www.buildoffsite.com / December 17

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Buildoffsite: Enabling our Members to deliver greater construction value. Buildoffsite's emerging role as the first point of contact for offsite housing.

Third Annual RICS BIM4SME Awards. Showcasing the excellence and the opportunities that BIM presents. Latest news on the Buildoffsite Hubs. Updates on the Housing, Water, Rail and Pharma sectors.

Digitising Construction. The latest techniques for digitising construction and how the new technology is taking offsite construction to the next level.

Tekla software improves FP McCann's workflow. How it has increased efficiency across the business.



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Welcome

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Welcome to our December newsletter, as 2017 draws to a close we celebrate some of the amazing achievements of our members and reflect upon the some of the wins the industry has enjoyed over the past 12 months, as well as an insight into what challenges lie ahead for 2018.

We have seen an insurgence in the use of offsite methods on large projects in the UK and Tim Hall, our Interim Director tells us how privileged he feels that so many people from across the client and supplier communities are interested in offsite and willing to collaborate to ensure the benefits of offsite solutions are delivered.

It has been said this year that by increasing the use of offsite methods in construction could be the answer to the UK housing crisis, and the Buildoffsite Housing Hub was set up to address this very issue, providing the mechanism to link suppliers, clients and government agencies of all types.

We have also seen many areas of the industry embrace new technologies and see the benefits of aligning BIM and offsite. Offsite specialists, and BIM4SME award winner The McAvoy Group, tells us how new technology is taking offsite construction to the next level, giving them in particular, the opportunity to radically improve the way they design and produce

Budget 2017

The small print in November's Budget Statement set out some very important developments:

offsite construction by 2019

- Massive additional increase in provision to boost house-building
- A £170million investment to transform productivity in the construction sector
- A commitment that Government Client Departments including Transport, Health, Education Justice and Defence will adopt a presumption in favour of
 - Additional investment for construction skills
 - An increase in the allowance for R&D

to thousands of subscribers. March edition: June edition:

buildings for their clients. This is something that can be replicated across the industry, as can be seen in other articles from more of the Buildoffsite Member who are BIM4SME award winners - well done to you all.

October played host to the annual Offsite Construction Show. This year we saw record numbers in attendance, and we thank our Members for contributing to the success of the show. This unique show is the only UK event that is totally dedicated to the fast-developing offsite construction market, with every single visitor choosing to attend because they have an interest in offsite and see how it provides construction solutions.

We would like to take this opportunity to thank all our Members, old and new, for their continued support and wish you a prosperous and successful 2018. There are significant opportunities for offsite in the coming year and as advocates of offsite methodology, what better way to start a new year than enjoying past achievements.

Buildoffsite Members are actively encouraged to contribute material on projects and other activities for the Newsletter, which is emailed

Submission deadlines for the 2018 newsletters are as follows:

- Friday 16 February
- Friday 11 May
- September edition: Friday 10 August
- November edition: Friday 19 October

Send your submissions to: nathalie.quinn@buildoffsite.com Follow us on Twitter or LinkedIn: @Buildoffsite

The UK Construction Industry - some impressive wins, but a long way to go

Like it or not, there is something of an inevitability that large parts of the media, politicians of all stripes and perhaps many working in construction, may well characterise the industry as if it were a single entity. That sort of assessment is as inaccurate in construction as it would be for any other industry sector, but generalisation is often how we tend to categorise modern industries. Popular benchmarks for performance and quality are often derived from our collective experiences of modern industries and modern brands.

"Brands matter and manufacturers will do everything possible to protect their brands, and if things do go wrong they will automatically take action to put things right."

As consumers, when we think about car manufacturing it is now taken for granted that all new cars, no matter where manufactured, will be built to the highest standards and will offer different customers value for money that improves year on year. We will all have some sort of understanding that cars are nowadays manufactured in what ranks as an almost clinical environment where new technologies such as the application of advanced robotics and digitally delivered quality assurance become ubiquitous among all serious manufacturers almost immediately. The same applies to just about any consumer product you care to name. Brands matter and manufacturers will do everything possible to protect their brands, and if things do go wrong they will automatically take action to put things right. The market is global and globally competitive. Informed and driven by social media, customers can switch their buying preference almost instantly. This presents an incredible challenge for manufacturers to get things right at all levels.

Globally, construction is a laggard when compared with other industrial sectors. Close coupled is the challenge that for the most part, the industry's clients can't readily exert consumer power by switching to another supplier, as most parts of the industry operate in substantially the same way. The construction industry is in a real bind when it comes to a challenge to do things differently and to become more like almost all other modern industries. There seems little room for doubt that the profitability of constructors in the construction industry is simply too low to justify sustained investment in the business – whether in people and skills or in technology. Ditto levels of industry productivity are bumping along the bottom of industry league tables and going nowhere. Client value is deteriorating against a background of increasing value in other elements of the economy.

Customers may not like the consequence of these common industry characteristics, but other than a few high spending, very determined and expert clients who can perhaps do things differently, the reality for most clients boils down to a simple choice of deciding whether or not to make an investment.

If the predicted return on an investment is borderline, then given the cost, quality and other uncertainties (ie risks) then perhaps now is not the right time to make the investment. If the value of the investment is so certain that issues such as cost escalation, material and labour shortages, and the likelihood of project over-runs don't matter so much, then perhaps the investment will go ahead. This is hardly a vote of confidence in the construction industry. At a time of some considerable uncertainty in the wider economy, this additional element of risk is most unwelcome. There are of course some positive developments, which although not guite game changers in their own right, collectively inform new thinking and serve to move the industry on. Clearly the rapid increase in the understanding and adoption of offsite manufactured components is a real positive in simplifying the process of construction, reducing the need for inefficient and unproductive site based construction, shortening project timescales, simplifying the critical path, and removing project and reputational risk in terms of build quality and performance in use. This is a hugely welcome development that Buildoffsite has been advocating and supporting since it was set up 14 years ago.

Welcome too is the massive increase in the use of Information Modelling and Digital Technology generally to drive more efficient, more certain, better informed design, construction and maintenance. OK, so construction remains a laggard compared to the use of digital in other industries, but in part driven by Government leadership, some incredible progress has been made over a relatively short period. It is fantastic that all parts of the industry are investing in new skills and technologies, and bringing these into their main-steam business activities. This is creating new jobs and demonstrating in a highly tangible way the opportunities for careers in construction for new entrants into the labour market from Generation Digital.

It is great news that so many SMEs are investing in digital and having their achievements recognised in prestigious industry Award Schemes. Buildoffsite Members were well represented in the recently announced RICS BIM4SME Awards. Our congratulations go to Co-Builder for their work on The National College for High Speed Rail project. To McAvoy for their use of virtual reality in delivering West Hill School, Leatherhead. And to Willmott Dixon for winning the best overall BIM project for their work on 39 Victoria Street, Westminster. Short updates on these projects are set out in this newsletter.

The application of digital technology to drive increased efficiency and client value is an important component in bringing about a more efficient industry. These are still early days, but it is clear that the leading edge of the industry are moving rapidly to develop the use of digital as a tool for client engagement, for project delivery and for the effective management of the 'in use' phase of the project.

Where more work is required is in the area of construction process efficiency. The work that goes on in terms of developing the project design can certainly make a real difference in issues relating to buildability and construction form, but too often it is the process of construction or perhaps more accurately the management of the process of construction, that can either contribute to or if done poorly detract from the adoption of more efficient construction, and consequential time and cost savings. It is a truism that what happens on site can be massively inefficient in the use of increasingly expensive labour. It is also well understood that many – and indeed perhaps the majority – of construction projects end up running late, adding to costs, and impacting in terms of ongoing environmental impacts and on lost opportunities for UK PLC. Taking steps to minimise the amount of work undertaken on site whilst increasing work undertaken in a factory environment, is perhaps the single most important efficiency gain that the construction industry can readily grasp.

As has been said so many times, assembling final product offerings from a kit of assemblies is how all other modern manufacturers operate. Is it at all likely that the process of construction is so special that a different model applies? Seems a tad unlikely.

"The application of digital technology to drive increased efficiency and client value is an important component in bringing about a more efficient industry."

Buildoffsite: Enabling our Members to deliver greater construction value



Tim Hall, Interim Director

The drive for change in construction is relentless and many eyes are on the offsite sector to play a leading role in ensuring that productivity, quality and value all increase at pace. The key industrial focus from Government is UK productivity and construction is recognised as having the highest potential to deliver significant improvement, make an impact on National Statistics and, more tangibly, accelerate delivery of infrastructure; including housing.

Buildoffsite is at the centre of activity to align government, clients and the supply chain. We represent our members' ambitions and concerns through the Construction Leadership Council (CLC) innovation in buildings programme which is developing the Construction Sector Deal. The Sector Deal's ambition is to 'Transform the construction sector through the adoption of digital and manufacturing technologies, to deliver better performing built assets more quickly and at reduced cost."

The associated investment in innovation is measured in hundreds of millions of pounds and this will be used to stimulate excellence in Digital, Manufacturing and Whole Life Performance across construction. Buildoffsite will act as conduit to ensure the innovators in our membership have opportunities to access funding where their innovation and collaboration drives the productivity and skills agendas. Nobody can have missed the increasing emphasis on housing delivery at scale from all guarters. Buildoffsite, DCLG, HCA and GLA have a shared goal to ensure that more, higher quality housing is delivered at a faster pace and more cost effectively. This gives even greater emphasis on the Buildoffsite Housing Hub as our hugely successful recent events at City Hall with the GLA and the housing focused Direction Group Meeting with Legal and General demonstrate. Buildoffsite's emerging role is to act as the first point of contact for social, private and public sector developers to explore the potential of offsite housing delivery; then to connect them with those manufacturers, designers and other suppliers that can enable flawless delivery at scale. Reduced costs will also be delivered down the line if DfMA and standardisation benefits are applied to on-going pipelines of work.

This CLC report on DEMAND CREATION, INVESTMENT AND VOLUME SURETY sets out the path to unlock the UK housing supply and demand conundrum, through demand aggregation, standards and longer term strategic procurement. Link below:

http://www.constructionleadershipcouncil.co.uk/news

Housing was a key part of the agenda in early October as the Buildoffsite Team decamped to ExCel in Docklands to support the Offsite Construction Show. This Show now in its third year was delivered by our Member Marwood Events. Lots of industry shows are now adding offsite as a bolt-on extra to their mainstream programme but the Offsite Construction Show is the only UK event exclusively for the offsite industry.

Buildoffsite had three main roles at the Show. We were an exhibitor and over the two days hundreds of delegates made their way to our stand. It is a great privilege that so many people from across the client and supplier communities are both interested in offsite and willing to collaborate to ensure the benefits of offsite solutions are delivered.

Perhaps our key role is to deliver a programme of Seminars and Workshops to address the information needs of the market and to provide platforms for knowledge exchange and B2B networking. My thanks to those fantastic and passionate speakers who gave so generously of their time and expertise to take part in the programme. We must be doing something right as about half of all delegates list attending Buildoffsite hosted events as one of the main reasons they come along to ExCel.

We also attend the Show to promote our Members capabilities including those who exhibited. It is also a great opportunity to connect with Members old and new, forging collaborations between clients and the supply chain and also engaging with those who want to join Buildoffsite. We are already planning for the 2018 Offsite Construction Show and we will be bringing forward some really exciting fresh ideas to add even more value for delegates and exhibitors. In recent weeks we have delivered a workshop event for the rail industry with input from TfL. The Mayor of London has set challenging targets for the Capital's transport network to become 'Step Free' to improve accessibility for all. The challenge has been taken up by the Buildoffsite membership to accelerate delivery of station lifts with improved whole life costs. This approach of setting a 'Client Challenge' to be tackled by Buildoffsite Members is an important part of our strategy. We are working with HS2, Heathrow and the retail sector to create more opportunities for offsite to demonstrate its capability to improve construction outcomes.

Just a week or so ago we organised a visit to the National Composite Centre at Emersons Green, Bristol. This knowledge transfer event was very well supported by the Membership and Guests including some from The Institution of Structural Engineers. This visit not only ensured our Members have early sight of technologies and that will be game changing in the next few years, but also gets members exploring opportunities to work with organisations with a similar appetite for innovation.

In addition to the above highlights we carry on working on a day to day basis to connect with our Members in support their business ambitions. One of the great things about Buildoffsite is our ability to connect people who have complementary skills and solutions and enabling them to work together and deliver more. The fact that we are completely non-partisan with respect to technology, supplier or sector, gives Buildoffsite a unique voice in construction to challenge clients, government and the supply chain alike. This generates demand for more activity from our team and members. Our ambition is to enable more collaboration and innovation and we will need to grow our team and Industry Advisors to deliver. We will achieve this as the membership grows and will be looking for input and support from government to enable us to scale our resources and ensure UK plc delivers on its productivity ambition.

"Buildoffsite's emerging role is to act as the first point of contact for social, private and public sector developers to explore the potential of offsite housing delivery."

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At the time I am writing we are still a few days away from the Autumn Statement. There is no doubt that Construction, Infrastructure and Housing will be amongst the priorities. What is abundantly clear is that UK PLC needs a dynamic and efficient construction industry that scores a lot higher in terms of productivity than is currently the case. A shift of process, practice and mindsets that supports the increased use of offsite is part of the solution. Let's ensure that the offsite and wider construction sector are poised to deliver, using Buildoffsite as the vehicle for alignment across the value chain.

"It is a great privilege that so many people from across the client and supplier communities are both interested in offsite and willing to collaborate to ensure the benefits of offsite solutions are delivered."

Hub Updates

















Housing Hub

There can be few issues as important, or as challenging as housing - or more accurately the need to build a lot more decent homes.

It is not just about numbers, quality is also non-negotiable.

If you read the bare headlines in the mainstream media, in large parts of the technical press and in political soundbites, you risk getting the sense that the answer is 'offsite' - now, what is the question?

There is no doubt that in the UK we need more homes. There is also little doubt that reliance on traditional house-building methods is a blind alley in terms of quality and efficiency. Almost all commentators are calling for an increased role for offsite solutions - but few understand that to make offsite work at scale requires not just a potential market but also a supply chain that can offer efficient manufacturing and has the capacity to deliver. Creating manufacturing is an expensive process and works best, if at all, if there is confidence regarding demand.

The Buildoffsite Housing Hub has been set up to provide the mechanism to link suppliers, clients and government agencies of all types.

A GLA hosted Housing Hub event took place on 27 September. This brought together a wide range of clients including HA's and LA's and senior representatives of supply side companies. A report on this event was contained in the October newsletter.

On 25 October, a Buildoffsite Direction Group was hosted by member Legal and General at their London HQ. This meeting focussed on housing developments and included guests from the GLA and from Local Authorities

Important issues that came up included:

- The need for better understanding of what it would take to enable manufacturers to deliver more homes
- Identifying key developments that will have an impact on the market for offsite homes
- The importance of sustained procurement programmes
- The need for changes in clients procurement practices
- The importance of ensuring quality and resilience of offsite enabled homes
- The capacity of the supply side at scale – if pipelines are assured
- Opportunities for financial incentives for offsite suppliers to come to market

Opportunities for mass standardisation

- of products and processes
- The need for relevant new skills
- Demonstration projects that help make the case.

The Buildoffsite Housing Hub will be progressing these issues.

Outstanding actions also to be addressed include: responding to the Mayor's Draft Housing Strategy; input to the CLC work streams on mortgageability and risk; responding to growing interest from Local Authorities, in particular London Boroughs and the Metropolitan authorities.

The next meeting of the Housing Hub will be scheduled for February 2018, with a number of workshops and site visits to be held early in the year.

For more info, contact nathalie.guinn@buildoffsite.com



Water Hub

The Water Hub continues to be very active both on client and supply chain sides, and is progressing various projects on standardising products within the water industry. The Water Hub Client Group had a great meeting at United Utilities in Warrington at the end of August and a meeting at Scottish Water in Glasgow at the end of November.

The Hub presented at the Offsite Construction Show in October and the crack team of Jon Rains (Mott MacDonald), John Browne (United Utilities), Stephen Wright (Yorkshire Water), Dave Bennett (Laing O'Rourke), Steve Kennedy (MWH) and Mark Livingstone (Ross-shire Engineering) gave well received presentations. These are available to everyone on the Buildoffsite website (https://www.buildoffsite.com/sectors/ oscs-2017-water-hub-seminar/).

Scottish Water has joined Anglian Water, Northumbrian Water, Yorkshire Water and United Utilities as members of Buildoffsite.

Plans are underway for site visits in 2018. These include a visit to Nomenca to demonstrate the "end to end" design, manufacture, installation, and commissioning process. There is also the possibility of Director Level Conference in Spring/Summer 2018, to update senior executives from both clients and the supply chain on the progress of the hub. Ross-shire Engineering, Thames Water and Anglian Water have also offered to host visits in 2018. Details for all events will be circulated as soon as the plans are firmed up and our Water Hub members look forward to the opportunity to show off their sites and the expertise behind them.

For more information on the role of the Water Hub contact: hubs@buildoffsite.com



Rail Hub

This is a really busy time for the Buildoffsite Rail Hub.

In October we held a seminar session at the Offsite Construction Show (OCS) at which Tomas Garcia of HS2 explained their challenges and needs with respect to bridges and viaducts, Shaun Chivers of Mabey Bridge presented approaches to exploiting modular bridge designs and Graeme Jones of C-Probe Systems explained how the use of impressed current cathodic protection can be used to design reinforced concrete structures with unlimited / indefinite design life. See Graeme Jones' article later in this newsletter.

Following the OCS, Buildoffsite has consolidated the information presented at the Show plus the outputs from 2 workshops on DfMA for Bridges and Viaducts and submitted it to the Rail Hub Client Group to get initial feedback and to obtain approvals for the proposed illustrations. If you have examples which you feel would make useful illustrations, please send them to Nigel Fraser at nigel.fraser@buildoffsite.com

A Rail Hub Clients Group meeting was then held on 2 November at which progress against the plan for 2017 was reviewed and ideas generated for activities in 2018. Feedback was also provided on the DfMA guide.

On the 6 of November LUL/TfL hosted a workshop on their accelerated Step Free Access Programme. You can read more on this later in this newsletter. Presentations will also be available on our website.

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Bill Price at WSP has just published a report: Out of Thin Air. Building above London's Rail Lines. See at: http://www.wsp-pb.com/en/WSP-UK/ Who-we-are/Newsroom/News-releases1/ Silent-page-container/How-can-building -above-rail-lines-help-solve-Londonshousing-shortage/

The opportunities outlined in the report include significant scope for offsite solutions in terms of both structures and residential accommodation. A workshop to look at this in more depth was hosted by WSP on the afternoon of the 7 of December at their London office in Chancery Lane. This is a really significant development which we will report on in the next newsletter.



Hub Updates

"Factory in a Box has demonstrated that time. cost and quality can all be improved in the delivery of these types of facility."



Pharma Hub

The Pharma Hub is now up and running, and the second meeting brought together companies in the pharmaceutical and healthcare supply chain focussing on two themes:

Theme 1

John Dyson spoke about the importance of time, in line with the GSK mission:

- Do more, feel better, live longer more quality time for all.
- The time it takes to bring new medicines to market
- The time when we are waiting for test results or our hospital appointment
- The time taken to design, build and bring into operations new healthcare facilities
- Time is the largest lever on return on investment driving cash-flow

Other industries teach us that speed doesn't come at greater cost or loss of quality. By addressing waste and transaction costs all three can be improved at the same time.

Theme 2

Clean rooms are a critical and ubiquitous part of healthcare; laboratory, manufacturing and hospital. Factory in a Box has demonstrated that time, cost and quality can all be improved in the delivery of these types of facility. Clients collaborating with supply chain could transform the delivery of these facilities to the benefit of all; businesses, patients and society.

The way forward:

Both clients and supply chain have expressed interest in developing the Pharma Hub. The proposed way forward involves:

- Client sessions to further define the interest and ways of working
- Supply chain discussions to collate current offerings and ideas
- Plenary collaborative discussions to define and deliver opportunities

Any further information needed, please contact: hubs@buildoffsite.com

News

Quantifying the Benefits of Offsite Construction

CIRIA has started work on developing a new data research project for 'Quantifying the benefits of offsite construction' which has been endorsed by Tim Hall and the Buildoffsite team.

Buildoffsite members asked CIRIA to embark on this project as they felt it was important to establish and quantify the benefits where off-site construction might be used. CIRIA, working with Buildoffsite members, will provide a summary report of key benchmarking data to enable comparison of benefits of off-site construction with more traditional techniques. They are hoping to involve clients as procurement practices will most probably benefit from quantifiable business cases for off-site solutions.

Currently, most assessments are made through the client's tender process on a case by case basis. At present there is no industry standard methodology for assessing the benefits of off-site techniques against traditional construction practices. The Project Steering Group (PSG) for this research project will determine the final scope but the key objectives will be to:

- Identify common project drivers in more detail; approach to risk, innovation and procurement
- · Identify the benefits of off-site techniques against more traditional approaches by collecting data in a format that will enable comparison

Third Annual RICS BIM4SME Awards

Ten firms that utilise BIM technology to create smarter and more creative buildings were recognised at this major industry event, held at the iconic HMS Belfast in London. The RICS has identified BIM as the critical development affecting organisations of every size across the construction industry, and it continues to promote the importance of BIM adoption and those companies at

the forefront in the UK. The BIM4SME awards showcase excellence, promote best practice, and the tremendous opportunities that BIM presents for the whole of construction.

Commenting on the awards, Alan Muse, Global Director of Built Environment Standards at the RICS said: "BIM offers significant benefits for construction projects....it enables a project to be

"The RICS has identified BIM as the critical development affecting organisations of every size across the construction industry."





• Enable clients, designers, specifiers, contractors and others to quantify for themselves the benefits of offsite construction techniques when compared to typical construction approaches.

Buildoffsite members are already helping CIRIA with refining the scope of the data requirements and they will be convening their first project meeting next month.

Further details can be found via www.ciria.org or get in touch with kieran.tully@ciria.org if you would like to get involved.

delivered faster, of higher quality, have more sustainable performance and more efficient operation. More firms are adopting BIM for these reasons and our winners are testament to those leading the way in utilising it to deliver better, more innovative and cost-effective built initiatives. I hope they inspire other businesses of the importance and benefits of BIM in revolutionising the construction process."

http://www.rics.org/uk

Digitising Construction



In this article, David Clark, Innovation Manager at offsite specialists The McAvoy Group, looks at the latest techniques for digitising construction and how the new technology is taking offsite construction to the next level.

Building Information Modelling (BIM) has been the subject of much debate in recent years, but the aim of driving greater collaboration across the disciplines of architecture, engineering, manufacturing and construction has to be the right approach. Digital transformation is happening all around us and the developing technologies, such as global connectivity, and new advances such as drones, satellite images, robotics and electric cars are set to accelerate and will continue to change the way we live.

The construction industry, however, has been much slower to adopt and benefit from the digital transformation. McAvoy's view is that there is tremendous synergy between offsite construction and the latest digital techniques, which give us the opportunity to radically improve the way we design and produce buildings for our clients.



Building Information Modelling (BIM)

Our experience of BIM is much more than just the creation of 3D models of buildings. It is about the process of how we deliver projects to our clients in the most efficient way possible. Harnessing the latest technology has allowed us to streamline processes at the earliest stages of a project, to deliver shorter design periods and buildings that exceed our clients' expectations. It allows us to collaborate more effectively internally with our supply chain and also with the client.

Shorter design periods are critical for offsite construction. We need to start manufacturing buildings as soon as the ground is broken on site. To achieve that, detailed design information has to be released to our manufacturing teams at a much earlier stage than with site-based construction – and that necessitates earlier decision making on the part of the client. BIM allows a building design to be co-ordinated in a more efficient way and facilitates better quality decisions earlier in a project. There is better client engagement with the use of 3D models – teachers or healthcare professionals for example, are not trained to read 2D construction drawings. If we use data rich, fully detailed 3D BIM models and walkthroughs, we can communicate a building design much more effectively and present design options for discussion in a far better way.

"Harnessing the latest technology has allowed us to streamline processes at the earliest stages of a project."



Virtual Reality in Construction

Advances in virtual reality (VR) have allowed us to actually put our clients and end users into their virtual building as part of the design process. They can feel and experience their working environments, and are now able to validate instantly whether the layouts work for them.

VR takes client engagement to another level and works alongside BIM. It is another way to communicate with clients and stakeholders, allowing them to engage and review the design as it develops. It removes the potential for misinterpretation of drawings and data loss. Using a headset, you can be in the space in a building. Our customers simply love this. We used it for a recent project at Dublin Airport, where the client wanted to assess ceiling heights. It provides instant and more informed decision making.

In the US, VR is being used for planning, for example, allowing authorities to check if a building visibly overpowers a streetscape or not. Mobile VR can now easily be set up and remote multi-user sessions can be created. Permanent VR can be installed on site for our major projects, hosted at our head office. Our CAD designer can then be linked to the client, who can tour the building in a collaborative but remote design workshop. This really enhances the way our clients and users visualise a building. Its design and functionality can be assessed with a view to producing better building designs, more quickly.

VR in Manufacturing

We are now looking at building a VR experience for training our manufacturing teams in the most efficient and safest processes. With offsite construction, there are many repeatable operations to produce bespoke buildings in our factories. We can now take the highest risk activity – such as moving large modules – and build a VR programme around that process to help us continually improve health and safety.

Augmented Reality – the Next Development

Augmented reality (AR) allows us to project CAD data onto the world around us. For example, we could take AR onto a site and superimpose the building. This would be an excellent planning tool and offer a new level of client engagement. It could also allow us to deliver 3D data to manufacturing, potentially cutting out 2D drawings, which we are exploring and believe has huge potential for offsite manufacture.

As part of our commitment to digitising construction, McAvoy is now working with the Manufacturing Technology Centre (MTC) on an advanced visualisation project to use AR in construction. This is a 12-month programme to develop construction-related engineering skills to address the needs of digital construction.

Our aim is to cut out the resource-intensive processes of 2D information. By removing the reliance on manual processes, there is less data loss and more informed decision making, all driven by BIM.

As a business, McAvoy sees tremendous opportunities for digitising offsite construction, particularly to help us address the industry challenges of meeting the ambitious targets set out in the Government's Construction 2025 Strategy. We were the first – and we believe only – offsite specialist to achieve BIM Level 2 accreditation and it is transforming the way we work with our clients.

As advances in digital technology continue to improve, we can only see even greater benefits to our customers, users and stakeholders in the facilities we design and construct offsite.

For more information, visit www.mcavoygroup.com call 028 8774 0372 or email info@mcavoygroup.com

Willmott Dixon Interiors Wins Best Overall BIM Project











Willmott Dixon Interiors (WDI) were Overall Competition winners for their work on 39 Victoria Street, London A category B fit-out project to create The Department of Health's new head office.

Amador Caballero, WDI Head of BIM

The project requirements called for the implementation of BIM Level 2 in accordance with the Government's BIM mandate. Willmott Dixon Interiors used BIM to successfully design and deliver an attractive, highly cost effective and sustainable building which was handed over defect free, on time and budget. The works comprised modern offices, meeting rooms, restaurant facilitates. The 34 week project was completed in September 2017.

One of the challenges of implementing BIM on fit-out projects is working with existing services. Although extensively refurbished in 2014 the O&M information was found to be of poor quality.

WDI decided to undertake a point cloud survey of the existing building to verify the dimensions of the site as well as researching information for elements that would not be replaced in the project.

WDI set up a Common Data Environment (CDE) for the exchange of project information. This tracked document revisions, making the latest versions always available for the whole team and restricting access to the information to the authorised team members.



Learning

The use of BIM on this project facilitated the production of visualizations, animations and VR presentations to support the client's understanding of the project. This led to modifications of some material finishes.

The architect, as lead designer, provided a clash report with the relevant issues detected in the design discussed and resolved during the Design Team Meetings (DTM). The client's Project Manager and BIM advisor collaborated with WDI and the delivery team to ensure that the asset information provided at the end of the project met the client expectations, and that the COBie data was in the right format to be used within their CAFM system. The BIM deliverable supports the client's Facility Management team, providing detailed asset information of the building at the end of the project for better management of their asset during the life-cycle of the building

At 39 Victoria Street all subcontractors with design responsibility provided BIM models, which they developed in-house or outsourced. The majority of the Supply Chain only had to provide data requested by the client for incorporation in the model. This data was captured using the COBie template, including examples of how to fill the cells in order to support the Supply Chain members on this task. For most of the Supply Chain, this was the first time they had to open a COBie file. As expected, there were numerous questions about how to populate the required data.

A clear asset register of equipment maintenance and what information is needed for each component was provided at handover to the clients FM team. This model will need to be kept up to date during the life-cycle of the building.

*buildoff*site



The WDI report on this project is available at: https://www.willmottdixoninteriors.co.uk/ project/department-of-health/?rel=commercial-offices&type=sector

For more information on the use of BIM on this project contact: Amador.Caballero@willmottdixon.co.uk

McAvoy Wins Award for Best Virtual Reality BIM



The McAvoy Group has won a major industry award for its commitment to adopting and implementing Building Information Modelling (BIM) in its offsite construction projects. McAvoy was presented with the award for Best Virtual Reality BIM at the third annual RICS BIM4SME Awards. This is for the design and delivery of a two-storey primary school building for children with special educational needs at West Hill School for Surrey **County Council.**

Eugene Lynch, Managing Director of The McAvoy Group said: "We are absolutely thrilled that our industry-leading commitment and investment in BIM has been recognised in this way. McAvoy was the first offsite construction specialist to be accredited to BIM Level 2 – which was a major achievement. We are now working towards BIM Level 3

as we really value the efficiency benefits that the process and the latest virtual reality technology can bring to our customers and our offsite projects."

David Clark, Innovation Manager at The McAvoy Group added: "There is a strong synergy between BIM and offsite construction. Our offsite solutions and factory production processes significantly reduce time on site, and improve the quality and efficiency of buildings. The use of BIM takes that to a new level. We consider BIM and virtual reality to be an absolutely vital part of our business. Harnessing the latest technology allows us to streamline processes even further, to help facilitate better decision making and enhance stakeholder engagement at the earliest possible stages of a project. This will deliver shorter design periods and in our view, outstanding buildings that exceed our clients' expectations."





For more information, visit www.mcavoygroup.com call 028 8774 0372 or email info@mcavoygroup.com

News

coBuilder wins the 'Best use of BIM for Embedded Data' category

Creating the Asset Information Model or the Digital O&M is the main focus of the practical implementation of BIM on construction projects today. This information model consists of geometry, data and documents. The link between these three elements is rooted into practice called information management. Embedding the data and documents into the geometrical model requires a systematic data management strategy in order to set data requirements, acquire the data, validate and verify it and attribute it.

Taking all these considerations in mind, Willmott Dixon were among the first general contractors to seek out the help of the innovative construction product data experts coBuilder who specialise in providing product data management solutions for all actors in the construction industry. The result was a

unique project showcasing the essential value of embedded data in the final stages of delivering the National College for High Speed Rail in Birmingham. Bound to be noticed for its pioneer spirit, the project was soon awarded the first place in the 'Best use of BIM for Embedded Data' category of the RICS BIM4SME Awards 2017.

'The BIM4SME Best Use of Embedded Data Award for our project with coBuilder has highlighted how forward thinking and innovative coBuilder is. Together, we look forward to helping the industry see the path towards digitisation whilst continuing to collaborate and share our knowledge whenever required.' - Jill Guthrie, Senior BIM Manager, Willmott Dixon.

'Through coBuilder's 'Embedded Data' services, Willmott Dixon were able to collect structured asset data (COBie) and product

London Underground Step free access programme

London Underground (LUL) has a challenge from the Mayor to make all stations fully accessible by making them step-free. How can Buildoffsite help them deliver?

On 6 November the Buildoffsite Rail Hub held a workshop session with the LUL Step Free Access Team to review their programme.

The initial aim is to adapt over 30 stations to make them accessible to a range of passengers, including the disabled and people with pushchairs, prams, shopping trolleys etc.

This involves both overground and underground stations. It will be followed by a roll-out across more stations.

3 procurement phases were outlined. (Details have been posted on our website). LUL have already looked at their requirements and identified opportunities and challenges for using modular solutions. It is intended to employ modularisation to achieve reduced unit cost with the following benefits and characteristics:

- · Modular offsite fabricated components that are interchangeable
- Product of high quality by introducing repeatability
 - in the manufacture of the components
 - Reduced on site construction time
- Reduced maintenance costs over the life of the asset.

The programme will be sourcing systems including lift shafts, link bridges, ramps and elevated platform modules.

"Our offsite solutions and factory production processes significantly reduce time on site, and improve the quality and efficiency of buildings."

information (Product data sheets and documents) throughout the construction phase of the 'National College for High Speed Rail' project. Using our tool ProductXchange, we were able to help the project teams in ensuring they are delivering accurate and validated as-built COBie based on the client's data requirements. In this way we were able to deliver a full digital repository of all the products installed in the building available for export in various open formats so that all stakeholders could benefit from accurate, paperless construction product data - ready to be transparently shared with anyone who might need it.' - Vasil Tanev, Customer Production Team Lead, coBuilder.

Read more about the project in the BIM4SME official blog: http://www.bim4sme. org/bim4sme-awards-winners-case-study-2/

Lower unit costs by introducing competition

Some of the challenges relate to how these will be integrated into existing sites with differing spans to bridge over plus structures such as existing foundations and canopies. Configurability will be key.

The Team is keen to understand how approaches to specification and procurement may assist them to achieve their goals.

LUL outlined their process for getting products included in their database of authorised products and these are also on our website: www.buildoffsite.com

Buildoffsite has been invited to organise a follow up session with the Step Free Access Team to go into more detail and peer review the approach. This is a great opportunity to directly liaise with and inform a major client, so please contact Nathalie on Nathalie.guinn@buildoffsite. com if you would like to be involved.

Buildoffsite at The Offsite Construction Show 2017



The annual Offsite Construction Show provides a great opportunity for Buildoffsite to meet up with as many client and industry people as possible, to promote what we do and to support the interests of our Membership.

The Show is unique in that it is the only UK event that is totally dedicated to the fast developing offsite construction market. Every single visitor who chooses to attend does so because they have an interest in offsite and recognise that the use of offsite solutions in all markets is only going to grow. No matter where people are in developing their careers and competences they need to build up an increasing knowledge of what offsite is what it can do and is doing and to learn from experts about those products and processes that are just around the corner. The Offsite Construction Show serves an essential purpose in delivering a major knowledge sharing opportunity.

The Buildoffsite Team had an excellent Show. Over the two days some hundreds of visitors came onto our stand to share information, to seek advice or simply to say hello. This is just what we were looking for. The place was buzzing. Our congratulations go to the Team at Marwood Events for all their hard work in making this happen.

We understand that those Buildoffsite Members who chose to exhibit also had an excellent Show, notably the quality of visitors and appointments, and you can see more on their video here: https://offsiteconstructionshow.co.uk

Most delegates came onto our stand as individuals but we were delighted to welcome a number of international groups from France, Finland and other countries. Let's just think about this – major groups comprising senior people taking the time and trouble to visit a UK Show because they recognise that the UK is in the driving seat in pushing fundamental change within the construction industry. Change that is helping to bring about an industry that assembles structures on site and has the resources, products and competences in place to bring this about. In short, they had come to learn

As in previous year's Buildoffsite's special contribution to the Show was to deliver our programme of Seminars and Workshops. We outlined the programme in the October issue of this Newsletter. These events are not sales events they are crafted to deliver the sort of learning opportunities that our Members and delegates to the Show tell us that they want. A chance for delegates to hear from key industry people from the client and supplier communities who are working at the leading edge of offsite enabled construction and who willingly turn out to share their hard won and invaluable experiences. It is a real pleasure to hear that around half of all those who attended the Show identified attending our events as one of their priorities, and their most valuable experiences at the event. See more on our website: www.buildsoffsite.com

Our thanks go out to all those who took part in our programme and also to our good friends at the Department for Business, Energy and Industrial Strategy (BEIS) who were able to lend support. Goes without saying but we literally could not do this without their support.

OSCS 2018

As many will be aware Buildoffsite will be working with our Member Marwood Events to deliver the 2018 Offsite Construction Show. Year on year the Show gets better. We will continue to play our part to up the game and deliver an event that does credit and delivers value to this rapidly developing industry.

To do our job effectively we need to hear from the Membership and from the wider industry about what they need from the 2018 Show that will most effectively support their businesses and ambitions.

Do please send your thoughts and suggestions to: nathalie.quinn@buildoffsite.com



Plans are already well advanced for **The Offsite Construction Show 2018**. The Show is once again being supported by and will run in association with Buildoffsite who will lead on the Seminar and Workshop programme. These free to attend sessions really are a fantastic opportunity for delegates to listen to experts and really find out what is going on in this rapidly expanding industry and how the business and other opportunities are shaping up. It is also a fantastic launch-pad for new products and systems.

Paul Shelley the Show Director said "Although we live in an increasingly digital age, still the best way to communicate remains face to face – by attending the Show you can see more in a few hours and speak to more people than in any other form of interaction". The quality and number of visitors is what makes this event truly unique, Heads of Procurement, Board members, Senior Technical and Commercial Management were all in attendance at the 2017 Show. Additionally we saw a significant increase in our international visitors with buying groups from France, Spain, Russia, Brazil, South Korea, USA and Finland all in attendance.

Companies including Trimble, Howick, Poppers Senco, Scott & Sargeant, Yara, Shuttlelift, Strucsoft Modulek, Wetherby Building Systems, Murtagh Precast, Actavo Building Solution, JJ Smith, Marley Drainage and Plumbing, TDS Midlands, Cadcoe, Cornish Concrete Solutions, Morland, Creagh Concrete, Hadham International, Discrete Heat, Veka, offsite Management School, TMP, Eurobond Laminates and others have already booked their stand spaces.

2018 is open for registration now for 20/21 November at Excel, London and Buildoffsite members receive a 10% discount on stand space, so call now to book your exhibition stand. Contact Paul Shelley paul@ marwoodevents.com

Offsite Standards

At the Offsite Construction Show Tim Hall and Nigel Fraser met with Clare Price of BSI to review how Buildoffsite engages with BSI going forward with respect to the proposals to update the ISO standards and to get an update on where BSI is with respect to researching the gaps in standards with respect to the offsite sector. BSI have received funding from BEIS to fund this research which will happen over the coming months. Please contact Buildoffsite if you are keen to have an input to this work.

As an industry organisation that is technology agnostic, Buildoffsite is seen as an important sounding board for standards in this area and we will be maintaining our involvement with developments. "No matter where people are in developing their careers and competences they need to build up an increasing knowledge of what offsite is what it can do and is doing and to learn from experts about those products and processes that are just around the corner."

National Composites Centre visit and tour



At first sight the link between **Buildoffsite and the NCC might** seem somewhat tenuous, with the construction sector not known for adoption of leading edge technology. However, from the outset of this joint event it was clear that there is a shared ambition and a great opportunity for cross fertilisation of ideas.

Graham Harrison, Head of Government Affairs & Strategic Partnerships welcomed the 60+ attendees and outlined the remit of the NCC to support businesses in developing leading edge materials and systems with a focus on added value, productivity, scalable capacity and reduced cost. The parallels with what the construction sector needs to achieve are obvious. Graham also reminded us of the salutary lesson of past UK innovations, including Lithium Ion batteries, where the technology was developed here but industrialised and cashed in overseas. Let's ensure our offsite and composite innovations are exploited here and exported.

Neil Appleton of NCC is the construction market lead for NCC and got the audience really engaged in the potential of Fibre Reinforced Polymers in construction applications from water treatment facility Covers to ultra-high strength and lightweight structural components. The presentation will get you thinking and is available on the Buildoffsite website.

To give some thought provoking insight in to what can be achieved with composites Tim Edmund of Tufeco showcased the materials capability and their ambition to partner in construction. His video of people handling composites straight out of a 1200'C oven is etched on many of our minds. In addition we had real examples of composites in construction from David Barber of new members Apply Structures and David Wallach of Eurobond who shared examples of where what were once leading edge composites that are now mainstream solutions for façades and building the envelope. This got the audience really engaged in exploring

where composites and innovation can give a competitive advantage. The ensuing discussion and sharing of ideas, ambition and the need for partners was one of the most productive sessions we have had in Buildoffsite, Really valuable business links were forged on the day. A summary of the ideas and opportunities is on the website and Buildoffsite encourages and supports the connections between members.

The facility, in Bristol, is of an impressive scale with many hundreds of thousands of square feet of offices, laboratories and production space. Most delegates took the opportunity to tour the production space where some really leading edge (and secret) automotive, aerospace and construction products are being developed and manufactured. For those who know offsite factories well; the production space has a 'Wow Factor' immaculately clean floors, no clutter, a place for everything and visual standards of operation everywhere. This should not be seen as an unobtainable goal and the offsite supply chain must realise that not only are these standards of production achievable, but that with world class facilities we will give great confidence to the client base that offsite is highly capable of delivering high quality, on time at a viable cost. A long way from the 'tradesmen in a shed' images that the industry needs to shake off.

NCC and Buildoffsite will be working on on-going collaboration to ensure we share emerging technology and materials. The corollary is to be the voice of the construction market to enable new materials to be developed or adapted to suit a 21st Century construction sector.

See what the NCC are up to here: http://nccuk.com/

News

Comparator: A Leap Forward





The Buildoffsite sponsored 'Comparator' version of the CombiCycle whole-life cost and sustainability prediction program is now well into its latest stage of development i.e. the introduction of an 'eclectic' pricing system which is a major departure from the QS type schedules of rates used in previous versions.

Cost planners will be able to select any material of any thickness in any format and get a reliable up- to-date price for the material and cost of installation, both onsite and offsite, as well as CO2 emissions, program time implications and sustainability rating.

This mammoth task is being undertaken by the program developers - Buildoffsite members IFPI (International Facilities and Property Information Ltd). The timeframe to full commercial introduction has been put back to 2018 to allow for its completion.

However, a hybrid version which uses the earlier schedules of rates for each component is being kept open until substituted by its new 'eclectic' price structure; that way the model can be demonstrated live and, more importantly, user-specific components can be entered into the system to suit any users' standard products allowing them to start using the model straightaway.

"Cost planners will be able to select any material of any thickness in any format and get a reliable up- to-date price for the material and cost of installation both onsite and offsite."

The IFPI team is currently finalising an in depth analysis of all the currently available insulation materials working out capital and whole life costs, thermal efficiency, compressive strength, CO2 emissions and sustainability ratings for ALL the generic materials such as PIR, EPS, Stone Wool, Glassfibre, etc and allowing calculation of costs and environmental data for a whole myriad of hybrid bonded material options. This has obviously been no mean task, but it is judged that nothing less will be acceptable to the conservative target audience of cost planning and environmental consultants and their developer clients.

In the interim IFPI is currently conducting an onsite/offsite case study on a railway engineering project and are about to start the first live building application with a firm of architects looking to explore the opportunities for offsite housing construction.

Plans are in place to afford universal access to this web-enabled model funded by links to suppliers' websites. Buildoffsite members can have a FREE link to their own websites provided they apply early enough.

Updated Guide to R&D Tax Credits



Are you getting your share?

In September 2017, HMRC published its annual R&D tax credit statistics. These showed that over 170,000 claims have now been made, generating over £16.5 billion in tax relief. Construction claims represent less than 3% of this total by volume, and less than 2% of relief claimed.

These last two statistics are startling given the extent of innovation and development within the construction industry. So, why doesn't the construction sector claim more R&D tax relief? There are six most commonly cited reasons.



We aren't doing R&D

We hear companies say this every day, usually because they don't understand the breadth of what can be claimed, they find it hard to articulate the technical challenge in their work, or simply that they regard solving challenging problems as routine.

Many companies who describe themselves as not doing R&D are undertaking eligible activity, and just need help articulating it.

We don't have the time

This is both the most significant barrier and the easiest to overcome. Making a claim does not have to be onerous and there are methodologies that can simplify the process, using information that is readily available in most businesses.

An average claim for a medium sized company usually needs less than 10 hours of effort from employees.

We don't understand the rules

Companies often tell us that they don't know where to start when looking at R&D relief.

For first-time claimants it can seem like there are several sets of rules that are difficult to apply, whilst in other cases companies feel that their work might meet some eligibility criteria but not fully meet others. Working out what is eligible activity and what is not can be a daunting task for the uninitiated.

Few businesses have personnel who are experts in R&D tax relief and finance teams can find it challenging to navigate the rules on expenditure. Not all R&D costs qualify for relief and the rules can seem complex.

Sourcing external support is often a good solution to these challenges. Whether you are making your first claim, are looking for a new partner, or would simply like a review to increase your confidence, seeking external assistance can provide invaluable support.

We can't take the risk

Understandably, companies are often concerned about the consequences of "getting it wrong" and becoming embroiled in lengthy discussions or formal HMRC enquiries.

In our experience HMRC approach R&D relief positively and actively encourage businesses to submit claims. They are happy to conduct supporting discussions when issues arise and freely offer technical advice when needed.

Providing that the claim has been constructed sensibly, has been done on a reasonable and conservative basis financially, and illustrates clearly why the activity claimed is eligible then the vast majority of claims are straightforward and will meet HMRC's requirements with ease.

We don't have the right info

This is a common problem, particularly in small and medium-sized businesses that lack project or cost tracking tools.

Fortunately, it is another easy problem to solve, and there are several approaches that can allow claims to be made even when detailed data isn't available.

We can't afford to

It is a common misconception that making an R&D claim is an expensive exercise. It's not! Companies have the option to develop their own claim documentation which is very low costs, or can seek the services of an accountancy firm or specialist provider.

Whilst expert advice carries a cost, it reduces the risk of a claim to near zero as any professional firm will help remove any ineligible activities or costs that do not qualify.

Further, agreeing a contingent fee ensures there is no financial risk in making a claim, as the fee only becomes due if the claim for relief is successful.

So what can be done?

Working with a specialist provider to explore R&D claims is the obvious solution to these challenges.

Agreeing a contingent fee keeps costs controlled, and with deep technical understanding and experience across numerous claims a specialist provider can ensure that effort is minimised whilst benefits are maximised.

Over the last ten years ela8 has helped numerous companies in the construction sector claim millions of pounds of relief, Buildoffsite recommends us as their preferred provider, and we have supported many members in making claims.

"In our experience HMRC approach R&D relief positively and actively encourage businesses to submit claims. They are happy to conduct supporting discussions when issues arise and freely offer technical advice when needed."

"Few businesses have personnel who are experts in R&D tax relief and finance teams can find it challenging to navigate the rules on expenditure. Not all R&D costs qualify for relief and the rules can seem complex."

We have also produced an updated guide for Buildoffsite members covering the key aspects of the regimes which is available as a download or hard copy at www.ela8.co.uk



If you would like to take part in a Buildoffsite visit to AMRICC please contact Anna Whiting: anna.whiting@buildoffsite.com

Digital Delivery of CrossRail Tunnels



Jaimie Johnston Director and Head of Global Systems

Bryden Wood have been working with Laing O'Rourke (LOR) to develop the manufacturing design and installation solution for the passenger tunnel lining for a number of key stations for Crossrail including **Tottenham Court Road, Liverpool** Street and Whitechapel.

In stark contrast to the highly site-based solutions typical in civil engineering and infrastructure projects, the solution developed by Bryden Wood and LOR is a highly digitally enabled, manufactured solution that maximises on site productivity and is an exemplar of digital to physical workflows.

In the design stage, virtual prototyping, failure mode effect analysis and then physical prototyping and testing were used to optimise the design. By reducing the weight of components and limiting the amount of mechanical lifting required, safety was dramatically increased through the entire lifecycle (both installation and ongoing maintenance).

The highly complicated 3D geometry precludes the use of drawings as a method of communication.

Instead, highly detailed SolidWorks models (which include every component down to the level of bolts and washers) were created which then drive the procurement,



manufacture and assembly processes that follow. Prior to manufacture, automated analysis compares point cloud surveys from completed sections of the tunnel with the as designed model for compliance validation, to ensure a seamless fit. As a result:

- Issues such as out-of-tolerance or non-compliant installation are identified and documented as construction progresses
- There is pro-active management and control of issues identified rather than site operatives unilaterally deciding on a course of action (e.g. forcing elements to fit, or locally modifying elements without proper management/design/documentation and understanding knock on effects)
- Precise coordination occurs for elements that are still in design stage with the actual as built context in which they will be installed
- · There is an ability to mass customise off site fabricated elements to a suit as-built structure (for precise installation)
- There are reduced delays (and knock on effects of teams being unable to progress) leading to greater programme certainty

 There is reduced rework and increased productivity. The manufacture of the complex moulds for the tunnel lining sections is undertaken by CNC (computer numerical control) milling machines linked directly to the design model. Linking modelling tools direct to manufacturing processes in this way is a very powerful way of increasing productivity by eliminating e.g. the need to output and check drawings, reduce the possibility of errors being introduced and facilitating mass customisation. The swept path of the components down through the tunnels to point of installation is pre-checked digitally to ensure that logistics and installation is carefully pre-planned. In addition, the pre-kitting of sections of lining is also planned digitally, with every component given a unique identifier so it can be tracked through the manufacture, procurement, delivery and assembly process.

The result has been a highly productive site where the installation process resembles an assembly line, with highly accurate components fitting perfectly and needing no local adjustment. The solution, on a project of this scale and complexity, also demonstrates how DfMA thinking can be applied to even the most bespoke projects.

For further information contact Jaimie Johnston, Director and Head of Global Systems on email: jjohnston@brydenwood.co.uk or call: +44 (0)7990 978 653

News

AMRICC – Fast tracking the future





To develop and transition a new material from initial discovery to full production and practical use, can take 20 years or more.

For further information contact

Cathryn Hickey, Chief Executive

AMRICC call: +44 (0)1782 764333

or mobile on +44 (0)7943 333614

is a unique world-class centre where advanced materials and material processes are fast tracked into commercial products.

Using the dedicated expertise of scientists, engineers, financial analysts and economists, AMRICC develops innovative ideas into market ready technologies and processes.

This provides customers with a true end-to-end solution by addressing the so called 'valley of death' between innovation and commercialisation. Using world class pilot scale facilities, AMRICC develops ideas into prototypes and then through scale up into commercial products.

AMRICC has a range of pilot processes, particularly in the area of advanced ceramics. As an example, sustainable geopolymer materials are being developed as a replacement for traditional cement and other building materials. It is a sustainable, energy efficient and high performance solution, and is already in use in a number of commercial applications worldwide such as concrete, asphalt, structural insulating panels, waste encapsulating blocks, grouts and binders. The key benefits of geopolymers include excellent flame retardancy, high heat insulation, long lasting structural strength, fast settling time and they are inert.



The Applied Materials Research, Innovation & Commercialisation Company (AMRICC)

KILN CENTRE

With the reduction in steel production, traditional cement is undergoing a supply chain crisis having to procure fly ash from abroad. This leads to an increase in costs, therefore the need for an alternative, such as geopolymers.

AMRICC's other key technology area is that of flash sintering which enables new products to be developed, especially for those sectors which use technical ceramics for their high strength and high temperature capability. Key applications include the development of thermal and environmental barrier coatings for power generation and aerospace applications, development of piezoelectrics for sensor technology, and toughening enhancements for the healthcare sector.

AMRICC also has a postgraduate school in conjunction with some of the UK's leading universities which specialise in materials. The AMRICC postgraduate degrees give the best in industrial and commercial training alongside applied research opportunities so developing the future skills of students to enable them to compete globally in a range of industrial environments.

Designed to Fail An Opinion Piece from Ali Mafi



"The use of offsite manufacturing can provide a clear and tangible time benefit as the result of the parallel processing opportunity, simplification of the critical path and providing increased certainty about both quality and supply to market."

Ali Mafi is a Lean Thinking consultant with 35 years construction experience who has spent the last 15 years advising project teams on how to compress project time. Since time accounts for 80% of the project cost, Ali has developed a comprehensive data base detailing the real reasons why projects run late and what it takes to deliver the project to agreed timescales or ahead of programme if that would deliver client value.

Construction projects can be highly complicated and in many cases are probably made needlessly so. This is not just the situation in the UK. Last year's Report from McKinsey pointed out the productivity of construction around the Globe is poor and the UK is only marginally poorer than the average. Increasing levels of productivity is key to success and wealth creation in all market sectors but in the UK this is just not happening to any significant extent in the vitally important construction industry.

Over the last couple of decades we have had a plethora of learned reports from industry experts setting out the ways in which the industry (clients and suppliers) can bring about significant improvements. The Reports from Sir Michael Latham, Sir John Egan and Mark Farmer all contained great learning based on a wide raft of experience but as so often happens the learning and the carefully crafted words have in practice made no material difference to the performance of the industry overall.

Sure some client and some project teams work brilliantly together and have delivered fantastic results but in my experience these are the exception.

It is not as if the industry has simply stood still over recent years. There have been some welcome developments including the widespread application of BIM/Digital Engineering, the recognition of the role of offsite solutions and an increased understanding that Buildings can be assembled on site plus new forms of contract and increased emphasis on partnering.

In isolation all good stuff but despite these new ways of working the harsh reality is that most projects continue to run late. The Industry KPI data shows over 50% complete late and this performance has been constant for years. In my experience this result is actually slightly flattering as most clients I work with say that around 80% of their projects run late. The remaining 20% only substantially completing after a lot of extra working at nights or the weekends with a great deal of stress, despondency, despair and massive additional cost which either directly or indirectly eventually falls on the client community.

One thing the industry has mastered is an unfailing ability to pin the responsibility for delay on to clients. Citing client changes and late decisions as the cause. This is in conflict with the delay data that we have gathered over the last 15 years that shows the chances of project delays due to clients is actually less than 30%.

The use of offsite manufacturing can provide a clear and tangible time benefit as the result of the parallel processing opportunity, simplification of the critical path and providing increased certainty about both quality and supply to market. However, only very rarely is a construction fully delivered through the use of assembled offsite components. In most cases offsite needs to be integrated into a delivery schedule that is still often dominated by traditional construction methods and traditional construction mind sets. In practice the valuable benefits of an offsite approach may be lost when projects run late and the client end up with disheartened impression of offsite.



Lean Thinking Ltd. © Copyright

How can the joint Government and industry target of delivering project 50% faster be met when most project don't even complete on time?

The big question is why do projects continue to run late?

In my experience the cause of the poor outcome is due to the project delivery system and ways of working that is utilized in near identical ways by all the players in the industry's supply side. The typical practice is that everyone is individually held accountable for the outcome and each person will have their own daily and weekly method of managing, monitoring and controlling their work. There is no transparency or set pattern/routine. It is subjective and passive. Most of the day is spent in reacting to events and engaging in unplanned communication and progress chasing. There is little deep learning. Events are addressed but rarely scrutinized in depth to understand why they occurred.

Our data shows that the current system of delivery leads to 3 days a week average time loss. There are many reasons for this time loss but our experience is that typically 90% of delays could reasonably have been anticipated in advance.

The delays are wide ranging and include lack of resources, equipment failures, adverse weather, information errors, lack of knowledge of the priorities.

All projects have between 40%-50% time risk allowance built into their program. These delays use up some of this time risk allowance but the system guarantees that any other time risk allowance is used up even if the risks don't materials.

The solution lies in the complete rethinking of the delivery system/process. Adopting a system that ensures no time is lost weekly and none of the time risk allowance is frittered away needlessly.

Early in 2018 Buildoffsite will be delivering a number of Workshops at which Ali will lay out the detail of his findings and outline an alternative approach to project process that starts to address the challenge of time compression and the productivity deficit facing the UK construction industry.

These workshops will be free to attend for Buildoffsite Members. The details will be published on the Buildoffsite website as soon as possible, or contact Ali Mafi at mafia@lean-thinking.co.uk

buildoffsite

Manpower Shortage 21%

A system that:

- Is transparent, visible and standardized across all projects.
- Daily computes the time to completion and the end date. Akin to SatNav direction.
- · Eliminates all egotistical and other behaviours that prevent change and productivity improvement.
- · Problems and failures are the biggest source of innovation but in the world of traditional construction practices are rarely seen in this light.
- Ensures systemic thinking, horizontal accountability and full utilization of collective wisdom at all levels

It really is all about the system.

Protecting Reinforced Concrete Infrastructure – C-Probe



Corrosion is a major contributor to the degradation of reinforced concrete structures. Typically remedying the problem is costing around 3% of the GDP of developed countries equating to a \$4trillion repair problem globally.

In most instances, early proactive measures to mitigate and control these problems within new construction are not being implemented. Quite incredible!

C-Probe is a corrosion specialist business and a member of Buildoffsite and has been developing sustainable materials and monitoring methods that aim to answer many of these structural "health" issues.

The challenge set in collaboration with Shay Murtagh Precast was whether an impressed current cathodic protection (ICCP) anode could be incorporated within the pre-casting process. Once effected this provides corrosion mitigation from the birth of the structure by setting control and performance criteria in accordance with ISO EN 12696:2016.

The photograph shown here demonstrates a "layer" of low carbon Alkali-Activated Cementitious anode (AACM) concrete bonded in a wet-on-wet casting process (WoWSmart®) to an OPC concrete mix. This was successfully powered and controlled to standard using C-Probe's Achilles ICP network management system online. Cube tests demonstrated over 50MPa compressive strength at 28 days with no loss of bond between the AACM anode and OPC concretes.

For more information contact: Graeme Jones gjones@c-probe.com

Research at Sheffield Hallam University has examined the impact to concrete:steel bond with the passing of protection current. It was found that bond can be maintained at 6kN for accelerated test times of over 250 years for aggressive marine-exposed conditions and over 2200 years for urban exposure conditions with only small and predictable current densities from 0.02 to 0.2µA/cm2. This yields operational costs in practice of around £0.03/m2 for marine exposed structures and 0.4p/ m2 for urban exposed structures. At a capital investment of between 1-3% of construction cost the additional investment to futureproof structures at their most vulnerable points would seem worthwhile.

The research data will be published by the end of 2017.

Case Study

Eurobond: The Old Dairy, South Ruislip



Background

The Old Dairy regeneration project is a mixed used development of the former Arla Dairy site in South Ruislip. The scheme includes 162 residential properties, a Cineworld cinema, an Asda food store and family-themed restaurants. The £49m retail, leisure and residential project is breathing new life into the former dairy site having been derelict since its closure in 2005. The new scheme has delivered a vibrant blend of different sectors whilst maintaining a consistent high level aesthetic that stimulates the regeneration of South Ruislip.

Challenge

The main challenge was to rejuvenate a brownfield derelict site by creating a high quality, attractive and distinctive aesthetics that provides a number of enhancements to the area. It was also important that new public spaces were created and that the new leisure facilities complemented the existing amenities of the local centre

Objectives:

The client wanted to create a progressive and sustainable mixed-use development with energy efficiency at its core with approximately 40 per cent of the project's energy being provided from renewable or low carbon sources. The scheme also aimed to achieve an environmental BREEAM rating of 'Very Good'.

Action

The scheme needed to positively improve the existing environment by contributing to the viability of the area. An essential part of this was the consideration of building materials used in construction that have a low environmental impact. Eurobond composite panels were specified as the inner layer of external façade of the building, signifying a commitment to maximising the sustainability of the project. Eurobond cores have zero Ozone Depleting Potential (ODP) and zero Global Warming Potential (GWP). At the end of its useful life all panel steel and insulation can be recycled into new material. Another aspect of the project was the inventive installation of the outer veil, by attaching a sub frame through the vertically installed panel; a second façade has been positioned at varying distances to create an impressive curved finish. The Eurobond composite panel was specified in Colorcoat Prisma® pre-finished steel in White as the ideal inner skin of the building. This specification helped towards removing the second façade installation from the critical path and achieving weather tightness early on in the building programme.

"The challenge set in

collaboration with Shav

Murtagh Precast was whether

an impressed current cathodic

protection (ICCP) anode could

be incorporated within the

pre-casting process."

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Results

RICS Awards: Winner of the RICS London Award for Regeneration, honouring exceptional improvements to urban, rural or coastal areas.

Environmental: BREEAM 'Very Good' rating achieved.

Functionality: External facade suitable to all the different sectors and their individual needs and requirements.

Sector: Retail Client: Citygrove Securities plc Architects: DLA Architecture Main Contractor: Simons Construction Ltd Sub-Contractor: Cover Structure Ltd

For more images, visit www.eurobond.co.uk/case-studies/

For more information, contact Sales Director David Wallach by email: david.wallach@eurobond.co.uk

or call: 07881 958770

You can also follow Eurobond on LinkedIn for news on the latest projects.

Case Study

Billington Structures uses Tekla software for ingenuity project



The complex triangular structure of Interserve's new office building, Ingenuity House, meant that all parties involved in the challenging project had to be fully committed to working within a 3D environment and to BIM Level 2, to ensure that it was delivered on time and within budget.



Structures, used Tekla software to model the steel frame and temporary bracing, and to fully detail all connections to Level of Definition (LOD) 5/6. Consequently, this project went on to win the Public Vote Award in this year's Tekla UK Awards. Ingenuity House is a 5-storey, 12,000m², highly sustainable, office building located next to Birmingham International Airport and Birmingham International Railway Station. The building consists of large (up to) 3,000m² truncated triangular floorplates, which are arranged around a central internal atrium, a suspended ground floor and an apron podium structure. The whole structure is then capped off with a lightweight steel atrium roof frame, consisting of trussed radial rafters, inwardly cantilevering from the main roof and propped by a central compression ring in the permanent state. The complex geometry of the building meant that working in anything other than a 3D environment would have been extremely difficult and time consuming. Tekla Structures and Tekla Structural Designer

Structural Steel Specialists, Billington

were both used on this project by Billington not only to model and design the steel frame, but also to carry out a structural analysis in the temporary state.

Approximately 1,700 tonnes of structural steel was supplied and erected by Billington, including a roof level truss (weighing 30 tonnes) which supported the roof and fourth floor above the feature recessed entrance area. In addition, approximately 50 tonnes of extensive temporary bracing and props were also designed and supplied by Billington to control temporary deflection and facilitate the erection of this unusual and complex structure. Billington identified a number of risks at construction stage; such as temporary stability issues and horizontal sway deflections. Following the identification of risks, a detailed set of temporary state structural analysis models were carried out to assess the potential movement of the structure during construction. The result allowed Billington to design and specify a complex layout of temporary bracing to

maintain dimensional stability throughout the construction phases. All of the non-standard temporary elements were modelled directly in the Tekla 3D model. Fabrication drawings were automatically produced by Tekla software and with minimum editing, they were ready to be issued to the factory; together with files produced directly by Tekla for reading by automated cutting and drilling machines. With this information issued to the shop floor and material arriving in line with previously created orders, the fabrication process became a much more efficient service.

The automated export facility within Tekla was also used to create export files for the cold rolled supplier, which automatically populated their fabrication process, making the exchange of information between the two quick and easy. Billington Structures' Technical Director, Simon Thrift said: "One advantage of using Tekla is having the ability to import and export information in multiple formats with ease, to suit third party needs. Providing the model in various formats enabled all parties to approve and coordinate within the design team efficiently.

Having discussions with the Main Contractor during the early stages to agree the erection sequence was essential. This process was aided by the ease in which the Tekla model could be viewed and manipulated, by using the Tekla BIMSight Viewer. Models created with Tekla Structures contain precise, reliable and detailed information needed for successful BIM and construction execution; it creates more accurate ways of working and streamlines collaboration between all parties. While Tekla Structural Designer is a revolutionary piece of software that gives you the power to analyse and design buildings efficiently and profitably."



"Approximately 1,700 tonnes of structural steel was supplied and erected by Billington, including a roof level truss (weighing 30 tonnes) which supported the roof and fourth floor above the feature recessed entrance area."

For more information about Tekla software, visit: www.tekla.com/uk.solutions

Case Study

Tekla software improves FP McCann's workflow



Following the industry's push towards BIM level 2, FP McCann has incorporated a variety of Trimble's Tekla software to meet this requirement and to also satisfy its manufacturing needs. Although it has been a learning curve, the software has enabled the UK's largest manufacturer and supplier of precast concrete to increase efficiency across the business. Through its quarries, surfacing, ready-mix and precast concrete plants, FP McCann supplies a wide range of heavy building materials to the construction industry. Colin MacKenzie, Senior Technician at FP McCann, said: "Being able to view highly detailed drawings and schedules, combined with the ability to build and visualise large quantities of material precisely, Tekla software makes it easier for us to adapt to changes in design, highlight any possible errors and avoid potential difficulties in the overall build."

FP McCann integrated both Tekla Structures and Tekla Tedds within the business. Models created with Tekla Structures contain accurate, reliable and detailed information needed for successful BIM and construction execution; it creates more accurate ways of working and streamlines collaboration between all parties. Tekla Tedds automates repetitive structural calculations – helping to speed up the review process.

Wayne Maxwell, BIM/Technical Manager at FP McCann said: "By using the data contained within the Tekla models, we're able to increase efficiency across other departments within the business. We're also able to quickly provide accurate models and bill of quantities at estimation and tender stage. As the models progress, we can then use the data to plan our projects for both on-site installation and sequencing, to production capacity planning within our factories, enabling end-to-end precast product tracking and visibility."



FP McCann has developed a range of parametric components in Tekla to aid the implementation, as the manufacturer rolls it out across its precast product range. The first products developed were a set of custom components for its Box Culvert department. These components enable detailers to parametrically build accurate 3D models containing full manufacturing level of detail.

Since these initial developments, FP McCann has continued to develop other products in Tekla such as the Dock Leveller Pit solution, Modular Rooms structural solution, retaining walls and trough products – all parametrically designed to export data seamlessly into its production systems. Wayne continued: "Most recently, we've implemented a suite of Tekla tools for our Tanks and Chambers water

storage solutions. The Tanks and Chambers team are now starting to reap the benefits of using a completely automated system, whereby our quotation sheets and structural calculations are linked to Tekla to automatically create full models, complete with drawings and production data. "We're increasingly finding that the benefits of using Tekla Structures is not only its ability to speed up the detailing activity through the design phase, but also its flexibility to integrate into the rest of our business systems. This unlocks a huge amount of value throughout the business, through reduction in duplication and transparency for all parties. Ultimately, the use of Tekla is helping to improve the quality and certainty on our projects, and therefore enhancing the service to our clients." Capable of producing highly

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detailed schedules and drawings, combined with the ability to build and visualise large quantities of material precisely, Tekla software is ideal for projects that require accurate forecasting and collaborative project understanding.

For more information about Tekla software, visit: www.tekla.com/uk.solutions

New Member



For more information, please contact: **Anthony Lymer Business Development** Manager M: 07801 760024

E: asl@protrade.co.uk



The DIPT group of companies was established in 1973 to meet the fixings and tool requirements for traditional construction companies in the East Midlands. Now called PROTRADE we have a strong nationwide presence and remain focused on the construction sector through the latest off-site building methods. Our product range of fastenings, fixings, sealants, adhesives, power tools and their related consumables encompasses over 10,000-line items but our business offer also includes measurable and accountable processes such as Stock Inventory Management which is proven to significantly reduce cost from procurement, meet and exceed production needs and reduce administration. By having stock in place at your production facility, we immediately remove the hidden costs of production downtime. This system also produces management reports by project and even by operative for in-depth analysis.

Much in the same way that the off-site manufacturing community have streamlined their processes to promote innovation and create tangible benefits far outstripping that of traditional methods, PROTRADE have aligned themselves with the same ethos. Challenge us to show you our proven track record on continual innovation in manufacturing, analysing profit to cost ratios, accessibility to what is required and slick procurement processes.

"Our product range of fastenings, fixings, sealants, adhesives, power tools and their related consumables encompasses over 10.000-line items but our business offer also includes measurable and accountable processes such as Stock Inventory Management which is proven to significantly reduce cost from procurement, meet and exceed production needs and reduce administration."

Events

Event Calendar 2017-18

Septe	mber 2017	Janu	ary 2018
5	Water Hub Client Group Meeting	10	Pharma I
19	BOPAS Briefing & Meeting Rail Hub Project Visit	17	Housing Review (
27	GLA Event, City Hall, London		
27	Member dinner – NG Bailey, Ilkley	Febr	uary 2018
		7	Manufac
Octob	er 2017	27	Direction
11/12	Offsite Construction Show	28	DG Meet
24	Direction Group Dinner	—	
25	Direction Group Meeting, Housing at Scale Legal & General, London	March 2018	
		7	Manufac
Nover	nber 2017	14	Housing Models (
2	Rail Hub Client Group Meeting		
6	Step Free Access Project Visit @TfL	April	2018
7	Water Hub Leads Group Meeting		Member
14	Composites for Offs Construction: National Composite Centre Bristol		ARUP Lo
29	Water Hub Client Group Meeting	11	Newcast & Directio
		12	Student / & HE DG
Decer	nber 2017	25	Pharma I
5	BOPAS Briefing & Meeting		
7	Rail Hub: WSP, Chancery Lane		
13	Direction Group Meeting & Lunch,	May	2018

Browns, Covent Garden

Water Hub (TBC) Director Level Conference

June 2018

07	Direction Croup	
	Leeds/Bradford	
26	L&G Modular (T	

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Pharma Hub Priority Planning (TBC)

Housing Hub: Workshop

Review (TBC)

Models (TBC)

ARUP London

Manufacturing Hub Launch (TBC)

Direction Group Dinner

DG Meeting, Skills, TDS Dudley

Manufacturing Hub Launch (TBC)

Housing Hub Procurement

Member to Member Event:

Newcastle Housing Hub & Direction Dinner

Student Accommodation

& HE DG Meeting

Pharma Hub (TBC)

BC) Dinner

Direction Group Meeting NG Bailey

August 2018

28	Direction Group Dinner
29	Direction Group Meeting, Polypipe

October 2018

Direction Group Dinner 30 31 Direction Group Meeting

November 2018

20/21 Offsite Construction Show

December 2018

9

Direction Group Meeting & Lunch

Upcoming Events

Member to Member event, London
KPMG & McKinsey event
Shay Murtagh factory tour
RNLI manufacturing plant tour
Metsec tour
McAvoy
Hochtief
NG Bailey offsite
Encon
Nomenca Site visit –end to end process
Visit to Ross-shire Engineering

From design to reality

Woonzorgcentrum De Polbeek (Holland)

Tekla Structures is intelligent 3D modelling software designed to help you deliver all types of precast concrete elements at the right time to the right place. Integrating design and detailing with manufacture, project management and efficient information sharing Tekla Structures can do it all.

Together we are shaping a smarter future for construction.

www.tekla.com/uk/solutions

