to recharge damage. Insist on clear SLAs that will protect both parties.

Be clear from day one on how refuelling is charged. Enterprise Flex-E-Rent, for example, offers a simple 'empty to empty' system, which means vehicles are both rented and returned with minimal fuel remaining. It means no fuel charges and no confusion.

There are a huge number of other details that will need to be sorted out as well. Are the vehicles Euro VI-compliant and able to enter low emission zones? Do your vehicles need telematics systems? How can you ensure you have extra vehicles to meet seasonal demand?

It's a lot to handle – and this is why having a supplier with experience in providing vehicles to the construction sector is so important. If you'd like to know more about Enterprise's background and expertise, please get in touch.



To find out more about the difference we can make to your business, call **0800 328 9001** or visit **flexerent.co.uk**



Danny Glynn,
Managing Director
of Enterprise
Flex-E-Rent

TfL back electric vehicle uptake with £18M initiative

Transport for London (TfL) has made clear its commitment to electric vehicles following the appointment of five providers, each of whom will have responsibility for the funding, installation, operation and maintenance of a brand new network of rapid charging points. BluepointLondon, Centrica Consortium, Chargemaster, Electricity Supply Board and Fastned are the five providers in question. The timing is telling. April saw the unveiling of Sadiq Khan's so-called Ultra Low Emission Zone, which will tax London's most toxic vehicles from 2019 onwards. As such, TfL is keen to encourage greener alternatives, with electric vehicle uptake a priority. The new appointments will now move to install each rapid charging point; the first of which will be operational in a matter of months. Rapid is the operative word here. Each charging point can power an electric vehicle in little more than 30 minutes - a considerable improvement on the three to four hours associated with a standard unit. In total, TfL intend to establish a network some 75 charging points strong before the end of the year. This will rise to 150 in 2018 and 300 by 2020. It's a logistical tightrope walk however. TfL must work closely with the

London boroughs, investing more than £18M to upgrade power supplies and unlock potential new sites. A network of "strategic hubs" is also being considered along arterial roads owned and operated by TfL, and on private land at Heathrow Airport and numerous Shell service stations. These are envisioned as off-road sites, each with potential enough to house multiple rapid charging points. This being London, there's specific focus on the city's iconic black cab fleet. New taxis licensed after 1 January 2018 must be zero-emission capable. The rapid charging network has an important role to play here, with many charging points designated exclusively for their use. "Urgent action needs to be taken to clean up London's toxic air and rid the capital of the most polluting vehicles," said Ben Plowden, TfL's Director of Surface Strategy and Planning. "An extensive rapid charging network is fundamental in helping drivers make the shift from fossil fuels to electric. This is particularly important for the taxi and private hire trades and the fleet and freight sector, which over the next few years will be looking to dramatically increase the number of journeys made with zero-exhaust emissions."

With five providers all jostling for their fair share of the marketplace, TfL is confident price will remain competitive. Drivers can expect to pay at the charging point itself using a credit or debit card and it will not be compulsory to sign-up to a cumbersome subscription scheme. For the concerned, support will be given via a 24-hour, seven-day-a-week call centre. The location and availability of rapid charging points will also be accessible online and through downloadable apps. "This investment in London's infrastructure is great news for the capital," added Shirley Rodrigues, Deputy Mayor for Environment. "It will help to shape a new competitive market for rapid charging points, preparing for new taxis as we look to phase out diesel and make the move towards ultra-low emission vehicles to help clean up London's toxic air." Counsellor Julian Bell, Chair of London Councils' Transport and Environment Committee concluded: "We welcome this next step to provide rapid electric vehicle charging points in the capital, which play an important role for business users of electric vehicles in particular. We look forward to seeing these rolled out across all boroughs in the coming months and years."

NEW LORRY PARK AT JUNCTION 11 ON THE M20 IN KENT

THERE are over 300,000 HGVs on the roads in the UK, all transporting goods up and down the country, keeping the economy going. With strict laws in place to ensure that all drivers are well rested and alert while they drive, the availability of suitable places to stop is incredibly important to keep things moving smoothly. However, with the number of HGVs increasing, there is a substantial lack of suitable rest places for drivers. Drivers are often forced to park up in unsafe areas such as lay-bys where they risk theft and criminal damage to their vehicles, an outcome that is all too common. They have also been forced to park in more residential areas, creating an unnecessary nuisance to local residents.

In the south east of England, especially between the M25 and the Port of Dover, the lack of suitable sites is particularly problematic. In 2015, when French ferry workers went on strike and Operation Stack was enforced, tailbacks for miles and miles transformed the region's roads into truck parks. A site at Otterpool Quarry in Sellindge accommodated some of the vehicles and is now in the process of being shut down by Shepway District Council due to lack of planning permission. The site's owner, Pat Breen, is in a battle with the authorities to keep the site open and available, having applied for retroactive planning permission to help his case. Drivers



have to leave the M20 in order to find somewhere to park up and with a dwindling amount of available space, they will take to clogging up lay-bys along the A20 and nearby areas. Fighting to close down what few sites are available is not the way to go, these trucks will still need somewhere to stop.

The solution favoured by the government is to build a vast, new lorry park at junction 11 on the M20 in Kent, capable of accommodating an impressive 3,600 HGVs over an area of 250 acres. This plan was announced by Transport Secretary Patrick McLoughlin, a few weeks before leaving his position amid the fallout from the Brexit vote. The price tag is thought to be £250 million, but with all large scale public works, it's reasonable to expect a dramatic increase. But the plans were put on hold pending the outcome of a legal review. Campaigners cite the lack of consultation with residents, destruction of local countryside and increased pollution as the main problems around the planning and

construction of the new lorry park. Let's not forget, this lorry park is only intended to be used as an overflow parking area if and when Operation Stack is brought in. Seems like a hell of a lot of money to spend on something that won't even be used all the time.

Instead of focussing their efforts on one ridiculous truck park that will face endless local opposition, why don't the government look at the land they already own. Throughout the motorway network in the UK, the government owns 23 different sites, all initially earmarked for use as motorway services but to this day they are unused. While these sites are probably too small to accommodate a modern MSA, they are more than big enough to be parking areas for HGVs. We approached the government in 2012 in order to ask them to release their completely unused sites to offer more parking and convenience for drivers across the UK. They didn't, and all they've managed to do since then is dig one of their sites up and cover it with grass.

All it will take is a little bit of forward thinking. Our government is often a hindsight acting power, in this example looking at what we can do for the industry going forward would be useful, anticipating the needs for the years to come, rather than focussing on an over the top project that will have little impact on the wider problems of the industry.

Parking



Washing



Recovery



Repair



Dartford



Daily Checks





Big Data: Fleet Management in the Era of the Connected Car

The Association of Car Fleet Operators (ACFO) is urging fleet sector stakeholders to brace for "massive revolution" following the rise of the connected car and the much anticipated implementation of so-called 'big data'. This was the topic of conversation at the ACFO's spring assembly, entitled 'Big Data - Big Seminar'.

Around 80 fleet decision makers made the trip to Whittlebury Hall in Northamptonshire to hear first-hand Nick Mitchell's - Service and Technical Manager at Audi - address: "The arrival of the connected car will result in massive changes in the way people use cars and the application and provision of cars," said Nick. "Technology will be updated before our eyes. It is a massive revolution that we are about to go through and the pace of change will never be as slow again."

'Big Data' is more than a mere buzzword however. For contract hire and leasing organisations in particular, it signifies "transformational change". According to Lex Autolease, the availability of data will enable their leasing specialists to "predict the future" in terms of vehicle service, maintenance and repairs, and driver behaviour - doing away with uncertainty altogether. Already, that journey has begun. Lex Autolease is piloting 'operational

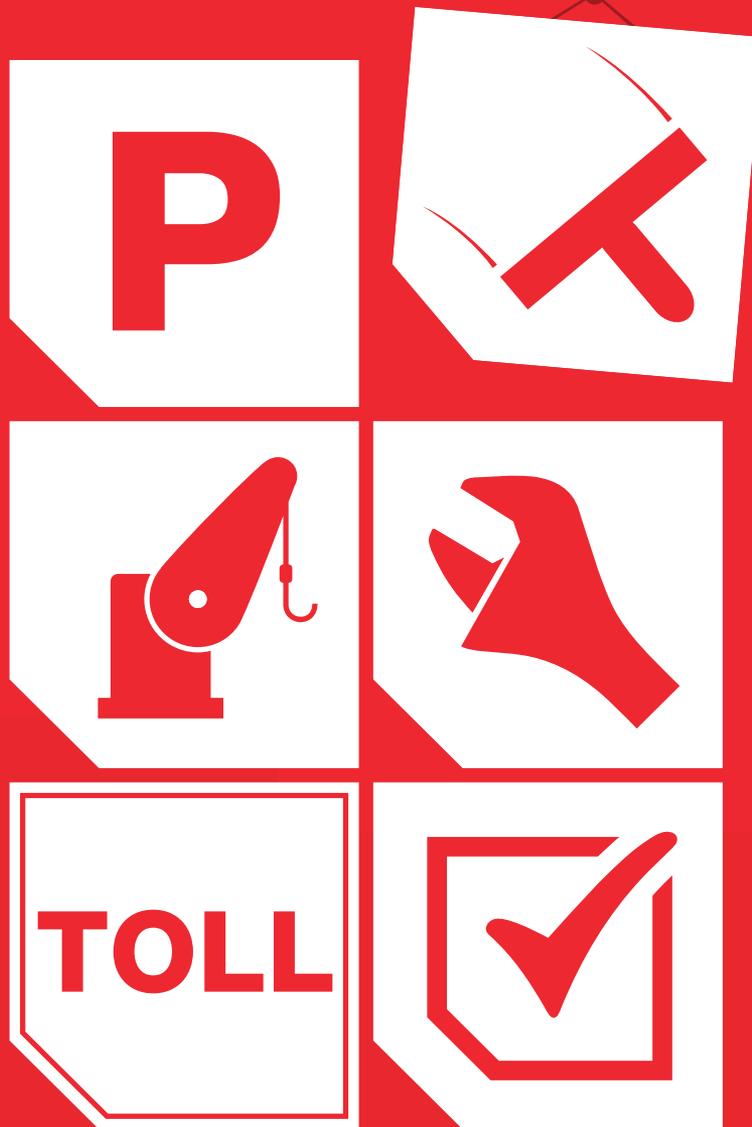
benchmarking' across a wide variety of in-life areas, including vehicle expenditure and risk, to allow fleet refinements to be made and cost efficiencies incorporated. Craig McNaughton, Corporate Director at Lex Autolease, told attendees: "Connected car data will fundamentally change our industry. We have a long way to go, but we must change from a rear-view mirror perspective to using data to predict the future and move from a leasing company that provides management information to a data company that leases vehicles."

There are challenges inherent, of course. A new way of working naturally brings with it a host of potential pitfalls. As such, key policy makers, vehicle manufacturers and leasing organisations have all pledged to tackle issues around data ownership and accessibility. Who is liable for breaches in data, for instance? How can we ensure vehicle and driver data is deactivated at the end of a contract, and not accessible to a second-hand buyer?

"There are real contractual challenges to overcome due to the difference between retail customers and fleet owners," continued Mr McNaughton. "The connected car will be a huge part of the data lake and the volume of information ever-increasing. Fleet customers demand information to

tell them what is happening to their vehicles and to predict the future and lead them on a journey to provide cost savings and deliver safety." But what are the real-world applications of 'big data'? According to Mr Mitchell, car connectivity will enable drivers to "download functionality" and fundamentally change the characteristics and specifications of their vehicle without impacting on fleet operations or incurring tax or legislative revisions. "Drivers will want that functionality, but the car will no longer be the vehicle that it was," said Mr Mitchell. "It could be that cars are sold with the lowest specification and on day two the specification is updated by drivers. That would have a massive impact on HM Revenue and Customs' revenue. Legislation and the tax system as we know it will have to change and that will have to be dealt with." Bafflingly, cars may come to be regarded as mobile devices themselves, with greenhorns Apple and Dyson entering the fray alongside established manufactures, each with an eye on innovation. It's a vision of a more connected future then. The bottom line? If 'big data' can drive out inefficiencies and bad practice, and give vehicle performance a welcome boost, can fleet operators afford not to take note?

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It's time for the built environment to embrace big data and technology

A recent list compiled by Information Age outlining the UK's top 50 data leaders makes worrying reading for executives in the built environment sector. While industries such as retail, IT and aerospace dominated the rankings, just three representatives were present from the built environment space in the form of social housing company Bron Afon, Network Rail and RICS. At a time when the Government is placing increased pressure on meeting housing targets and billions of pounds are being invested in large scale infrastructure and construction projects, the ability to efficiently collect, collate and analyse data could prove instrumental for businesses looking to win and improve delivery on big contracts. Additionally, with smart city initiatives becoming gradually more important, built environment businesses are also faced with the task of future proofing developments for the technological advancements to come. How can an industry facing a technological revolution capture talent and develop initiatives to fully realise its future potential?

For businesses in the sector, a systemic change in the attraction and nurturing of talent must be a priority, driving the positive change and data-led insight required to unlock innovation and higher commercial returns.

Attracting future leadership talent by breaking down barriers

A growing majority of firms across the world are seeking to leverage data as a critical business asset and drive new sources of business value. Yet, for the built environment this requires new skills previously less accounted for. Key challenges lie in the capability, knowledge and confidence in data science. According to international research firm Gartner, 90% of companies will have a Chief Data Officer by 2020, proving its universal validity at management and board level. For built environment firms it's time to think firstly about a 'bottom up' plug of the gap for data-savvy talent through attracting individuals from all stages in their development. Opportunities lie in reducing barriers to entry for young people

through broadening requirements on graduate schemes as well as progressive pre-apprenticeship initiatives. The likes of engineering firm ADI Group this year launched the UK's first pre-apprenticeship scheme designed to ignite, inspire and integrate more digitally friendly talent from a younger age. Relaxing degree specifications will also aid the attraction of capable individuals to drive digital transformation. Currently, many schemes limit the process to degrees related only to the built environment, turning away the data-minded from areas including business, maths and science. Some organisations are already embracing this such as construction firm Wates, which is now delivering a scheme that welcomes all degrees and focuses instead on passion, innovation and technical intrigue. For those outside of traditional education routes the Built Environment Leadership Group, delivered by the Prince's Trust and industry partners, is also proving useful in attracting and developing the next generation of the sector's leaders.



How can an industry facing a technological revolution capture talent and develop initiatives to fully realise its future potential?



Beyond early stage initiatives, the built environment is faced with an opportunity to tap into leadership from digitally-adept sectors such as IT, retail and aerospace, or those that have a track record for implementing technological transformation. An example can be seen in the recently appointed Director of Data and Insight for Balfour Beatty, James Vietch, who was previously responsible for IT and business intelligence at gambling and casino firm Eurocoin. Vietch is now leading the delivery of Balfour's data strategy to improve efficiencies and decision making through intelligence. **Working to attract such talent may prove instrumental in securing the skills and capabilities to make data and digital innovation a crucial part of built environment delivery.** Developing existing leadership to embrace digital innovation and drive transformation While the attraction of the next generation of built environment leaders is crucial to long-term success in the changing nature of the sector, focus must also be placed on nurturing and upskilling the existing

pool of management and board-level staff to ensure short-term progress on data. Large skills deficits lie in understanding, navigating and decision making via data and the board's HR function has a large role to play. A priority should be to refresh management training programmes to include modules that will help leaders keep abreast on data and how to use it to unlock growth. Additionally, for sectors where digital disruption is popular such as energy and utilities, forging links between leadership teams could encourage knowledge transfer, collaboration and greater efficiency. An example can be seen in utilities, where the likes of Thames Water is beginning to use drones to survey assets and report faults. Should leaders come together to share ideas around these methods, the principles could be applied to construction sites where security and monitoring of a development are vital to preventing delays. To foster digital innovation, initiatives are also emerging that highlight a demand for transformative roles on

the board or committee of a company. The dotBuiltEnvironment Network, an open group of passionate and digitally savvy industry professionals, is calling for representation on every committee of built environment organisations to influence decision making and drive transformation. It is widely accepted that the UK's built environment industry could and should be doing more to harness the power of big data. However, now is a time of massive opportunity as businesses have the chance to forge ahead and secure a prosperous future supported by data-led insight and digital innovation. Early adopters that have recognised the importance of data are making it central to built environment delivery and are driving some changes, but it is in plugging the current and future leadership skills gap where we will see demonstrable operational and commercial benefits.

By George Dobbins, a consultant across the built environment at Berwick Partners.



HIGHWAY DESIGN AND 3D MODELLING SOLUTIONS

Cassidy Forsythe are experts in the 3D modelling of highway schemes to the BIM protocols.

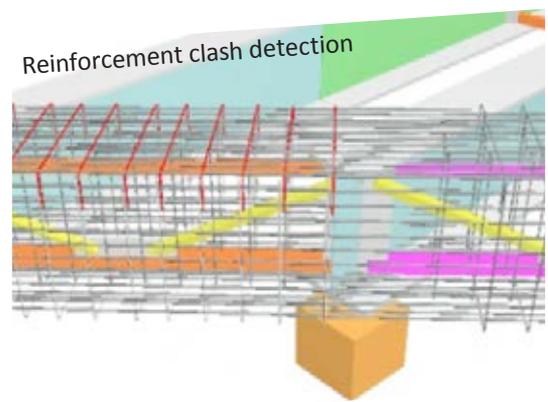
We can provide a 3D model of your design or we can design your scheme for you to DMRB standards or your adopted standards.

We have extensive experience in the design of highway schemes, including feasibility studies, preliminary and detailed design, contract preparation and construction supervision.

We can create 3D models for you which comply with the BIM principles.

These models will show all 3D elements, such as pavement layers and street furniture, allowing quantities to be extracted directly from the model and 4D schedule simulation to be carried out. The models created will capture the design intent and will facilitate clash detection.

The models will also feature elements which are capable of being attributed with information for asset management purposes, which is a key requirement of BIM level 3.



DO YOU NEED TO REVISE YOUR WORKING PRACTICES?

So you have accepted that it's a good idea to work in line with the BIM protocols, however are you prepared to change your working practices?

As you are probably aware now, BIM is about a number of things, including 3D modelling, 4D schedule simulation, 5D cost estimation and 6D asset management.

However, a very important part of BIM is collaboration and the "single source of truth".

SINGLE SOURCE OF TRUTH

To explain, everybody within the project team, including the client and any sub-consultants need to be using exactly the same data.

You may think you already do this, but you may be innocently working in a silo.

Do you produce your models and drawings on your own servers and then upload them to a collaboration site?

If you do you are already missing the single source of truth – you will definitely have different versions on your server compared to the ones on the collaboration site.

Also, if you have another consultant working on your project doing something like drainage design, traffic signals design, structural design etc I'll bet they are working from their own servers and then uploading their work to the collaboration site.

So what version is on the collaboration site and what version is on their servers?

Do you work on your computer's hard drive or C drive? If you do you have same problem as the consultants.

The answer is for everybody to work on a sophisticated file collaboration site such as Bentley Projectwise, which can handle all files including documents and model files. Projectwise checks out files to the user and locks the checked-out files so that nobody else can access them until they are checked in – so a real single source of truth.

Other file collaboration systems are available, however I don't have much experience of them so I can't comment on them.

3D MODELLING

If you are already producing 3D models you probably think you are doing okay, however you also need to think about the further BIM processes such as 4D, 5D and 6D.

Does your software allow you to attach intelligent data to elements in your model or can you create IFCs from your model, allowing you to transfer your model to another software package which will allow you to attribute the elements?

If it doesn't then your software package isn't really suitable for the whole BIM process and you need to think about changing your software package.

4D SCHEDULE SIMULATION

4D schedule simulation is invaluable as tool for seeing what is being built at any particular time on your programme. It also shows if you have missed any work activities from your programme and it will highlight any clashes between built work and elements still to be built.

So – your 3D model needs to be capable of being used by good 4D software such as Synchro.

With any 4D scheduling software you need to be able to associate an element in your model with a work activity on your programme. If you don't have suitable elements in your 3D model and you only have 3D lines then you can't do 4D schedule simulation from your model.

5D COST ESTIMATION

5D cost estimation is about being able to extract usable information from the elements in your 3D model which you can export to a spreadsheet, allowing you to instantly calculate the costs of the elements in your project.

Again, if you don't have elements in your model and you only have 3D lines then you won't be able to do this.

Also, if your software isn't capable of exporting the data from your 3D model then it isn't BIM compliant.

To summarise, think about all of the BIM processes before you start working.

Collaboration is Key to Successful Facilities Management

By Paul Thomas, Facilities Management - Principal Consultant at Turner & Townsend

To maximise the use of the technical systems behind Building Information Modelling (BIM), the involvement of the Facilities Manager as the long-term custodian of the building in a BIM project team and soft landings process, will require the Facilities Manager to be collaborative with the rest of the project team.

Experienced Facilities Managers are excellent at collaboration because it is part of our background and as with any skill the more it is practiced the better we get at doing it. Facilities Managers collaborate with customers, staff and suppliers many times a day for mutual benefit.

It is therefore unfortunate that this is not recognised as a professional skill and requirement. For example, the British Institute of Facilities Managers (BIFM) professional standards contains no collaboration standard defining how Facilities Managers are to work with others to achieve common goals. The British Standards Institute report that clients who plan to collaborate expect the following business advantages:

- 79% believe it will increase their

competitive edge

- 62% consider it will attract new customers
- 55% improve products and services
- 55% protect their business
- 53% help manage business risk

Things are getting better. The Edge Report 2015 also highlighted that the Construction Industry Council has potentially a wider role to play in helping the construction professionals work together.

The BIFM has recognised that members need to collaborate with the other professionals in project and design teams and has re-joined the Construction Industry Council to help members expand networks.

The recently published ISO 44001 Collaborative Business Relationships Management System, sets the standard for organisations. Whilst an excellent standard, ISO 44001 may need altering for day-to-day use on projects, for example the selection of partners on a BIM project will often be outside the control of the Facilities Management team. It is hoped that professional organisations who demonstrate poor collaboration will not be invited to take

part, but that depends on an informed procurement process that asks about collaboration. The requirement to internally check that your Facilities Management organisation is ready to collaborate, definitely applies to all organisation and could provide a template for all FM organisations to apply for all activities.

Should ISO 44001 be a requirement on tenders and have the same level of weighting as Quality, Health & Safety or Environmental requirements? In some cases when an organisation fails to achieve the standards expected on these other core standards, the reason for failure is a lack of communication or collaboration to achieve positive outcomes by others.

The Construction Project Information Committee, BIM capability questionnaire asks limited questions about supplier's definition of collaboration, how the organisation collaborates, and who they collaborate with. But provides no guidance on what a good example or answer will contain. The committee that drafted the capability does not appear to have engaged or collaborated with the FM industry.

Suggestions to help improve collaboration in BIM project teams

Suggestion	Impacts on Facilities Management Organisation
<p>Have collaboration standards</p>	<p>Collaboration must be embedded in the culture and processes of the organisation and reinforced in every aspect of the business through policy, process and systems.</p> <p>Senior management must lead by example.</p>
<p>Speak up – you are representing the long term interest of the business</p>	<p>Changes to the design are cheaper to fix earlier in the process. If there are concerns or if something is not going right raise the matter early. Facilities Management representatives need confidence in their knowledge and that they will be supported if they raise concerns.</p> <p>Collaboration does not mean agreeing with everything but understanding the impact of agreeing or not agreeing.</p>
<p>Collaboration is better with people we know and trust.</p>	<p>Encourage and support the Facilities Management staff to network outside of FM. Use regional CIC to find local events to attend. May need to allow for time off in lieu for out of hours events as networking is work.</p> <p>Train FM staff to be task and relationship oriented.</p>
<p>Partner organisations will expect a well-informed professional Facilities Manager</p>	<p>Facilities Management organisations to invest in the development and training of Facilities Management team.</p> <p>Educate the Facilities Management representative to understand and appreciate the skill and roles of the other team members.</p> <p>Coaching Facilities Management staff on how to build relationships, communicate well, and resolve conflicts creatively can have a major impact on team collaboration.</p>
<p>Staff attending meetings are empowered by their own organisation to make collaborative decisions.</p>	<p>Clear levels of accountability for decisions, similar to the type of controls placed on financial decisions.</p> <p>Organisations will put in place training to allow their representatives to make the correct collaborative decisions.</p>
<p>Smaller teams collaborate better</p>	<p>Do not send a large delegation to core meetings. Allocate FM resources to attend the specialist providers sub-meetings, this will help to build rapport; knowledge and shared understanding.</p>
<p>Virtual working over long periods of time reduces collaboration</p>	<p>There is a need to have face to face meetings allow time to attend – it will not be possible to do all the day job and work on a complex project. Facilities Management organisations need to backfill roles to allow staff time to engage with the project.</p>
<p>Set realistic time frames for collaborative decisions</p>	<p>Coach staff not to feel rushed into making snap decisions on last minute changes to the design. Facilities Management organisation will have to allow the representatives time for consideration of options.</p> <p>Where a level of technical understanding is required to make a well informed decision, partners will allow time for this to happen and for decision makers to research whole life cycle impacts.</p>

The Parthenon: What if History had BIM?

Whether you appreciate the mathematical precision of its design, the artistic vision and social commentary of its embellishment, or the astonishing fact that it has survived for millennia, the Parthenon stands out as an outstanding cultural monument.

Constructed in the 4th Century BC, we have limited insight into the method of its construction and the team behind it, but by all existing accounts, the effort and cost that went into completing it were enormous.

The Greeks understood the connection between mathematic principals and beauty as integral to their cultural identity. It was a key capacity that set them apart from their perspective – surrounding barbarian peoples. The Parthenon was constructed on ‘perfect’ mathematical ideals to represent a Greek vision of natural harmony in its proportions and design. A ratio of 9:4 was implemented on multiple levels, from the overall proportions of the structure along the vertical and horizontal axis, as well as in space measurements between elements such as the columns.

The maths, while theoretically simple, was further complicated by the need to convey complex concepts visually in the structure. Despite the overall geometric nature of the structure, there are no completely straight lines. For instance, the columns both bow along their length and taper outward near the top, subtly conveying an organic, or even anthropomorphic sensibility to the Parthenon while shaping sightlines and suggesting weight and responsiveness. Further, seemingly identical elements, such as the columns, vary in dimension depending on their placement in order to affect the viewers’ sightlines as if they are identical.

Presumably, to ensure the construction conformed to such socially proscribed, philosophically elevated ideals and visual standards, painstaking calculations would have been worked out manually for every component and measurement prior to the start of construction. Then the measurements would have been copied – again, by hand – and applied separately by overseers and construction workers to implement.

Impressive, deceptively complex and monumental as the Parthenon is, it’s hard not to wonder what it would be like to recreate such a structure today. How long

would it take? How hard would it be to achieve the same precise specifications? How would the cost stack up? With today’s tools – Building Information Modelling (BIM) in particular – just how would the experience, and even the finished product, have changed?

Mathematics & modelling

The computing options of today provide a clear advantage; simply performing ratio-based calculations is a near-instantaneous function. With BIM, today’s architects, designers and engineers have the opportunity to take principles like a theoretical ‘perfect ratio’ as used in the Parthenon and easily experiment with scenarios in collaboration with one another. While the design stage still requires a great deal of creative input to identify and refine direction, the calculation and modelling of plans is quick and highly collaborative in the online Common Data Environment (CDE).

3D rendering

Both the overall structure of the Parthenon and the numerous, detailed embellishments situated on and within it are situated to interact with viewers along carefully considered sightlines. The regular visitor to the Parthenon was not intended to enter the structure, but to move along the outside of it, experiencing it from below. Both the placement of embellishments, as well as structural design elements had to carefully consider that sightline. For example, some columns were built with slightly larger diameters than their fellows to counteract the optical illusion of narrowing when seen against the blue sky. With BIM 3D rendering, the fallible imaginative work of identifying the correct sightlines at any given point is transformed with access to a fully developed digital model to test – and adjust – the design from every angle well before the first stone is laid. Schedule management.

4D BIM refers to the additional component of scheduling integration with the CDE design, planning and construction. Linking scheduling information to every phase of the project not only helps catch potential missteps before a costly and unprofessional mistake is made – say, heavy outdoor construction during the rainy season, or booking the sculptors before the lintel is ready to go – but it supports better estimating and resourcing. Maintaining the schedule as the project develops

allows quick, informed and flexible adjustments when needed, intelligently manages the budget and facilitates efficiencies for suppliers, team members and the client. The Parthenon took over a decade to complete, including all ornamentation. Perhaps a 4D BIM implementation could have offered the chance to consolidate the schedule – at the very least, it would have let the client and team know up front what kind of duration to expect.

Cost management

Constructing the Parthenon was undoubtedly a massively expensive undertaking. While it’s impossible to pinpoint the exact currency conversion rate, the Parthenon was said to have cost 469 silver talents, nearly half the gross annual income of the city of Athens. With BIM 5D, the detailed plans of the CDE can be associated to cost projections, allowing accurate and adjustable estimating prior to and during development. Not only that, but the detailed modelling, 3D rendering, CDE plans to ensure the most accurate, up-to-date documentation is in place, and 4D schedule management have the potential to represent significant cost savings over a traditional – or in this case, classical – development. With BIM, the Parthenon would have benefited from accurate cost-projections and, almost certainly, a financially tighter production cost.

Could a skilled team today produce a more beautiful, more complex version of the Parthenon with Building Information Modelling? Philosophy of art and mathematics aside, they could certainly have an easier time collaborating and refining their ideas than the Greeks of the 4th Century BC. BIM absolutely offers an advantage when it comes to maintaining and sharing documentation, modelling and rendering plans, scheduling and managing costs but what if your in-house capability is limited or scarce? Happily, if that’s the case, there’s no need to build without BIM.

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Rapid ROI after BIM implementation: A guide for MEP contractors

BIM. Everyone's heard of it and (according to a McGraw Hill 2012 SmartMarket report), the majority of North American MEP contractors have leveraged it. However, while some firms might be fully-fledged converts, others remain unconvinced as to whether BIM adoption will ever deliver a measurable return on investment (ROI).

For many businesses who view the cost of BIM adoption with trepidation, implementation is regarded as something of a necessary evil; a hurdle that needs to be cleared in the race to win bigger, better contracts. When a client specifies a project must conform to a particular BIM level, contractors obviously know that securing the work depends on that requirement being met. What many also anticipate is that making that grade will not be without cost. Alongside an investment in technology, there's also the need to ensure that such an investment is properly used and that means manpower. Whether it's training existing staff or bringing in experts from the outside, putting BIM management in the right hands is

certainly not cheap.

Let's face it: Everyone wants to win bigger, more lucrative contracts but, equally, no one wants a hefty bill for landing them. In short, BIM can feel like a taxation on the overall value of a contract, like a hefty service charge pre-applied to a restaurant check when all you were looking for was a light lunch. In the case of the latter, it's likely you'd chose another place to eat next time and avoid dining in the more expensive place unless everywhere else was shut. For a lot of firms, the same applies to BIM: If the contract doesn't demand it why spend out on implementing it?

The irony is, that while totally understandable, it's just this approach that can prevent an MEP contractor from achieving BIM ROI. In fact, the more engaged businesses are with BIM the sooner they'll reap the rewards it offers both in finance and efficiency. Indeed, while implementing BIM on a project-by-project basis only when it's a specified requirement, makes its adoption considerably more costly than making an early commitment to embracing and engaging with it fully and across the

board. Although the latter inevitably incurs a good deal of investment not just upfront but ongoing, highly engaged firms gain far and away the most from BIM. Between 2009 and 2012, increased profit was the most reported benefit of BIM. Other positives included increased repeat business from existing clients and a greater volume of new work being won. The more highly engaged firms are, the greater the benefits are. There's a direct correlation between ROI and a high level of BIM engagement and companies who continually invest in training and implementation reap the rewards significantly more than their less engaged counterparts.

The bottom line with BIM is that you have to speculate to accumulate but accumulate you can. However, it's not immediately obvious how to go about implementing a program that will ensure your investment pays the best possible dividends.

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The VR Property Boom: Go house hunting without even stepping foot through the door

With the advent of drone photography, 3D animations and virtual-reality headsets, it's safe to say that digital developments are changing the very way that we now buy and sell properties. Here, Andrea Gardner, Sales Director at Waterstone Homes, explores how these technologies are revolutionising property sales across the country.

If you've ever bought a property, you'll know first-hand that photos can sometimes be a little misleading, thanks to craftily selected angles and well-designed frames that highlight strong features while hiding away less desirable elements. These unforeseen surprises can waste valuable house hunting time for prospective buyers. Unsurprisingly, today's buyers are very cautious, often doing their own in-depth research. Across the industry, we are seeing a growing desire from customers to acquire as much information about a property as possible before viewing it. That's where Virtual Reality (VR) and 360° technology comes in, enabling prospective buyers to explore a property, from all angles, without stepping foot inside it.

The technology works by filming a property using a combination of scanning and 360-degree image capturing equipment, with the content then put through a post-production process to create a virtual reality model which can be delivered to the customer either as a 3D walkthrough online, or via a VR headset.

The software is completely immersive, giving the illusion of being directly in the property, allowing users to see what a house looks as well as gain a sense of its space, size and flow of rooms.

If done well, virtual reality can not only showcase a property more realistically than images, but also help to drum up real excitement by helping buyers to picture themselves going about their daily lives there.

In the not-so-distant future, VR technology could make house-hunting far less time-consuming, with homebuyers able to tour properties virtually, only visiting the ones they decide to shortlist. Indeed, for buyers who may find it difficult to schedule property viewings around work, children and busy social lives, the technology could prove invaluable,

enabling them to view ten properties in the same time it would take to travel to and view just one. At the same time, the software is beneficial to sellers, providing them with increased visits without even needing to open their doors.

Most notably, virtual reality is particularly useful for international clients, offering a practical solution when time is tight and distances are large. As a result, VR is growing in popularity across the country, especially for prime real estate locations in London, where investors often live thousands of miles away from the properties they want to view. It's also an invaluable tool for off-plan developments that are yet to be built, where buyers are essentially asked to envisage their future lives in what is still a hole in the ground.

For us, VR has had a key role in the sales of our luxury 51° Latitude development in Tenby, Pembrokeshire, which saw over 50% of all apartments sold before the project even broke ground.

With the development in the midst of construction, we felt that customers needed to see something more real





than a picture to convert enquiries into sales. Employing the latest cutting-edge technology, we teamed up with digital agency iCREATE to develop a virtual version of a finished apartment, which built into a wider suite of marketing materials including artist impressions, internal visual walkthroughs, bespoke online property brochures and drone footage. Being able to actually see how the completed properties would look and feel gave buyers the confidence to commit and put down deposits. We always point out that VR is a starting point to the design process and if anything changes along the way, ensure that we make this known to the purchasers.

The VR experience, which was created using 360-degree artist impressions stitched together and uploaded onto a Samsung S7 mobile, was made available at an open day event hosted in a bespoke designed camper van on-site. To complete a viewing, all attendees needed to do was put on Samsung headsets which, by tracking their head and eye movements, enabled them to move through the apartment and onto its balcony where they could take in fantastic views of the beach and waterfront.

In addition to the ultra-realistic footage, the VR tour also incorporated an array of real-life sound effects to accompany the customer's journey - everything from doors opening and footsteps in the kitchen to the sound of the sea. Going far beyond what artist impressions could offer, customers felt like they were really there, with some even reporting that they felt ready to cook in the kitchens. Following the successful use of VR at Tenby, we are now working on further virtual reality tours for upcoming developments, including residential properties in the village of St Nicholas, and homes on the Pembrokeshire coast at Broad Haven.

For new build developers, VR technology is also a great tool to fully involve buyers in the whole buying process, helping them to choose customisation options during different stages of construction. For a start, buyers can see details such as door handles, bathroom fittings and staircases, which are captured more clearly than through photographs, to decide whether they would like to change any of these to alternative models. Similarly, by being shown the basic specification of properties via virtual reality, customers can assess

any personalised touches they'd like to add, from moving electrical plug positions and selecting under floor heating to tailored kitchen designs and dressing room upgrades.

The UK property market is fully embracing new virtual technologies, and the scope to build upon these developments is truly exciting. More property developers are utilising this technology and hosting VR open days, and we are also seeing a rise in Virtual Open Houses, where homes are live streamed online to give detailed views of a property. As technological developments advance, we can expect to see buyers being able to use VR to view properties in the comfort of their own home at just the click of a link.

Ultimately, the future of property marketing lies in tools that capture a property as realistically as possible, benefiting both buyers and vendors. Combine storytelling techniques that engage home buyers' interest with a younger generation who are not only at ease with technology but are increasingly willing to buy using its aid, and virtual reality undoubtedly provides a winning formula for property sales.



FEATURE

Construction in the Virtual World

Andrew Zhao, Emerging Technology Strategist at Mott MacDonald, speaks exclusively to UK Construction Excellence about the emergence of augmented and virtual reality, and the potential applications for construction industry-wide.

How prevalent is augmented and virtual reality in the construction sector? What factors have contributed to its uptake?

Immersive technologies have certainly been making headlines for infrastructure. There are degrees of virtual reality (VR) and augmented reality (AR) being used at various aspects of the delivery process on major projects. While there remains a stark disparity between flagship projects and delivery as normal, this is beginning to change. The increase in availability of consumer VR systems and VR ready computers over the last year has been a key stepping stone in the use of VR across many industries.

How is Mott MacDonald putting augmented and virtual reality to good use? Has its implementation been at all difficult?

We've been exploring and utilising pre-consumer ready AR and VR on major infrastructure projects for a while now. However, it is far more challenging to take the knowledge from these specific projects and enable more members of the company to have the same capability globally. In order to do this, we are leading immersive technology innovation centrally within Mott MacDonald, specifically aiming to overcome the two hurdles of hardware and content creation.

How do you see augmented and virtual reality impacting construction best practice? How is this technology rationalising the built environment?

The thing to consider with immersive technologies is what you can only do using the technology and not through a proxy such as a laptop or a phone screen. It then comes into a spectrum of uses from pure VR through to pure mixed reality (MR).

Pure VR, contrary to popular belief, is not just about experiencing a shiny 3D model. Fundamentally it is about empathy, experiencing the world through the eyes, ears and hands of another person. The obvious use is for a designer, contractor or client experiencing the world through the end user or the operator/maintainer's point of view. However, VR offers so much more. Designers can experience a contractor's point of view mid-construction, allowing for better and safer constructability. They can also see the perspective of someone with a visual impairment or another disability, delivering better signage and layouts. AR and MR offer more than the often touted uses of checking progress against programme or stakeholder engagement. Engineers can begin designing right out in the field, which is only one step away from undertaking civil or structural calculations. This helps reduce the design and build decision making cycle significantly, which in a world where we have to react rapidly to environmental and climate changes can make the difference between an effective, resilient scheme and one that is delivered too late to make a difference.

How long is it before augmented and virtual reality is as commonplace as BIM, for instance?

Immersive technologies are emerging as a layer of new services which, in architecture, engineering and construction (AEC), are built on top of building information modelling (BIM). It is only on maturing our BIM processes that we can unlock the advantages of immersive technologies. Certainly, the rapid development of wireless and station-less VR converging with AR over the next few years will accelerate uptake. In fact, I see it riding closely on the coat-tails of BIM advancement. Where businesses have strong BIM capability, VR and AR usage will develop quickly over the next few years.

Does augmented and virtual reality have wider applications - training, for instance?

Beyond AEC, there are so many uses in entertainment, education and healthcare that can deliver, seriously democratise and disrupt traditional industries by providing better social outcomes.

What advice would you have for companies considering investment in augmented and virtual technology?

Immersive technology is a rapidly changing world, there will always be bigger and better technology coming over the horizon. It's not just the technology that should be thought about when it comes to investment, it's also the improvements and changes to processes, workflows, services and ultimately capability as a business.

AR and VR: The Building Blocks of the Future

Augmented reality (AR) and virtual reality (VR) continue to be hot topics. As with all new tech these applications become muddled if not fully understood.

The difference is quite simple - stimulating rather than static. VR, probably the more familiar, enables you to physically feel like you've stepped into a virtual world in the comfort of your own environment. It can be of absolutely anything - a beach, a penthouse apartment, the moon even... or in this industry, it can enable you to explore the layout of a new building or development. AR on the other hand, is described as an information overlay in real time, providing a more aspiring view of a product you don't have in a physical form. Imagine standing in the bare shell of a new building, wondering how a stairwell might fit into place for example. AR enables you to position it exactly where you want it. No lengthy manipulation with scaled-down models or computer images, and all you need to do this, is a CAD model. Both AR and VR offer something unique to the construction industry as the following examples illustrate, bringing ideas and products to light in a way that a static model or brochure can never achieve:

- Plastic pipes and drainage specialist Wavin launched a VR experience at

Flood Expo last autumn. Using Oculus Rift, visitors truly felt the experience of being inside one of the company's flood protection systems - an exciting almost theme park experience of what would formerly have been static images and technical data.

- Sustainable habitat and construction materials leader Saint-Gobain use VR to demonstrate its unique MULTICOMFORT model. Customers explore how a holistic building approach works by creating spaces which require less heating, have better quality air and bring the outside in. The VR demonstration plays videos to see products in action and experiment with acoustics and sounds, a totally immersive and inspirational presentation.

- PIR thermal insulation provider Celotex used AR and VR to support a new product launch at this year's EcoBuild exhibition. Visitors were able to stand inside a virtual loft space to understand more about the company's products, and through the use of a neat little pop-up house and a free app, took a detailed look at insulation products using AR. While these examples are pioneering in terms of how the construction industry is using immersive tech, there's a much greater opportunity ahead of us in the form of BIM. The UK Government is urging the

construction industry to make BIM common practice and rival firms are already keen to be seen leading the development path. But add AR to the mix, and there's an opportunity to edge the boundaries of BIM further. As it stands, BIM is viewed as an effective means of communicating and transferring detailed information accurately along a project timeline. BIM is all based around CAD modelling - and so is AR. Imagine being able to take a computer model which has already been developed as a matter of course, and bring it to life, straight from the screen. Your project immediately takes on a new dimension not only providing a far better understanding of the development, but adds new opportunities for sales and marketing. You have a brand new promotional tool.

The decision whether AR or VR is the more appropriate tech for your project comes down to what you're developing. AR and VR in themselves offer amazing immersive experiences and could potentially be applied to almost any situation in everyday life. The opportunity they present for the construction industry however, is that this is bursting with potential for the future.

By Joe Ashton, Creative Director at Exhibit Interactive



Station to Station: HS2 Ltd seek designers and London Euston development partner



BUSINESSES large and small are set to benefit from two new roads in Bedfordshire, both of which are fast approaching the final phase of construction.

Highways England's A5-M1 Link - a 2.8 mile dual carriageway which will create a new junction along the M1 and improve east-west connectivity between the A5 and the motorway - and Central Bedfordshire Council's Woodside Link - a 1.8 mile road adjoining a number of industrial parks to the new M1 junction - are already benefitting organisations and their ongoing growth, and attracting all manner of new businesses to the wider Dunstable region.

Iftikhar Mir, Highways England's Major Projects Director overseeing the A5-M1 Link, said: "The M1 is the backbone of the national road network, and the improved links that Highways England

and Central Bedfordshire Council are creating near Dunstable will help businesses of any size to connect to their customers anywhere in the UK and beyond.

"Whether it is helping an established business invest and grow or attracting new operators to the area, these new link roads will benefit Bedfordshire, the region and the entire country."

Since the schemes first began in early 2015, more than 50 contracts have been signed for industrial and distribution space across Dunstable, Houghton Regis and Leighton Buzzard, generating an additional 2,500 jobs regionally. What's more, this investment is thought to amount to an astounding £2Bn boost for the local economy.

Transport infrastructure has a vital role to play in unlocking economic opportunity. In Bedfordshire,

businesses are beginning to sense the benefit of improved access to both the M1 and the wider road network. The availability of skilled workers - thanks in part to the planned HRN1 housing development, which will introduce more than 5,000 new homes north of Houghton Regis - is another key consideration for companies looking to invest.

According to Highways England, the business parks are filling up fast. A tranche of new developments are likely to free up a further 52 hectares of commercial space however, with sites available for occupancy from winter 2017/18 onwards.

THE BUSINESS CASE

In light of the new A5-M1 and Woodside links, there are many reasons a business might establish a

Bedfordshire presence. Bodybuilding.com is a fitness website and supplement store with sales of \$0.5Bn and growing. Established in 1999, the Idaho-based business has humble origins - having initially operated out of a domestic garage - but now supplies to customers in 127 countries around the globe. Since 2015, the US Company's European operation has been based along the A1-M1 corridor in Houghton Regis. Caroline Underwood, Bodybuilding.com's Vice President of Operations UK, was on-hand to explain why: "Central Bedfordshire stood out on the map as the ideal location, with a hub of employable people within the resident population. Business has more than doubled for Bodybuilding.com since it arrived in the UK and our current warehouse and office facility has plenty of room to create more jobs. "Improved transport links to the M1, via the new junction 11A and the Woodside Link, are another key part of the infrastructure, offering fast access to the M1 and airport links for quick

and easy transport to international markets." Signature Flatbreads is another such business. Beginning as a modest family-run, London-based baker in 1984 - known then as Honeytop - Signature Flatbreads has emerged as a world leader in flatbread production, with state-of-the-art bakeries in the UK and India. In 1995, Signature Flatbreads relocated to larger premises within the A1-M1 corridor near Dunstable to accommodate a wider product range and ever-increasing customer demand. David Laurence, Signature Flatbread's Commercial Director, said: "Given that we have a 24 hour production facility supplying fresh and long-life products with daily deliveries to all UK retailers, we have a constant flow of delivery vehicles collecting goods with booking slots to meet at their end destination. "We rely heavily on the road network to deliver our products so better, less congested links thanks to the A5-M1 and Woodside links

will make it easier for us to meet our commitments to our clients. "And if it also means that our employees arrive on time and in a better state of mind then so much the better!" At a cost of £162.1M, the award-winning A5-M1 Link involves the construction of an entirely new dualled road, three new junctions including an additional motorway connection, and six new bridges. Crucially, the scheme will unlock up to 40 hectares of land for business use and deliver infrastructure enough for 7,000 new homes to be built north of Houghton Regis. Access to the M1 via the A5 will also be substantially improved and congestion through Dunstable's town centre markedly reduced, offering motorists consistently faster and safer journeys. Elsewhere, the nearby £38.3M Woodside Link will also alleviate congestion on local roads and provide better access to the M1 from the Dunstable and Houghton Regis regions.





FEATURE

The Case for Crossrail 2: Business leaders urge the Government to take action upgrade

Business leaders from the South East of England are urging Central Government to make Crossrail 2 - the continuation of a brand new £14.8Bn railway linking London and the wider South East region - a priority for the good of the UK economy.

In an open letter addressing both the Chancellor of the Exchequer, Philip Hammond, and the Secretary of State for Transport, Chris Grayling, more than 70 business leaders - including representatives from Aviva Group, Canary Wharf Group, Deloitte, EY, FSB Surrey & West Sussex, Gatwick and Heathrow airports and the Cambridgeshire, Essex, Hampshire, Hertfordshire and Surrey Chambers of Commerce - described the infrastructure scheme as being of "national importance".

They said that the new railway would not just benefit London - as is so often claimed - but the entire South East and the UK as a whole, thanks in part to a staggering £150Bn economic boost. What's more, with overcrowding and a perceived lack of growth an apparent concern, business leaders cautioned against indecision. According to the

group, the benefits of high-speed rail would be lost if passengers had to queue at London Euston without a Crossrail 2 connection.

Were the infrastructure to go-ahead, train-goers would benefit from improved journey times and better connectivity between London and the wider South East region. With population growth and railway congestion on the increase, Crossrail 2 could also relieve key choke points along the existing network.

Crucially, Crossrail 2 will also support the UK's construction, engineering and manufacturing industries at a particularly precarious time. This would bolster the West Midlands economy by more than £1Bn, Yorkshire and Humber by upwards of £900M, the North West by £750M, and Scotland by up to £170M.

Some 200,000 new homes will be built and a further 200,000 jobs generated as part of Crossrail 2. In total, 60,000 supply chain opportunities will be created across the UK, including 18,000 apprenticeship places.

Geoff French, Enterprise M3 Chair had this to say: "The major benefits from

Crossrail 2 extend all the way along the M3 corridor, through Surrey and down to Hampshire. Rail passengers are already experiencing overcrowding on the South West Mainline into Waterloo on a daily basis that is stunting economic growth in the Enterprise M3 LEP. Crossrail 2 is the only scheme being planned that can provide the necessary capacity and connectivity to boost our regional economy that is so crucial to the Government's new Modern Industrial Strategy."

The Mayor of London, Sadiq Khan, concluded: "This is yet more evidence of just how important Crossrail 2 is to the UK. Business leaders know it will bring hundreds of thousands of jobs and housing, and transport benefits right across the South East, as well as boosting the economy in all corners of the country. Despite the project benefiting the whole of the UK, London has actually met half the funding cost. What we now need is for the Government to take note of these benefits and give us the green light to progress, for the good of the entire country."



Britain Runs on Rails: Record £50Bn plus investment in nationwide rail network

Network Rail and South West Trains are among the organisations joining up to inject record levels of investment in Britain's rail network. In total, more than £50Bn is being brought to bear in support of highly skilled jobs, economic growth, development and regeneration opportunities, and housing provision throughout London, Surrey and Berkshire.

Commenting on the unprecedented amount, Stuart Kistruck - Director of Route Asset Management at Network Rail - said: "As part of delivering record investment in the railway, Network Rail is spending money with over 200 local businesses across London, Surrey and Berkshire.

"The railway is vital to economic growth. That's why Network Rail is spending £100M every week in Britain on our Railway Upgrade Plan. Here on the Wessex route we are spending hundreds of millions of pounds annually to provide a safe, reliable railway. A great example of this plan in action is the £800M Waterloo & South West Upgrade which will boost capacity at Waterloo by 30% by the end of 2018."

For Waterloo and the many projects like it, this funding has already proven absolutely vital. The enormous scheme is set to boost rail capacity by bringing the former International

Terminal back into operational use. Four existing platforms will also be extended to allow for the introduction of a 150-strong fleet of state-of-the-art trains.

Mr Kistruck added: "We intend to keep contributing to the economy in London and the South East, working with local businesses and creating jobs for local people on improving the railway to bring more connectivity and even more prosperity to all."

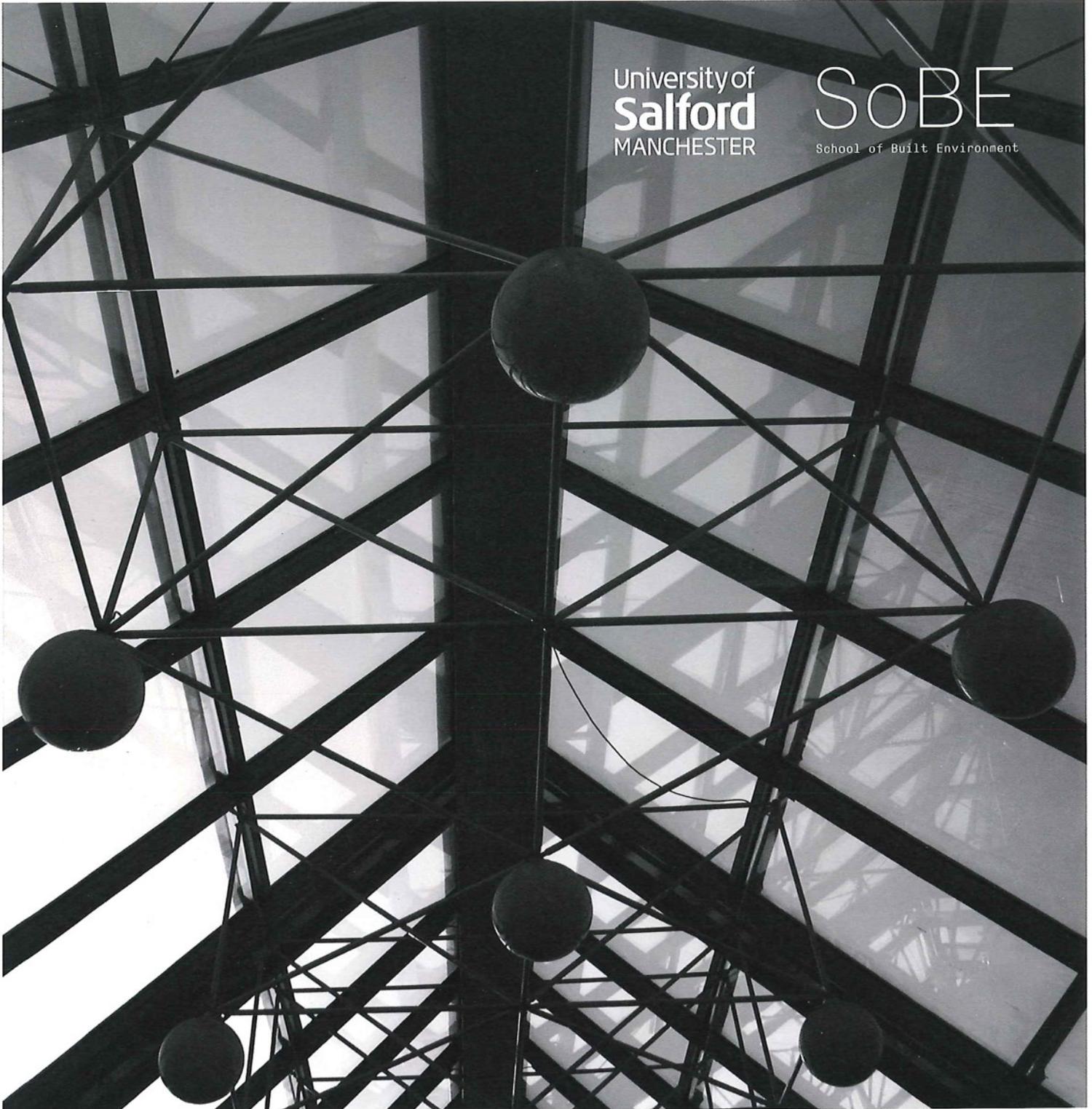
Outlining her plans for future rail provision, Margaret Kay - Managing Director of South West Trains - had this to say: "We are very proud of our record alongside Network Rail in delivering significant improvements for passengers.

"In the past year alone, we have invested in customer experience improvement projects across the network delivering 1,400 extra car park spaces at our stations, state-of-the-art cycle hubs with additional cycle spaces at 36 stations, innovative video ticket machines at 91 stations and we will continue to upgrade our trains. "Our £210M fleet of brand new 707 trains, providing 150 extra carriages for thousands of additional passengers will be out on the network very shortly. We will also continue to roll out our Smart card programme to make travel easier for our passengers.

"Working alongside Network Rail and our industry colleagues, we will deliver the vital upgrade programme at Waterloo this summer. This is the biggest investment in the railway for decades and will provide a significant increase in capacity for the thousands of passengers who use the station."

The record £50Bn plus investment is being showcased as part of a public awareness initiative, 'Britain Runs on Rails'. The aim here is to increase transparency so that the taxpayer understands how their money is being spent. The initiative is being overseen by the Rail Delivery Group.

Paul Plummer, Chief Executive of the Rail Delivery Group - a representative of train operators in addition to Network Rail - concluded: "Train companies and Network Rail are working hard together to improve journeys for the millions of passengers who use the railway every year in London and the South West. The result is going to be more trains running to more places, more often, creating new opportunities and supporting jobs. It will include significant upgrades to Waterloo station and the surrounding network. These improvements will help keep everyone in London and the South West moving and help to support a growing local economy."



MSc/PgDip/PgCert

Construction Management

An effective construction manager understands how to successfully organise and plan complex construction projects, diagnose corporate problems, and manage project teams, procurement, finance and risk. Many graduates use this course to gain the skills and knowledge required to advance their careers and undertake senior management positions.

Course Content .

The development of this course has been led by industry to ensure that it covers current industry trends and emerging future skills areas in construction management. Emphasis is on developing practical skills and tools for a rewarding career in construction. Additionally this course provides hands-on training in the use of state-of-the-art software tools and techniques.

This course will teach you how to successfully organise and plan complex construction projects and you will gain an understanding of international markets. You will also learn how to diagnose corporate problems and manage a multitude of areas including people, finance and risk. Additionally, you will be taught to recognise the significance of processes, technology and people to the success of projects in the construction industry.

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Duration:

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PgDip: Eight months full-time; one year and eight months distance learning/part-time

PgCert: Four months full-time; eight months distance learning/part-time

January intake:

MSc: One year and four months full-time; two years and eight months distance learning/part-time

PgDip: One year full-time; two years distance learning/part-time

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Entry requirements:

Applicants of this course must have a minimum of a second class honours degree. We welcome applications from students who may not have formal/traditional entry criteria but who have relevant experience or the ability to pursue the course successfully.

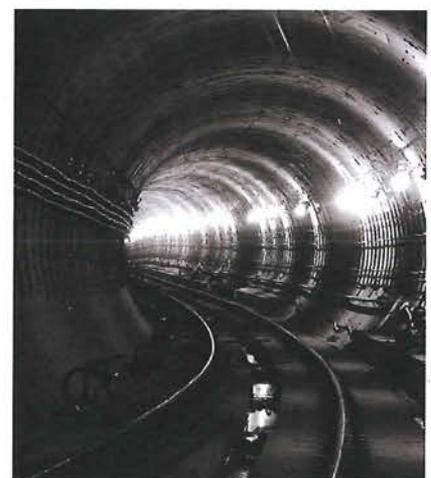
International applicants will be required to show a proficiency in English. An IELTS score of 6.0 (with no element below 5.5) is proof of this.

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AMP6 Update: An exclusive interview with Dr Ana Lanham

UK Construction Excellence's own Matt Brown speaks with Dr Ana Lanham, Lecturer in Water Science and Engineering at the University of Bath, about phosphorus removal technologies and the AMP6 programme.

Throughout her education and postgraduate studies, Ana has developed a strong background in environmental microbiology and biotechnology in particular, in terms of biological wastewater treatment, bio-reactors, bioremediation and biopolymers. During her PhD, she worked in collaboration with Aalborg University and with many water utilities.

Could you tell me about how phosphorus ends up in water and why its levels in needs to be controlled?

Phosphorus (P) ends up in water bodies as a consequence of agriculture run-off (from the addition of fertilisers containing phosphorus) and from concentrated urban wastewater. Phosphorus is a natural and essential element to all living forms as it is a major constituent of DNA and many other components in living cells. This is also why phosphorus is one of the key elements in fertiliser, along with nitrogen and potassium, as it promotes plant growth. In its geochemical natural cycle, phosphorus originates from phosphorite deposits, also known as phosphate rock, through weathering. It is then taken up by all forms of living organisms and released back into the environment through animal waste and plant decay. With the green

revolution, this natural cycle has been severely enhanced with the man-made exploitation of these phosphate rock reserves to apply in agriculture and the chemical industries. This, together with a greater urbanisation, has resulted in increased amounts of phosphorus in soils and water bodies. Phosphorus in itself, unlike other pollutants, is not toxic - on the contrary it is beneficial. However, if too much is available in water courses and marine environments then aquatic plants and organisms such as algae or specific bacteria called cyano-bacteria, will grow too much into what is known as algae blooms or eutrophication. This phenomena is utterly destructive to the ecosystems as this excessive growth depletes all the oxygen in the



Whilst chemical dosing and biological processes would remove 80-90% of P loads, there could be a need for polishing or tertiary treatment technologies around a combination of more or less established physical-chemical processes such as filtration, coagulation or adsorption such as the Blue PRO®, Comag® or Hydrok-Mecana® technologies currently under trial.



water body and prevents sunlight from penetrating into the water, reducing photosynthesis and literally suffocating all aquatic life.

One of the means of preventing eutrophication is to control the level of phosphorus in treated wastewater discharged into the environment. The recommended discharge levels depend on the recipient environment; e.g. if the treated wastewater is discharged into a small watercourse with low dilution, then phosphorus discharge levels might be lower than if the water is discharged into a high flow, high dilution stream. The other way to reduce eutrophication is to influence and inform farmers to adopt more informed or sophisticated practices for the use of fertilisers to minimise run-off.

Finally, it's not just about controlling the levels of phosphorus in the water; by encouraging lower discharges from wastewater we are promoting the opportunity to recover an essential resource that is finite and rapidly being used up.

AMP6 has seen a focus on innovation in phosphorus removal. Could you tell me about some of the new technologies out there?

Indeed, a majority of UK's water utilities have joined efforts with the UK Water Industry Research (UKWIR) to look into the best options to meet the increasingly stricter requirements of the Water Framework Directive.

Unfortunately, most of the P removal in the UK is achieved by chemical dosing using iron salts. This option is usually preferred because it's safe and predictable. However, it does result in a number of other issues for utilities such as continuous operational costs, increased sludge production and it will be difficult to continue to use it due to accrued costs if P discharge limits become stricter.

Therefore there are enormous opportunities for the increased adoption of already established technologies such as biological nutrient removal (BNR). The processes that govern these technologies, although still complex, are now quite mature. Therefore they can be used to efficiently remove most of the phosphorus in the wastewater. Not only that but the phosphorus is now concentrated in the biomass and the sludge can then be used as fertiliser or be processed to release and recover phosphorus in a purer

form such as struvite crystals before undergoing anaerobic digestion. There are a number of established forms of this technology that can be easily retrofitted into the currently existing activated sludge plants, sometimes just by modifying the operational parameters, and iron dosing can still be kept as an SOS treatment. However, there are also innovative variations such as the Nereda® system for aerobic granular sludge that is starting to be implemented in the UK.

Whilst chemical dosing and biological processes would remove 80-90% of P loads, there could be a need for polishing or tertiary treatment technologies around a combination of more or less established physical-chemical processes such as filtration, coagulation or adsorption such as the Blue PRO®, Comag® or Hydrok-Mecana® technologies currently under trial. Biological technologies including modified versions of bio-filters and algae ponds or passive and low carbon technologies with lagoons or constructed wetlands can also be used. The principles for all of these technologies are mostly established. The innovation comes from the way

they are combined, operated and monitored and their modularity or land footprint.

What are the advantages and drawbacks of these technologies?

The advantage of BNR processes is the reliance on the unique capacities of microorganisms to undertake the treatment of water. This is typically a cheaper, more efficient and more sustainable process than chemical processes. However, it is energy intensive, due to aeration and mixing costs and it does require some investment in skilled operators. The process, like activated sludge is also more sensitive to variations in wastewater composition and to environmental conditions and if run poorly might lead to greenhouse gas emissions.

The different variants of filtration, coagulation and adsorption technologies are currently emerging and offer very good prospects in terms of tertiary treatment. They would be able to offer a reliable P removal to low concentrations of P. However, they would imply an added cost to utilities to install them in addition to other treatments and in most cases they do not allow the recovery of phosphorus. Finally, the algae processes have shown promising results although there are still some limitations in terms of reactor design, growth and P removal yields and clarification. Low carbon or passive systems are quite well-known and some innovative features such as mechanical aeration or new design

configurations have shown it is possible to remove nutrients whilst reducing some of the land footprint. They are also getting a new surge of interest due to low maintenance and low carbon.

Is chemical dosing a sustainable solution to lowering P levels?

The biggest criticism with chemical P dosing is that you are treating wastewater by adding another chemical compound. This, of course, results in added costs and in added environmental pressures from sourcing these materials to their fate in the treatment process. The iron or aluminium dosing is an unspecific process that precipitates with the phosphorus compounds but also to other compounds such as sulphides or even organic matter and then ends up in the sludge. These metal salts can cause a problem in themselves as they might interfere with further biological treatment of the sludge (i.e. anaerobic digestion) or with the legal limits in the application of sludge to land as fertiliser. On another note, once the iron and aluminium phosphates are formed it is much harder to recover the phosphorus.

In my view, chemical dosing is a fantastic option as an SOS strategy, to complement the potential fluctuations of biological processes. However, in the long-term it is a recurring cost, an unnecessary use of resources and a difficult to process to scale up if increasingly low discharge limits are to be met.

There have been calls for phosphorus

to be recovered rather than just removed. Is this a completely different technology?

Yes, there is worldwide recognition that phosphorus is a depleting finite resource. To ensure the protection of our food production systems and chemical industries, recovering phosphorus from our wastewaters is an obvious solution, where approximately 10-20% of the mined phosphorus could be recovered.

We are already recovering phosphorus through the addition of sludge to land. This is a practice that is still permitted in the UK and that allows the non-specific recovery of many essential minerals and nutrients. However, this also has many drawbacks such as the potential spread of pathogens and concentration of heavy metals, as well as the fact that iron or aluminium bound phosphates may not be in a bioavailable form. Hence other countries in the EU have developed different regulations that ban the application of sludge to land, stimulating the need for other forms of recovery of phosphorus and nutrients in a more purified form. This is the case of struvite (magnesium ammonium phosphate) and hydroxyapatite (calcium phosphate).

Whilst the technologies for phosphorus removal are based on separating the phosphorus from the liquid phase into a solid phase (either biologically into the sludge or through chemical precipitation and adsorption mechanisms), the phosphorus recovery technologies imply that we then take



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We are already recovering phosphorus through the addition of sludge to land. This is a practice that is still permitted in the UK and that allows the non-specific recovery of many essential minerals and nutrients.

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the liquid or solid “stream” where phosphorus has been accumulated, release it into a liquid form and then precipitate it in a purified crystal. The most straightforward and less energy intensive way to do this is using the sludge of a BNR process, prior to anaerobic digestion, such as in Ostara’s WASSTRIP® and then PEARL® process, resolving many of the struvite issues in pipes and pumps. You can also recover phosphorus from incineration ash using thermochemical methods combining high pressures and temperature to convert the phosphorus in the ash to more bioavailable forms, leach the phosphorus and then recover it using precipitation or ion-exchange technologies.

Are the low P level consents wanted by water companies achievable within the AMP6 timeframe?

I would believe that it would be achievable for the most part. Many of these technologies or the knowledge we have over the processes is quite mature and the water utilities seem to be moving towards a greater interest and investment in this area. It might be that in the short-term - technologies using chemical dosing will still prevail - but would be replaced or complemented with main-stream biological processes or with polishing biological/physicochemical processes. The industry does need to make some significant investments in making this possible and in my view should have a longer-term perspective - even if they are now not recovering phosphorus,

align their investments with the possibility of doing this in the near future.

What can be done to speed up the development of these technologies?

I think the already existing collaboration between several water utilities and UKWIR are a great step forward in promoting potential technologies and in investigating and comparing potential options already available in the market and testing them at pilot scale.

The other effort should come from the regulatory agencies, to encourage a longer-term planning for utilities - where they can act on the double front of removing the phosphorus to preserve the good ecological status, but also on promoting resource recovery of a potentially vital resource to ensure food security.

Finally, we are achieving significant progress in modelling full wastewater treatment plants and the interactions between utilities and academia by exchanging monitoring data to improve these models further will play a significant role in screening the best technologies for a particular situation.

What difference could incentivising farmers to reduce their discharges of nitrogen make to P levels?

This is a very important approach at catchment level management that the UK has been focusing on and that can indeed play a huge role in reducing nutrient levels overall in water bodies. Nitrogen loads are intrinsically tied to phosphorus loads and so a reduction of either one affects the other. Wastewater

treatment can only go so far and it’s a great opportunity to recover phosphorus from a concentrated source, but it only contains maximum 20% of the phosphorus that we source - the rest is retained in the soil or incorporated into living organisms and ends up in agricultural run-off. Therefore finding strategies and working with farmers, as the example of Wessex’s Water EnTrade nutrient trading platform, is a very good practice that should be encouraged.

Is the Government taking enough of a lead on these issues?

There is a slow change across the world to move away from “wastewater treatment” to resource recovery. Wastewater treatment plants are a safeguard to the environment but they are also a mine of resources that can potentially be used. I am not aware at the moment of any particular incentives from the Government other than ensuring the compliance to the Water Framework Directive in terms of its phosphorus discharge limits. I believe there is a recognition that this might be an issue for food security and the Government should incentivise the adoption of longer-term thinking for water utilities, including reviewing the regulations on waste materials to enable an easy commercial uptake of recycled phosphorus.



Infrastructure schemes worth £6.4Bn underway in Scotland

A tranche of Scottish infrastructure schemes worth upwards of £6.4Bn are set to commence in 2017, including the hugely ambitious Forth Valley College Falkirk Campus, NHS Orkney's state-of-the-art hospital and healthcare facilities, and the much-anticipated A737 Dalry Bypass. In addition, ongoing initiatives such as the instantly iconic Queensferry Crossing, the M8 M73 M74 Motorway Improvements Project, and NHS Dumfries and Galloway's Acute Services Redevelopment Project are due to enter

into their operational phases this year, all of which means lasting benefit for Scotland as a whole. Following publication of the Scottish Government's 'Infrastructure Investment Plan' progress report, Secretary Keith Brown toured the construction site of the £14.6M Inverurie Health and Social Care Hub. He said: "Significant progress continues to be made in delivering our infrastructure investment plan, which is good for jobs, good for the economy, and good for Scotland."

"I am delighted that projects totalling almost £800M were completed last year, and that this year we are anticipating a further £2.8Bn worth of infrastructure projects being completed and becoming operational including the Queensferry Crossing. "I look forward to seeing these projects come to completion, but also seeing Scottish companies continuing to benefit from this government's record levels of infrastructure investment in the years to come."

Manufacturing sector drives second quarter growth in Scotland

According to April's Bank of Scotland Regional Purchasing Managers' Index (PMI), the Scottish private sector has made a positive start to the second quarter, seeing growth pick up slightly from the relative stagnation experienced previously. This slight upturn was driven by the manufacturing sector, which offset a shrinking services output. On the price front, input cost inflation accelerated and was steep overall, leading to a marked rise in charges. Job creation rose to an eight month high despite business confidence bottoming out at its lowest in six months. The seasonally adjusted Bank of Scotland PMI rose to 50.6; an increase on March's four month low of 50.1. The rate of growth remained below the historic series average which dates back to January 1998. Price pressures remained sharp in April. What's more, input price inflation was higher than the UK average for the first

time in four months. Panellists noted rising raw material cost and wage pressures as key factors. According to anecdotal evidence, companies passed on part of the burden of increased costs to customers, as corroborated by a marked rise in output charges in April. Finally, confidence towards future

growth prospects remained resolutely positive in April. That said, expectations eased since March, which firms attributed to political and economic upheaval in Scotland. Fraser Sime, Regional Director, Bank of Scotland Commercial Banking commented: "April's PMI signalled a tentative upturn in Scottish private sector growth, with both output and employment increasing at faster rates. The latest survey's results were driven by a strong manufacturing sector, which moved up a gear in April. There was good news all round from steep production growth, to solid job creation and a further easing of cost pressures. "Meanwhile, the service sector marred April's PMI score as business activity in the sector shrunk for the second month running. A faster rise in new orders bodes well, though continued growth in the second quarter remains heavily dependent on the relatively stronger manufacturing sector."





FMB report Scottish construction SME boom

Results from the Federation of Master Builders (FMB) Scotland State of Trade Survey Q1 has revealed that Scottish construction SME workload has risen faster than at any time since Q4 2007, with one in two construction SMEs predicting an increased workload over the coming months. Only 5% predicted a decrease in activity.

In total, 85% of builders believe that material prices will rise in the next three months and 58% of firms are struggling to hire carpenters - the highest reported level since the financial crisis.

Gordon Nelson, Director of FMB Scotland, said: "Scottish construction SME workloads have now risen for five consecutive quarters and rather

than tapering off in advance of Article 50 being served, that growth seems to have accelerated in the first quarter of this year. At a time of growing concern about the strength of the Scottish economy, the robustness of the construction SME sector is a definite good news story. Even more encouragingly, the number of enquiries for future work has risen solidly and one in two firms are now predicting that their workloads will continue to rise in the coming months."

However, the last three months have not been without struggle, with builders experiencing a sharp rise in material prices stemming from a reduction in the value of the sterling last June and

a rise in cost of imported materials and products. The skills shortage is also driving up the cost of skilled labour. Nelson continued: "The biggest concern for builders, however, will be the prospect of weakening consumer confidence. The risk of economic uncertainty impacting on consumer spending was already present due to confirmation of the UK's departure from the EU and the possibility of another Scottish independence referendum in the medium-term.

"Going forward, the industry is hoping that political stability will be re-established as soon as possible as both consumers and businesses respond best to political certainty."



£800M energy efficiency framework unveiled for Scottish councils

A national energy efficiency contract for Scottish councils, worth up to £800M over four years, has officially launched.

The new framework is Scotland Excel's largest ever contract opportunity, with 26 Scottish companies securing places as suppliers.

The contract will enable councils and housing associations to drive forward energy efficiency in their properties to tackle fuel poverty, create warmer homes for residents and cut carbon emissions.

Julie Welsh, Director of Scotland Excel, commented: "I welcome the launch of this innovative contract. It is our largest ever in value and brings opportunities for 26 Scottish companies to secure a share of the business.

"With sustainability at its core, the contract will support councils and housing associations in their efforts to deliver energy efficiency improvements which will bring benefits to homes for current and future generations.

"The contract has been designed to help councils deliver improvements to housing to create warmer, more energy efficient homes, to tackle fuel poverty, and meet national carbon reduction targets, whether through local investment programmes or from national funding allocations."

The framework will provide easy access to contractors for a range of efficiency measures including wall, floor, loft, window and door insulation, gas boiler and heating systems, electrical storage heaters, solar panels,

and domestic and non-domestic energy assessors.

It will also deliver lasting community and employment benefit with contractors committing to deliver a range of measures - including apprenticeships - to the region where business is secured.

Barbara Morton, Director at Sustainable Procurement Ltd, welcomed the new framework. She said: "This innovative contract demonstrates Scotland Excel's commitment to supporting local authorities and housing associations in delivering real progress in energy efficiency combined with benefits to communities. This unique combination of energy efficiency and employment opportunities has the potential to bring lasting benefits to communities throughout Scotland."



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Scotland celebrate record year for foreign direct investment

2016 was for many a tumultuous year. The 'Brexit effect', they called it. As the pound tumbled in the aftermath of the EU referendum, businesses across the UK braced themselves for tough times ahead.

And yet, against a backdrop of economic uncertainty, Scotland continues to buck the trend. According to an annual FDI attractiveness survey conducted by Ernst & Young, foreign direct investment (FDI) reached record levels in 2016. More and more, businesses are sensing the potential of a highland presence, with Scotland retaining its status as the highest performing UK region outside of London in terms of FDI.

In total, the '2017 EY Scotland Attractiveness Survey' revealed a 2.5% increase on foreign direct investment in 2016. One in every 50 investment opportunities in Europe is snapped up by Scotland, further emphasising its position as a location of choice for global investment.

2016 proved a promising year for inward investment as well. Scotland attracted 21 UK research and development projects, staking its claim to R&D investment nationwide. What's more, a UK top ten acknowledging projects secured highlighted Scottish cities, with Glasgow,

Edinburgh and Aberdeen finishing fifth, sixth and seventh respectively.

Unsurprisingly, Cabinet Secretary for Economy, Jobs and Fair Work Keith Brown welcomed the news: "These figures from Ernst & Young confirm that 2016 was a record-breaking year for foreign direct investment into Scotland. For the second year in a row we have attracted more projects than ever before - with 2016 up 2.5% on 2015's previous record - and Scotland has been the top UK region outside London in every one of the past five years.

"The statistics not only confirm Scotland's position as the top UK region outside London for foreign direct investment, but highlight the underlying strengths of the Scottish economy. We enjoy resources few nations can match, including one of the most highly-educated workforces in Europe, a long-standing reputation for innovation and an internationally-regarded brand." Also of interest is the origin of that investment. According to the Scottish Government, the top five countries contributing to the Scottish economy in 2016 were:

- **America (43 projects / 35%)**
- **France (14 projects / 11%)**
- **Germany (7 projects / 6%)**

- **Ireland (6 projects / 5%)**

- **China (5 projects / 4%)**

Mr Brown continued: "Today's attractiveness survey indicates these assets continue to be recognised on the world stage, with a substantial number of projects from the US, France and Germany. In fact, more than one in 50 of the investment projects across the whole of Europe are located in Scotland. "We will continue to support the Scottish economy. And we will never fail to highlight, wherever and whenever we can, Scotland's wealth of resources – the economic strengths that today's figures show have proved attractive to companies from all over the world." Paul Lewis, Managing Director of Scottish Development International, added: "Scotland has a great track record as a location which holds tremendous appeal to international investors, so it's heartening to see that position reinforced by the new EY survey, and it's particularly welcome to hear that Scotland now wins over one in 50 of all investment projects into Europe. "In a highly competitive inward investment market, this is a huge indicator of Scotland's global attractiveness and investment performance."

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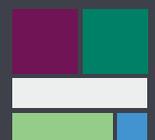
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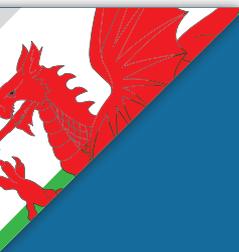
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Residential development made possible through Welsh Government funding

A newly built residential development in Cardiff has been brought to bear, thanks in part to a £1.4M sum courtesy of the Welsh Government's Social Housing Grant and the Smaller Properties programme.

Cabinet Secretary for Communities and Children, Carl Sargeant officially opened Cwrt Yr Eglwys in Canton last month. Helmed by Taff Housing Association in partnership with Cardiff City Council and Pendragon Construction, the development spans 16 one bedroom flats and four three bedroom homes. According to the Cabinet Secretary, the success of the scheme demonstrates the many benefits of partnership working.

Carl Sargeant said: "I am always keen to visit schemes which have received Welsh Government funding, to see for myself the benefits our investment can

bring to communities.

"I am pleased we have been able to support Taff Housing Association in this development with funding from the Social Housing Grant programme and the Smaller Properties programme. In 2016/17 we made available £4.2M from the Social Housing Grant programme to support the delivery of affordable housing schemes in Cardiff which are either on site or about to start on site. "Increasing the supply of homes in Wales remains a top priority for the Welsh Government, which is why we have pledged to deliver 20,000 affordable homes during this administration. I am committed to working with developers, housing associations and local authorities to bring forward schemes which will increase the supply of good quality affordable homes."



World's first compound semiconductor cluster for Wales

First Minister Carwyn Jones has applauded ambitious new plans to create a world-leading technology cluster in Newport which is likely to generate more than 2,000 highly skilled jobs and is backed by £12M of Welsh Government funding.

This state-of-the-art facility is the first such project to be supported by a £1.2bn City Deal and is the most recent milestone in the Welsh Government's bid to make Wales a global centre of expertise for compound semiconductors.

The compound semiconductor facility will put Wales at the forefront of technological advancements in this field and is expected to attract up to £365M of private sector investment over a five year period.

Compound semiconductors are crucial to driving advancements across a host of fields ranging from wireless technology and smart phones, to solar energy and power stations; from healthcare for new imaging devices and diagnostics, to transport.

First Minister Carwyn Jones described the cluster as a major coup for the South East of Wales, saying: "I am delighted our initial £12M investment has kick-started the creation of the world's first compound semiconductor industry cluster in Newport.

"Our support for the Institute for Compound Semiconductor Technology has been widely recognised as the catalyst for developing this world-leading cluster, which is expected to create more than 2,000 well paid jobs and be the cornerstone of a truly transformative project for the area.

"Today's major investment puts Wales at the cutting edge of this exciting technology, which has the ability to change the way we live. This is great news for Wales - and the first of many new exciting projects set to make a real difference to the economy of South East Wales."



Development Bank of Wales HQ shortlisted

Finance Wales has revealed a shortlist of properties across North Wales, each with capacity enough to accommodate 50 or more staff and become the headquarters of the new Development Bank of Wales.

According to Economy Secretary Ken Skates, several sites in and around the Wrexham region are being considered. The announcement follows Finance Wales' confirmation that last year was its busiest yet in North Wales.

Mr Skates said: "My decision to locate the headquarters of our new Development Bank in North Wales is part of a wider commitment we have as a Welsh Government to spread prosperity and jobs across to every region of Wales. Having the bank in North Wales will mean it is ideally located to make the most of the huge opportunities associated with the growth of the cross border Financial and Professional Services sector.

"Finance Wales is already doing great work in the North Wales area and has just confirmed that last year was its busiest yet in the region.

"We are now actively considering two potential sites in and around the Wrexham area for the Development Bank's headquarters which we believe will allow us to build on this success." Giles Thorley, Chief Executive of Finance Wales added: "The strong appetite for investment we have seen over the last year is testament to the ambition in the North Wales economy. We don't see that as the end of the story and feel that the region has huge potential for further growth. During the year we strengthened the investment team based in North Wales and we are currently looking at further recruitment which, once complete will more than double our presence.

"Finance Wales's overall impact last year of £26.6M into 43 businesses is a great result but we shouldn't be complacent. As we move forward towards the Development Bank of Wales it will be vital that the new organisation has a strong presence in all regions as we scale up to support more micro to medium sized enterprises."

It is thought that the Development Bank

of Wales will funnel more than £1Bn of investment support towards Welsh business over the coming five years and ensure micro to medium sized enterprises in Wales have improved access to financing, support services and management advice.

By 2022, 5,500 jobs will be generated and made safe each year thanks to the Development Bank of Wales. What's more, the organisation will be charged with boosting annual direct investment to £80M by that same date.

Subject to regulatory approval, the Development Bank of Wales remains on course to launch later this year.



Principal contractor appointed for £36.5M Monmouthshire school

Interserve has garnered a £36.5M contract to Design & Build a new secondary school in Caldicot, Monmouthshire.

Caldicot School forms part of Monmouthshire County Council's '21st Century Schools Programme', which will see the construction of two new schools over a three year period. Interserve secured the contract to build the 13,076sq m three storey school through the South East Wales Schools Capital Working Group. Construction is now underway, with up to 1,500 students to be accommodated once the facility opens in September 2017.

Gordon Kew, Managing Director at Interserve, said: "We have a strong history of working with the education sector, having completed over 200 schemes during the last 15 years, and we look forward to providing a modern new school in Caldicot, which we hope the pupils, teachers and the local community will be proud of. As part of the project we will be creating local jobs and using members of our trusted local supply chain."

County Councillor Liz Hacket Pain, Monmouthshire's Cabinet Member for Schools and Learning added: "I'm very pleased with the progress on

the delivery of the new schools. This is one of the largest construction projects in Wales, one which will bring fantastic opportunities to thousands of Monmouthshire's young people in the coming years."

The facility is to be built adjacent to the existing Caldicot School, which will be demolished once the new building is complete. Interserve hope to minimise disruption, with deliveries scheduled around both the existing school and local residents.

The entire project is due for completion in June 2018 and will be built to BIM Level 2 standards to achieve a BREEAM 'Excellent' rating.





£500M Swansea city centre regeneration bid approved

There has been some quite significant progress for the first phase of the £500M Swansea city centre regeneration scheme, with the local authority approving the proposal in early June.

The scheme will see St David's Shopping Centre transformed into a retail and cafe hotspot with a boutique cinema. There are additional plans in place for office and housing provision on the St David's site, which was previously demolished.

On the opposite side of Oystermouth Road, a 3,500 seat arena will occupy an existing car park adjacent to the LC

leisure centre, alongside a 13-storey residential block or hotel. Subject to final planning approval, the two sites will be linked via a footbridge, with both housing multi-storey parking facilities.

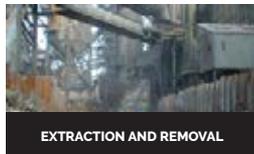
The area has long been identified as the "highest priority for redevelopment in the city centre", and Martin Nicholls - Director of Place at Swansea Council - described the milestone as a "major step forward" for the regeneration of the city centre.

He said: "This approval means we can now especially push on with our plans for the site that's south of Oystermouth

Road, which will form the first phase of the overall development."

While the project has been largely welcomed, Tesco, market traders and LC leisure centre have each raised concerns over road safety, fear of isolation and loss of light, respectively.

Work is estimated to begin on the southern site before summer 2018. A second phase will involve the demolition of the civic centre and the creation of a city beach which will also include an aquarium and digital science centre.



CMP History

Commercial Underwater Contractors Ltd was formed by Nigel Craddock in 1990 as a Specialist Diving Company. As a result of two successful contracts involving Beach Groyne Construction, the company diversified into Sheet Steel Pile Installation and the construction of Timber Sea Defence Structures.

In order to gain a competitive advantage in the market, the company invested in technologically advanced equipment and in a well-trained workforce. This investment along with efficient management of the projects undertaken secured an excellent reputation in the industry.

The merging of the companies has provided the opportunity for two long established businesses to operate as one, giving a full National Cover as a highly professional and diverse company in the fields of steel piling and marine construction.



Does Pembrokeshire Demonstration Zone spell a sea change for wave energy in Wales?

As an island nation, the United Kingdom has yet to make full use of its most abundant natural resource. Water. Even now, our coastline remains largely untapped, and with good reason. Marine energy is unproven on a grand-scale. But with renewables an understandable concern, alternative forms of energy must be considered if the UK is to make good on its green aspirations. The tide is beginning to turn it seems.

In recent months, much has been made of Swansea Bay Tidal Lagoon; the £1.3Bn power plant endorsed by independent review at the top of the year. Now Pembrokeshire Demonstration Zone, a separate offshore site intended to test the viability of 30MW wave energy arrays, is gathering similar pace.

For the uninitiated, Pembrokeshire Demonstration Zone forms part of the Pembroke Dock Marine project which reimagines the region as a hub for marine energy development. Spanning 90sq km of seabed off

the South Pembrokeshire coast, the demonstration zone will enable marine energy developers to put their technology to the test in open waters, and drive research and development. As such, Wave Hub - the organisation behind for the so-called demonstration zone - has commissioned Black & Veatch to undertake a comprehensive feasibility study. It's a toe in the water, so to speak. Design specifications for onshore and offshore grid infrastructure will be outlined, commercial viability assessed, and possible supply chain benefits explored in-depth.

"We very much look forward to working with Black & Veatch to help us understand how technically feasible and commercially viable the Pembrokeshire Demonstration Zone is," said Claire Gibson, Managing Director at Wave Hub Limited. "Throughout the study we will be engaging with industry and local stakeholders to ensure our plans are fit for purpose and take into account any

local concerns."

In total, the Welsh Government has allocated £100M for the feasibility study, through the European Regional Development Fund for West Wales and the Valleys. It's a considerable amount and further demonstrates changing attitudes to marine energy in Wales. Consequently, Wave Hub has established a Welsh presence, co-locating with other marine energy specialists in Pier House on Pembroke Dock.

"It's an exciting time for Marine Energy in Wales," concluded Madeline Cowley, Wave Hub's newly appointed Project Manager. "The feasibility study is the first step towards developing a world leading, large-scale marine test facility in Pembrokeshire. This project will be a key element of the development of a marine industry hub in the local area." The feasibility study, which began in May, is anticipated to take up to nine months to complete, meaning we can expect to know more from January 2018 onwards.

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Construction sector demand rises in Northern Ireland amid skills shortage concerns

According to the Federation of Master Builders (FMB), construction sector demand is on the increase across Northern Ireland, though the trade is being hamstrung by a serious shortage of skilled workers - carpenters and joiners, in particular. Construction SMEs in Northern Ireland are experiencing their ninth consecutive quarter of growth, with a near continuous rise in workload. And yet, an FMB survey has revealed that just under 60% of firms are struggling to hire carpenters - the highest level reported since the

financial crisis. In addition, a total of 85% of firms believe material prices will increase over the next three months. The FMB has said that housebuilding and demand for home improvements were fuelling the growth among small to medium-sized construction firms. Gavin McGuire, Director of FMB Northern Ireland, said: "In the first three months of this year, builders enjoyed growing workloads, rising numbers of enquiries and are increasingly confident about the future, despite the political stalemate

in NI. It begs the question - if we had strong political leadership in NI and political stability, how well would our core business sectors like construction be performing? "Although the NI construction sector is not fully out of the woods after the tough years following the financial crisis, it is in a much better place than it was two years ago. This progress within the SME building industry owes much to robust demand for both new homes and home improvement, the bread and butter of most small local builders."

John Sisk & Son Ireland's first considerate constructor

The Considerate Constructors Scheme - established to improve the image of the construction industry - is now international, having launched its first registered site in Ireland. The first contractor to register projects in Ireland is John Sisk & Son - a family owned arm of the international construction company, SISK Group. The first registered Irish site is The Exchange, which forms part of the International Financial Services Centre at the heart of Dublin's financial district. This project involves the construction of a six storey office block with basement car park and two retail units at street level. Sisk led the pilot of site registration to ensure a model that has been appropriately tried and tested before being made available to all construction activity in Ireland. Considerate Constructors Scheme

Chief Executive Edward Hardy said: "The opportunity for contractors to now register sites in Ireland is a huge step forward for the Considerate Constructors Scheme. With over 18,000 monitoring visits to UK-based sites, companies, and suppliers every year, the scheme is highly regarded across the construction industry as a central part of instigating positive long-lasting change, for the benefit of the workforce, local communities and the environment. "We are delighted to now be able to provide monitoring and support services to Irish-based construction sites to help raise their standards beyond statutory requirements - pushing the bar of considerate construction to a new level in Ireland." Brian Handcock, Head of Sustainability at Sisk commented: "We are proud to have worked with the Considerate

Constructors Scheme to deliver the first project registered in Ireland. Indeed, Sisk was one of the early supporters of the scheme, and has attained the highest standards possible on its projects on numerous occasions."





€1Bn National Children's Hospital approved in Dublin

The Irish Government has given the go-ahead for the construction of the new National Children's Hospital at the St James's Hospital site in Dublin. The children's hospital, which has seen its estimated costs more than double since 2012 when it was initially priced at €404M, will be one of the most expensive schemes of its kind in the world today.

Currently, the cost of the project is thought to be closer to €1Bn after additional commissioning costs have been factored in.

There has been much debate over the most suitable location for the hospital, though planning permission was granted to build on the St James's site last year.

Two satellite centres on the Tallaght and Connolly hospital campuses will also be built as part of the project.

The hospital will also see the construction of 675 car parking spaces, with a 100 earmarked for patients in need of long-term care. What's more, hospital staff will have 325 spaces allocated to them.

BAM Ireland is expected to begin work on-site shortly, while the scheme is due for completion before the end of 2021.

As he arrived at a Cabinet meeting, Health Minister Simon Harris commented: "It's extraordinarily exciting and will have huge economic benefits with about 1,700 construction jobs. "Today, all going well at Cabinet, we will give this project the green light and finally construction will begin on this project later this month and into next month."



New €5.1M Kinvara wastewater treatment works operational

A new wastewater treatment works has opened in Kinvara, County Galway following a €5.1M investment from Irish Water.

The Minister for Housing, Planning, Community and Local Government, Simon Coveney, was on-hand to top off the facility following its completion.

In addition to the creation of the wastewater treatment works, upgrades were made to the Kinvara wastewater collection network. The plant will also enable visitors to Kinvara Bay to enjoy improved bathing water.

Kinvara was one of 44 locations in Ireland where untreated wastewater was discharged directly into the sea. Prior to the plant, there were no wastewater treatment facilities for the town.

Minister Coveney described construction of the plant as being "significant" for local people and

businesses.

He said: "The works carried out by Irish Water will now provide the flexibility to deal with population growth in the area, allow for increasing tourist numbers and provide capacity for industrial and commercial development as well as ensuring that the treatment of wastewater meets all EU and Irish regulations."

Seamus Granahan, Irish Water's Regional Asset Operations Manager added: "As there wasn't any previous level of treatment in Kinvara, a new wastewater treatment plant was essential for the sustainable development of Kinvara Town and its environs.

"The construction of the new wastewater treatment plant being opened today is part of Irish Water's project to eliminate all untreated wastewater discharges going forward."



£46M office accommodation up for consideration in Belfast

Planning approval is being sought for a new £46M office development at the Waterfront City Quays site in Belfast. The project, dubbed City Quays 3, comes courtesy of Belfast Harbour and will become one of the largest offices in Northern Ireland.

With 250,000sq ft of office space across 16 storeys, City Quays 3 will have space enough for up to 3,000 workers and generate 600 jobs during its construction phase.

Once planning approval has been granted, construction should get underway by the end of 2017, with

completion scheduled for the following year.

Graeme Johnston, Belfast Harbour's Property Director, said: "Upon completion in 2019, Belfast Harbour will have invested £120M in City Quays and developed 450,000square feet of Grade 'A' office space supporting both Foreign Direct Investment and indigenous businesses. As with the two previous offices City Quays 3 will be a speculative development, which is a reflection of how strong demand for this quality of office space in Belfast is. "We will be tendering for a contractor

in tandem with the planning process which we expect to be swift due to Outline Planning Approval being in place.

"City Quays 3 will be built to the BREEAM Excellent sustainability standard and will include roof terraces and winter gardens taking advantage of the waterfront cityscape views.

"Located between City Quays 2 and the new AC by Marriott hotel, the office will also benefit from its proximity to a new public square that is currently being developed as part of the wider City Quays scheme."

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FEATURE



THE EXO: A brand new addition to Dublin's Dockland skyline

On either side of the Irish border there is a clear and consistent need for 21st century office accommodation. We've previously discussed the newly approved One Bankmore Square, thought to be Belfast's largest office building. Now Dublin has found its equivalent; THE EXO at Point Square. Standing 73 metres tall, THE EXO

will dominate Dublin's Dockland skyline. And with capacity enough to accommodate some 2,000 office workers, the €70M development is set to make a significant contribution to the local economy. Up to 350 highly skilled jobs will be generated over the course of a 24 month construction programme, ensuring a healthy supply

chain for the near future. The 170,000sq ft LEED (Leadership in Energy and Environment Design) Gold office development was granted planning permission in March of last year, mere months after an initial submission to Dublin City Council. According to Savills, this quick turnaround could be attributed to





THE EXO's location within a Strategic Development Zone (SDZ). For those unaware, an SDZ allows for the fast tracking of residential and non-residential development in areas of strategic importance. Point Square is one such location. Here, taller buildings are permitted and Shay Cleary Architects are keen to reinstate the square's significance within the wider Docklands region. More recently, joint receivers Stephen Tennant and Paul McCann of Grant Thornton have announced their intention to appoint a principal contractor, while Savills and CBRE are already seeking pre-let agreements with prospective tenants. "We are delighted to get this project off

the ground and look forward to seeing it through to completion," said Stephen Tennant of Grant Thornton. "Our first priority is to secure a main building contractor who can deliver a quality scheme on-time and on-budget." Roland O'Connell of Savills added: "THE EXO will provide the most spectacular workspace in the city. Its accessibility is unrivalled with the Luas stopping outside and the Port Tunnel providing quick access to the M50 and a 15 minute trip to Dublin Airport - surely one of the quickest airport links in the world." THE EXO's arrival is timely. Pre-lets accounted for 300,000sq ft or 44% of all Dublin office space leased in Q4 2016 - a sure-fire indication that demand

for first-class office accommodation is spiralling. Mark Smyth of CBRE commented: "Since planning approval was granted for the development of THE EXO, we have had numerous enquiries from both local and international office occupiers - all interested in being part of an area of Dublin that has been completely rejuvenated. Today's announcement from the receivers that they intend to press on with development is great news and our focus now is firmly on securing pre-letting agreements with tenants."

Images courtesy of Savills.



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