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Standards for offsite construction - Are they adequate?

Buildoffsite's new hub focuses on design quality

From Buzzwords to Reality: What is still missing in the digitalisation picture?

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Bouygues Bâtiment build 140-metre-high concrete modular towers



Joe Dyde,
Business Manager

Welcome to the July 2019 edition of the Buildoffsite e-magazine.

This edition focuses on some of the fantastic initiatives and projects that our members and the wider industry have been involved in over the last few months, and a chance to look forward to what the rest of 2019 holds. What strikes me most from reading this edition, and more generally in conversations with our members, is the huge importance of collaboration. A large number of successes being delivered and various other developments in the pipeline are being built on a strong foundation of collaboration between our members and the benefit of shared knowledge, experience and technology. That ethos sits at the heart of Buildoffsite, and how the diverse membership can continue to push the agenda and success of offsite.

You'll also read about the focuses and upcoming outputs from some of our sector hubs; and following a recent meeting between our Governing Forum and our hub leads, we'll soon be sharing our ideas on the next evolution of our hub structure to deliver increased value for our members.

With the Offsite Construction Show 4 months away, a huge amount of work is going on in the background to finalise our programme of seminars and workshops - we could fill the agenda multiple times over, which is testament to how much is happening in the sector at the moment. We are always welcome to our members adding and inputting to this, so if you do wish to discuss any fantastic ideas for inclusion please do get in touch.

Over the next couple of months, keep an eye out for some exciting updates through our involvement (on behalf of our members) with the Construction Innovation Hub and Construction Leadership Council, and I wish you all an enjoyable Summer, wherever you may be.

46 The **OFFSITE** Construction Show
Offsite Construction Show 2019
Buildoffsite prepares its programme of seminars & workshops
ExCel, London
20 & 21 November, 2019
Supported by *buildoffsite*




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Learning Materials for Offsite

An update from the Supply Chain Sustainability School



FROM BUZZWORDS TO REALITY: WHAT IS STILL MISSING IN THE DIGITALISATION PICTURE?

Mariela Daskalova, Marketing Manager at Cobuilder

The offsite industry is highly conscious of the major new technological trends that are seen to define the future of construction. Terms like digital twins, Industry 4.0 and Building Information Modelling are flying around each offsite construction event. However, despite the generally wide understanding of the need for digital twins and the healthy adoption of virtual modelling technologies, the information used to actually create or even record the use of a physical product (Industry 4.0) is largely provided in analogue formats.

According to the Cambridge Centre for Housing & Planning Research, “Innovation and digitisation through offsite housing manufacture will be part of the solution to delivering housing in a digital built Britain, but there is currently little in terms of an evidence base”

(Position Paper 2: What is the role of off-site housing manufacture in a Digital Built Britain, September 2018)

The benefits and technology for offsite construction are widely known and have been practised for a long while now. However, now there has been a shift towards offsite manufacture – a shift towards a more holistic approach to not only the construction but also the design, fabrication, procurement and delivery of volumetric, modular structures offsite.

Offsite manufacture (as opposed to offsite construction) is a concept that needs digitisation to help create highly productive, scalable factory environments that can deliver high quality, high performing products via efficient creation/sharing of data and information.

“Whilst much has been written about offsite construction generally, there is little information about how digital technologies are used in offsite housing manufacture.”
(Position Paper 2: What is the role of off-site housing manufacture in a Digital Built Britain, September 2018)

Digital technologies are an essential part of the solution to delivering housing in a Digital Built Britain, however there is almost no evidence of their implementation, states the report. Why is that?

Why are we inefficient in the implementation of digital technologies?

Saying that there is a single answer to this issue would be a huge overstatement. In our experience, however, all the dots seem to connect to a logical conclusion. Many providers across the offsite

construction and traditional construction sectors use BIM as a means of improving visualization and coordination of building structure, fabric and services.

This is commendable, but these approaches do not really address the real challenge associated with leveraging overall productivity. Such approaches reflect a lack of lean thinking.

The efficiency of the process of converting virtual intent to physical objects can be considered as a true measure of how lean a business is, and hence a digitally enabled agile manufacturing platform to control data flow is fundamental to leveraging enterprise productivity.

So here we come to the real productivity booster. **Yes, you guessed it – it is data!**

The productivity booster

An efficient approach to offsite manufacture must be founded on single sources of structured product data which flows between inter-operating and integrated systems across the product life-cycle. And who can be a more credible source of data than the manufacturer? Truly, the responsibility for bringing the value of digitisation the whole supply chain falls on the manufacturer. Is this responsibility going to boost offsite manufacturing or is it going to drive more and more businesses to go under?

To stay competitive and grow offsite manufacturing businesses need to adapt to the new digital environment. That does not surprise anyone.

The good news is that guidance is available.

The UK BIM Alliance for instance has produced a great report that is aimed at uncovering the specifics of structured data for digital use to the uninitiated. The report answers

the ‘age-old’ question ‘Data or objects or both’ and gives important recommendations for the essential points in devising a data strategy for the construction sector.

Standardisation is paramount

Most notably, the report discusses the importance of standards. In Europe and internationally there are standardisation bodies that are devoting serious time and effort in capturing the best practice for managing, creating, defining data to enable the seamless flow of information across the supply chain. Standards are important for creating a common language for everyone be it people or machines to interpret and therefore use the data that is created, exchanged and analysed. They are important for creating a level playing field for the whole sector, where everyone can take advantage of a common approach that works every time.

So will businesses make it or break it? As per usual, this relies on the careful conceptualization, planning and implementation of their strategies – in this case – digital data strategies. Each strategy is always facilitated by tools and tactics.

Are these available today? The answer is yes! Contact us and learn more about them.

<https://cobuilder.com>



Whilst much has been written about offsite construction generally, there is little information about how digital technologies are used in offsite housing manufacture”

Position Paper 2: What is the role of off-site housing manufacture in a Digital Built Britain, September 2018





STANDARDS FOR OFFSITE CONSTRUCTION - ARE THEY ADEQUATE?

There has been much talk recently about the lack of test standards for modular construction. This lack of standards has a two-fold effect; it gives permission for manufacturers not to verify their panel performance, and causes problems with regards assessment by the warranty bodies as to what is acceptable system performance.

The 2018 Hackitt review predominately deals with standards relating to fire but does reference overall test standards. The report recommends that manufacturers should provide an increased level of test performance rather than a calculation or desk study:

“A clearer, more transparent and more effective specification and testing regime of construction products must be developed, including products as they are put together as part of a system.”

There are some standards available which can be used to deal with specific aspects of factory built systems. Primarily, these are the Eurocodes which cover the design of frames: EC 3 for the lightweight steel frames also incorporating any hot rolled sections, EC 5 for timber frame construction and EC 1 which gives guidance on general loadings acting on buildings. However, these standards are limited in their use, and do not include connections at foundation level, at roof levels or wall to wall; these are all critical areas that will produce a successful or unsuccessful system design. If we look for standards that allow us to assess the composite performance of the system, we do not get very far. We are back to individual documents that enable us to examine at the individual components that make up the system, e.g. we can assess the performance of the ancillary components like channel ties, floor hangers, straps and sheathing boards, but we cannot see

how they work when built into the system.

When considering the European Technical Assessments (ETAs), there are again, a number of documents available which encompass frame design: ETAG 024 Concrete Frame Building Kits and ETAG 025 Metal Frame Building Kits. Similar to the Eurocodes, these allow only the frame to be designed and assessed, but do have the advantage that this route would enable the frame to be CE marked. Nevertheless, this again does not allow the system to be assessed along with its connections and interactions.

ETAG 023 deals with prefabricated buildings and does allow a full building to be CE marked if following the complete standard and covers all aspects, i.e. structural, durability, safety and fire. Unfortunately, the standard covers too much and is applicable to any design of pre-

fabricated building, and as such, goes into no detail for specific systems. The standard is not prescriptive enough and broadly suggests that certain aspects should be proved like the structural performance, but does not give advice on how to achieve any of the criteria. This inevitably leads back to either a search for individual component standards, desk studies or a ‘non-declared performance’ which gives no information to the system assessor further down the line.

It is important to understand the whole performance of the system under all of the aspects that may affect the building during its lifespan, including structural, durability and environmental performance. Examining the performance of individual components that make up the system is not sufficient. Until there are standards in place, or a standardisation of interfaces, connections and facades, there will be a continued struggle to convince

warranty providers of the quality of the build. This also gives a charter to the more unscrupulous manufacturers to avoid their due diligence in producing a quality product.

“

A clearer, more transparent and more effective specification and testing regime of construction products must be developed, including products as they are put together as part of a system”



For further information please visit: www.lucideon.com/buildoffsite

LEARNING MATERIALS FOR OFFSITE

AN UPDATE FROM THE SUPPLY CHAIN SUSTAINABILITY SCHOOL



David Emery, Project Manager Supply Chain Sustainability School

Readers of this publication will be well aware that the likelihood of our industry shifting towards Offsite construction at scale has never been higher. The drivers for this are many and varied but one of the most significant is, surely, the unprecedented skills gap.

According to the Farmer Review, “The real ticking ‘time bomb’ is that of the industry’s workforce size and demographicwe could see a 20-25% decline in the available labour force....a capacity shrinkage that would render the industry incapable of delivering the levels of GDP historically seen.”

The perceived wisdom is that the move towards factory-made elements - anything from simple ‘2D’ panels

to complete building modules - will reduce the reliance on the traditional skills historically associated with the construction industry, many of which will be increasingly less available due to an ageing - and, often, a migrant - workforce.

Whilst as a country we are - or at least have been - highly successful in factory production techniques, we must remember that bringing the production of building modules into a factory environment will require the teaching of new skills and processes for all concerned. Crucially, any new body of knowledge needs to be understood not just by the workforce in the factory but by the industry as a whole.

Adopting Offsite construction has implications for the entire supply chain and it will affect the way each of us works. Not only will we need to understand how our own roles will be affected, we also need to have a greater understanding of every part of the supply chain including Design, Costing, Procurement, Logistics, Project Management, Assembly and Site Management. Recognising the need to educate the industry, the CITB has recently commissioned a consortium of expert organisations to create a library of learning materials specifically for the Offsite sector.

The consortium comprises three organisations: The Manufacturing Technology Centre (‘MTC’) in Coventry, The Supply Chain Sustainability School and NOCN Group. My role is as Project Manager with the Supply Chain Sustainability School and I believe that the best way we can develop learning materials is to speak to those industry experts already involved in Offsite construction to tap into their knowledge and experience. This will enable us to produce material that is relevant, realistic and useful and I urge anyone with experience in this sector to [contact me](#).

In my 40+ years in construction I have seen other industries radically transform themselves and become successful through change, be that in automation, the use of new technologies, collaborative practices etc., etc.. Fundamentally the construction industry seems, to me at least, to have changed little in that time and, even though at its best it is capable of great things, there now exist too many external drivers for it to resist change much longer. ‘Modernise or Die indeed!

MEMBERS SHEPPARD ROBSON AND B&K STRUCTURES BRING HIGH-END TOUCH OF GREEN TO MANCHESTER’S FINANCIAL DISTRICT

THE PAVILLION, HARDMAN SQUARE, MANCHESTER

The £1.5bn Spinningfields development in Manchester city centre essentially forms the city’s new financial district. It provides about 430,000m² of prime commercial, residential and retail accommodation.

Following the urbane model of commercial development established by schemes such as London’s Broadgate and Birmingham’s Brindleyplace in the 1990s, Spinningfields features a number of office-led mixed-use buildings arranged around a series of landscaped squares and public routes. As one might expect, most of these structures follow the glass and steel template that is the accepted visual language of contemporary commercial offices. So, it comes as a surprise to find a four-storey timber pavilion complete with trellises and overhanging facade plant boxes located in one of the development’s key public spaces.

The new building has been designed as a prefabricated, modular pavilion by Sheppard Robson Architects for long-term Spinningfields developer

Allied London. It has been built in Hardman Square, already articulated as Spinningfields’ landscaped garden space, to which the Pavilion now forms a natural conceptual extension.

The building is home to the Manchester branch of high-end, modern British The Ivy restaurant and contains three floors of private and public bar and dining areas topped by a semi-enclosed rooftop dining terrace.

While there are no other timber buildings at Spinningfields, of course, timber buildings are not in themselves unusual. In Manchester, one enduring example is Chetham’s Library, the city’s oldest building, which was built in 1451 and fitted with rich oak interiors. But what is unusual about the new pavilion is that unlike timber-frame buildings or timber panelled ones like Chetham’s, virtually all the new building has been constructed from wood.

So, as well as the external facade, this includes a glulam structural frame, timber roof, timber beams, cross-

laminated timber (CLT) internal walls, CLT floor slabs, CLT stair cores, CLT lift shafts and even CLT strip treads for the stairs (also timber). The only non-wood primary materials used are diagonal steel members

for the external bracing and concrete for the substructure foundations. In fact, Sheppard Robson partner Neal Allen-Burt speculates that this might be the “first contemporary wholly timber frame, interior and facade building in Manchester”.

“Timber is obviously low carbon and we wanted to pursue that conspicuous green agenda” Neal Allen-Burt, Sheppard Robson

Why timber?

So why did the architect go for a timber in such a big way? As Allen-Burt explains, one of the chief reasons was context. “We wanted to provide a building that complimented the natural landscape of Hardman Square. It was the last element of the square to

be completed and we were after a building that was different from the rest of Spinningfields and acted as a natural counterpoint to the glass and metal used on the adjacent commercial blocks.”

There was also a need to provide a relatively lightweight but robust building that could fit into a tight, narrow plot severely constrained by Hardman Square itself and the fixed common development basement structure beneath it. Allen-Burt also explains that there were experimental and supply chain reasons for using timber so extensively.

“Timber is obviously low carbon and we wanted to pursue that conspicuous green agenda - not just visually - but in construction terms too. We debated whether

the building could be partially timber or whether it could just have a timber exterior. But in the end, we decided to do something more experimental and exploit the offsite manufacture of the timber components to minimise both the numbers of subcontractors working on the project and its exposure to the unpredictabilities of the supply chain.”

Regarding the finished building, Allen-Burt is proud to note that the scheme eschewed the conventional contractual arrangement of employing around 30 to 40 subcontractors to work on a construction project of this size and nature and, excluding the concrete subcontractor for the substructure foundations, was instead able to appoint “only about four or five”. The first was

the timber frame contractor that provided all glulam and CLT components. The second was the glazing subcontractor, which also built all the trellises and balustrades as well as the glass terrace box on the roof. Third came the facade and roofing subcontractor, which also constructed all the timber cladding used on the building. And the final main subcontractor provided the planting integrated onto the facade.

For a design and build contract, Allen-Burt says such a tight subcontracting team was liberating. “It gave us a tremendous amount of control over the final product in terms both quality and specifications. This was easily one of the biggest benefits of using timber and CLT so extensively and of course, of prefabrication too.”

contemporary building almost entirely from wood and to harness prefabrication deficiencies and supply chain control in order to do so.

Project Team

- Architect:** Sheppard Robson
- Client:** Allied London
- Main contractor:** Bam
- Structural engineer:** Engenuiti / RoC Consulting
- Services engineer:** DSA Engineering
- Cost consultant:** Gardiner & Theobald
- Landscape architect:** Layer
- Project manager:** Gardiner & Theobald
- Timber frame subcontractor:** B&K Structures
- CLT & glulam manufacturer:** Stora Enso
- Timber cladding & roofing:** Helix Roofing Contractors
- Building planting, irrigation and planting mesh:** ANS Group Global



Timber is obviously low carbon and we wanted to pursue that conspicuous green agenda”
Neal Allen-Burt, Sheppard Robson

Working to a grid

As Allen-Burt suggests, as well as the use of timber, the extensive use of offsite prefabrication is also a significant feature of the project. The building frame is based on a 6m grid broken into 1,400mm modules, with a 400mm zone for columns on each side. The principle was based on a 1,500mm office planning grid refined for a timber frame structure. This rationale simplified the prefabrication process by ensuring all components conformed to a fixed geometry, as Allen-Burt explains.

“The building essentially takes the standard prefabrication idea of being assembled as a giant kit of parts. But here, we’ve taken the logic slightly further by ensuring that there is a huge amount of repetition,” he says. “We’ve also worked hard to keep the number, size, shape and nature of the individual components that form the kit of parts as minimal as possible in order to reduce complications and increase efficiency.”

Allen-Burt also argues that the combination of prefabrication and the simple structural grid enabled some of the post-planning alterations that were made to the building easier to realise. This included the partial enclosure of the open roof terrace originally planned and the addition of an enclosed glass canopy structure protruding to the ground floor.

As built, the building certainly makes a stark yet softening contribution to the glass and steel Spinningfields office blocks that surround it. The 6m bay formation is evident on the elevations as are the smaller 1,400mm modules of alternating timber trellis screens and windows integrated into it. Most of the modules also feature a plant box from which overhanging greenery adds much to the building’s natural, planted character. The trellises being set forward of the glazing also adds to this effect.

The steel bracing is slender and

discreetly inserted into the bays, thereby not detracting from the naturalistic aspect of the elevations. However, the bracing makes a more visible impact on the narrow facades on each end of the block, which also appear fully glazed and free of planting. Each end of the building also features a swooping 6m cantilever at first-floor level to expand the building over the limited ground level determined by site and basement structure constraints. This forms a dramatic and more visibly engineered peak to each of the pavilions.

Throughout, the Hardman Square Pavilion subtly channels something of the experimental, plant-decked environmentalism of Bill Dunster or Kengo Kuma in the most unlikely of corporate locations. It also applies this kind of architecture to a type of use with which it is not commonly associated. But the project’s most striking ambition lies in its bold yet simple attempt to fashion a



For further information please visit: www.sheppardrobson.com

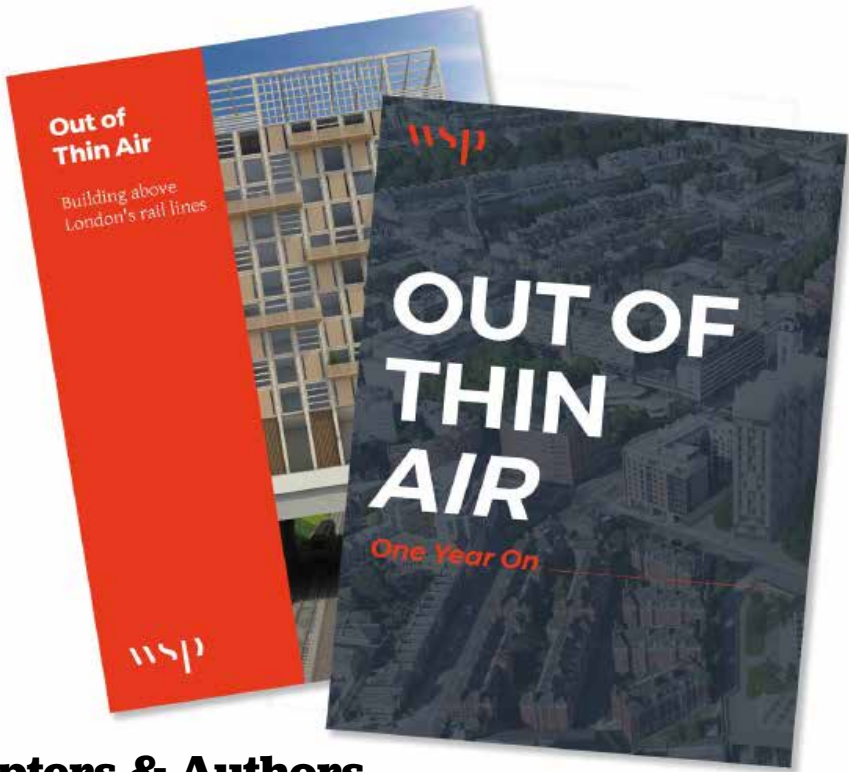
BUILDOFFSITE'S RAIL HUB TO PUBLISH OVERBUILD GUIDE

The rail sector is well-supported with hubs, forums and associations, so at Buildoffsite we aim to address specific topics with deliverables coming out of workshops and project visits. One such deliverable was the DfMA Guide for Bridges and Viaducts. We are now working on an Overbuild Guide for Linear Infrastructure, due to be completed in time for the [Offsite Construction Show](#).

The Overbuild Guide was conceived following WSP's publication of their Out of Thin Air - Building Above London's Railways report. The report concluded that if 10% of London's railway lines (excluding stations) could be built over to a height of 12 storeys, a quarter of a million homes could be created. This collaboration contributed to WSP's decision to join Buildoffsite earlier this year.

The aim of the Overbuild Guide is to look at how such projects could be approached in order to maximise the opportunities suggested by the WSP study. A key element of this is the role that offsite construction may play - whether it is through the optimisation of supporting deck structures, the delivery of lighter weight superstructures, programme duration reduction, reduced risk, improved safety or other means.

Leading the project are Nigel Fraser (Buildoffsite) and Bill Price (WSP), who are acting as joint editors. They are working with volunteer lead authors from Buildoffsite members, who in turn receive inputs from a range of members and industry players.



Chapters & Authors

- Place making opportunities:** Nigel Ostime, Hawkins Brown
- Approach to structural design:** Peter McMahon, WSP
- Creating sites:** Editors with industry inputs
- Overbuild delivery systems:** George Poppe, Sheppard Robson
- Cost considerations:** Bernard Williams, IFPI
- Potential Future Innovations:** Nigel Fraser, Buildoffsite
- Sustainability Analysis:** Editors using prior Buildoffsite report plus IFPI sourced data
- Global initiatives and expertise:** Bill Price, WSP
- Risk and procurement:** Patrick Hayes, Meinhardt & Nigel Fraser, Buildoffsite

Other contributing members to date include C-Probe Group, Design Automation Systems, HS2, Ideal Lifts, Lean Thinking, Mace, Mott MacDonald, Shay Murtagh Precast, Totalflow and TfL. Banagher Precast who are involved in a current overbuild project are also contributing. If you would like to introduce material for consideration, please contact [Nigel Fraser](#). The chapters are now taking shape, so please make submissions as soon as possible.

We want to maximise both the opportunities to create sites for developments above linear infrastructure and the role the offsite sector can play in doing this.

We are also organising an overbuild project visit for Buildoffsite members, on the 10th October. Look out for the invite.

BUILDOFFSITE'S NEW HUB FOCUSSES ON DESIGN QUALITY

The Design Hub was set up at the beginning of the year with the aim of promoting:

- the importance of early engagement in the project process
- the benefits of standardisation and
- good design and placemaking within the offsite sector

Offsite, particularly volumetric, is perceived by some to deliver unimaginative buildings. Whilst there are buildings using modern methods that are poor, this is not generally down to the method of construction but rather a lack of creativity and investment in the conceptual design and technical stages. Indeed, greater standardisation can free up time for the designer to improve design quality both in terms of placemaking and functionality as well as technical detail and environmental sustainability.

It is critical that the method of construction is considered from the outset, during RIBA Stage 2, and the group is developing an optioneering tool that will assist in the selection process. This tool will help analyse which offsite systems might be suitable and, in due course, the capability of the offsite market to deliver in a given location. This is an ambitious target, but Buildoffsite is well-placed to support such an initiative and it would reinforce our role as enablers. The group is also keen to promote DfMA in schools of architecture and has set up a link with Oxford Brookes. We aim to broaden our contact with education establishments and will be looking for other interested



Nigel Ostime, Hawkins Brown Hub Lead

organisations. We see training undergraduates in DfMA as being critical to improving productivity and value in the construction industry. We are also working with the Offsite School, with funding from the CITB, to develop training programmes and CPD on offsite systems.

We recognise that our efforts need to be client-focussed and plan to consult broadly regarding what clients want from the offsite sector. It is important to look outside the group of those already initiated in offsite processes and broaden the reach of the organisation.

Finally we recognise the importance

procurement plays in utilising DfMA and the enormous barrier that single stage D&B can present. Whilst the group is primarily made up of architects, we recognise the need to work collaboratively with the other designers, the contractor/assembler and the manufacturers. We also recognise the central role played by the client in enabling DfMA through the form of procurement selected and in understanding the importance of fixing the design. In due course we want to help promote more collaborative forms of contract, including integrated project insurance.



WORLD'S TALLEST MODULAR TOWERS

BOUYGUES BÂTIMENT BUILDS 140-METRE-HIGH CONCRETE MODULAR TOWERS

Construction company Bouygues Bâtiment International has built Clement Canopy, a pair of 140-metre-high towers made of prefabricated concrete modules.

Bouygues Bâtiment International claims the development in Singapore has set a new record for the tallest modular tower.

Previously the title had been held by George Street, a 135-metre tower built in Croydon,

England, by Tide Construction. The first high-rise modular tower was built in New York in 2016 by SHoP architects.

Clement Canopy's 1,899 prefabricated and pre-finished modules were built off-site.

The module's structures are cast from concrete in a yard in Senai, Malaysia, then a factory in Tuas, west Singapore,

carries out the fit-out to a nearly finished stage.

"Each module is around 85 per cent finished off-site, before then being assembled onsite," Bouygues Bâtiment International's head of modular construction Aurélie Cleraux said.

"This includes, for example, the painting, windows frame and glazing, doors, wardrobes and MEP

(mechanical, electrical and plumbing) including water and sanitary pipes, electrical conduits and ducting, which are all totally finished before the modules arrives on site."

Clement Canopy's concrete core was built at the same time as the modules were stacked and installed, in a carefully choreographed sequence. "This method is definitely more eco-friendly," added Cleraux. "We were able to reduce waste onsite by 70 per cent and offsite around 30 per cent with a central materials and logistics platform."

Modular projects can be even more sustainable, Cleraux added, if materials like timber are used instead of concrete.

The towers' facades are made from rendered and painted concrete, with aluminium window frames.

Clement Canopy houses 505 two-, three- and four-bed apartments, with a swimming pool complex at the base.

“

This method is definitely more eco-friendly. We were able to reduce waste onsite by 70 per cent and offsite around 30 per cent with a central materials and logistics platform.”
Aurelie Cleraux, Head of Modular Construction & Innovation



CALEDONIAN SECURES £25M WEMBLEY STUDENT ACCOMMODATION PROJECT

Caledonian, working with Bowmer + Kirkland, has been awarded a £25m contract to manufacture the accommodation modules as part of a £54m development for the University Campus of Football Business, First Way Campus in Wembley.

The majority of the 678 bedrooms have now been manufactured by Caledonian at its 40 acre site in Newark, Nottinghamshire. They will be installed by the company utilising its sector leading modular building system. At 10 storeys, the project really shows what is possible with Caledonian's modular building solutions.

On this project, the Caledonian approach and recent advances in process will provide bedrooms that are 96% complete prior to shipping to site.

Caledonian was selected because the company demonstrated how its modular building system would help meet the strict deadline dates on this project, which required handover by July 2020 in time for Euro 2020.

Fire compliance capabilities of the Caledonian modular system also featured highly in the selection process, due to the high rise nature of the 10 storey development. Caledonian provided the client and design team with confidence post Grenfell, providing a pre-engineered fire

compliant modular solution suitable for a development of this scale.

First Way Campus is situated a few minutes' walk from Wembley Stadium, and will include a mix of purpose-built student accommodation as well as academic, office and outdoor space.

Developers Cole Waterhouse brokered a deal with Unite Students, a leading provider of student accommodation in the UK. Caledonian has incorporated the Unite requirements into the design to provide a higher standard student living experience than is traditionally expected.



Our ability to deliver to a strict schedule and have an existing fire compliant solution made a compelling proposition for First Way Campus. The development rises to 10 storeys and that really shows what is possible with our modular building solution."

Paul Lang
CEO, Caledonian Modular



We liked the modular building solution proposed by Bowmer + Kirkland and its supply partner Caledonian for First Way Campus because it was a practical way of meeting the strict schedule. We are providing Wembley and the UCFB students with a fantastic campus that will include a number of facilities for students including purpose built accommodation (678 beds), seminar rooms and staff office spaces as well as amenities such as a café style restaurant, a gym and library/IT suite.

Damian Flood
CEO, Cole Waterhouse



MCAVOY WINS PLACE ON NEW £500M PUBLIC SECTOR FRAMEWORK

Crown Commercial Service (CCS) has awarded four lots on its new £500m Modular Building Solutions framework to The McAvoy Group. CCS is the largest public sector procurement organisation in the UK.

Under the new agreement, McAvoy has secured the opportunity to provide bespoke modular buildings and interim hire facilities with a particular focus on education and healthcare. The framework also covers public buildings such as facilities for the emergency services, MOD, community centres, offices, care homes, student accommodation and other residential schemes. It will operate for the next four years and covers England, Scotland, Wales and Northern Ireland.

This is the fourth consecutive CCS framework that McAvoy has been awarded and it follows a rigorous independent assessment process.

The Group was successful in winning a number of major free school projects under the previous CCS modular building contract which were built offsite, including the award-winning £20m Lynch Hill Enterprise Academy in Slough and Goresbrook School in London – an £18m all-through school taking children from nursery to sixth form.

Northumbria Hospital



Goresbrook School



Commenting on this latest framework appointment, Eugene Lynch, Chief Executive of The McAvoy Group, said, “Long-term frameworks are very important to our business and are a major source of new contracts, helping us to continue to grow sustainably. We look forward to working with CCS over the next four years.”

“The advantages of offsite construction for new public sector facilities are proven and clear. We can reduce the build programmes by up to 50 per cent for earlier occupation and offer significant quality improvements. Our approach also provides much greater certainty of delivery on time and on budget. These factors are very important for all public sector clients – from schools and hospitals to the emergency services, universities and local authorities.”

In addition to the Group’s permanent modular building solutions which have a design life of up to 60 years, the provision of high-quality interim accommodation for hire allows schools, hospitals and other organisations to react quickly to changing local needs. McAvoy can provide decant facilities for redevelopment projects and buildings to help meet short-term peaks in service demand, such as additional classrooms.

CCS plays an important role in helping the UK public sector save money when buying common goods and services. It uses its commercial expertise to help buyers in central government and across the wider public sector to save time and reduce the cost of procurement.



The advantages of offsite construction for new public sector facilities are proven and clear. We can reduce the build programmes by up to 50 per cent for earlier occupation and offer significant quality improvements.”

**Eugene Lynch,
CEO of The McAvoy
Group**

PREMIER MODULAR SPECIALISTS IN TEMPORARY AND PERMANENT OFFSITE BUILDING SOLUTIONS, NAMED AS SUPPLIERS FOR ALL LOTS ON THE LARGEST GOVERNMENT FRAMEWORK

Premier Modular Limited, a leading offsite manufacturer, has been named as suppliers on the Crown Commercial Service's (CCS) Modular Buildings Framework. Premier has vast experience of working across the full range of sectors looking to benefit from this Government led drive to use offsite construction.

Premier has recently completed the last of eight school projects delivered in partnership with ISG for the Manchester City Council in less than fourteen months. A collaborative approach from the outset, taken across the full supply chain for this scheme, delivered cost and design efficiencies, coupled with programme certainty. Offsite manufacturing takes the manufacture of buildings off the critical path; site works (including foundations, services and external works) can be simultaneously completed whilst construction of the building itself takes place in the factory. Early collaboration ensured that a base model was developed for the whole scheme, enhanced by the option of design changes to

suit different enduser requirements of the various schools and any planning requirements - without adversely impacting the programme timescales.

The successful delivery of the scheme was highlighted when one of the schools, Beaver Road Primary School, was named Education Project of the Year in the 2019 Offsite Awards.

Divisional Director, Dan Allison, said

"Investment in research and innovation has always been at the core of Premier's business and we are proud to play our part in the Government's push to use modular building solutions across the five central government departments." Divisional Director, Dan Allison, said

The CCS is the biggest public procurement organisation in the UK and has developed the framework to offer an alternative to traditionally built accommodation across all public sector organisations. Running to the end of March 2023, the framework is

available across a range of sectors that Premier is already an active and trusted partner in. Covering work as principal contractors, complemented by the speed of offsite construction, the framework provides a cost and time effective, compliant procurement route to market.

Premier was successful in all the lots they applied for and have been named as suppliers for lots covering the provision of temporary and permanent buildings for healthcare, education and other sectors.

The process of being named as suppliers on the CCS framework followed an exacting assessment process to ensure the suppliers named could demonstrate financial robustness, excellent health and safety records and quality of product.

Premier is excited and proud of their place in this framework and looks forward to supplying its award winning products.



We see this framework as a strong affirmation of the Government's drive to use modular construction to meet the growing demands of the key public sectors. Being named as a supplier on this framework is a real boost to our company and we look forward to using our knowledge and expertise to deliver quality, bespoke, value driven buildings through this framework." Dan Allison, Divisional Director at Premier Modular



SECOND PHASE WIN FOR DUAL HOTEL PROJECT

Elements Europe has secured a contract to manufacture bathroom pods for Staycity in Manchester's city centre.

256 bathroom pods will be manufactured for the new Aparthotel which will be located on top of a brand new Motel One hotel in St Peters Square in Manchester.

Elements Europe is already manufacturing 288 bathroom pods for the Motel One hotel working with client and main contractor Russell Construction. Staycity will occupy floors nine to twenty whilst Motel One will reside below taking floors one to eight.

"Two different projects in one building is a first for Elements Europe and we are really pleased to be involved in this project which sees two leading hospitality brands come together to share a development which is mutually beneficial." Commented Kevin Arthur, Director, Elements Europe.

"We hope to see more dual projects such as this and thank Russell Construction yet again in choosing Elements Europe as pod supplier." Kevin added.

All Staycity bathroom pods will be fully tiled and feature Duravit sanitary ware and Hansgrohe brassware.

Each will feature a shower and have quartz vanity tops. Every pod will be manufactured floorless as requested by the client and a number of accessible pods will also be manufactured.

This will be the fourth project Russell Construction has contracted Elements Europe to deliver in Manchester.



nmcn NAMED TOP CONTRACTOR IN THE WATER INDUSTRY

Exceptional profitable growth built on market leading innovation and excellent sustainability drives nmcn to top contractor in the water sector for consecutive years.

The water industry relies on its contractors and supply chain partners to drive forward best practice in construction, innovative techniques and sustainability, while maintaining high health and safety and employment standards. This award recognised nmcn as the contractor that demonstrated a combination of commercial success, agenda-setting innovation, environmental stewardship and workforce best practice through its work in 2018.



MAYOR OF LONDON LAUNCHES NEW APP TO SPEED UP CAPITAL'S HOMEBUILDING



London's homebuilding revolution is a step closer today after the launch of a new, freely available app aimed at accelerating the design and construction of high-quality factory-built homes.

London needs at least 50,000 new homes a year, but traditional construction methods cannot meet the scale of this demand. In 2017 the London Assembly Planning Committee called for better design guidance to enable the wider adoption of Precision-manufactured homes (PMH), which can be built twice as fast as conventional developments but to a far higher standard.

The [PRISM](#) housing design app has been developed by tech-led design practice Bryden Wood, building on extensive work undertaken by residential consultancy Cast and in collaboration with the Mayor of London, to

bring together central and regional government, funders, developers and manufacturers and drive a step change in productivity and quality in homebuilding.

The free and easy-to-use app combines the Mayor of London's spatial planning rules with PMH manufacturers' expertise to allow architects, local authority planners and developers to quickly determine viable PMH options for their site. This accelerates the early design phase and allows designers to focus on the quality of the built environment.

London is the first city in the world to make a freely available app of this kind, sharing PMH expertise and leveraging technology to revolutionise the design process. Open sourcing the app will encourage greater collaboration and means that this innovation can be used and further developed by the global design community.

The Mayor of London, who has championed the modernisation of the construction industry, co-funded the development of the new app alongside Transport for London, L&Q, Legal & General Modular Homes and Greystar. James Murray, Deputy Mayor for Housing and Residential Development said: "We need to build far more housing in London - and particularly more council, social rented, and other genuinely affordable homes. Even if we had all the investment and powers we need, traditional construction techniques will only take us so far. That's why the Mayor has been working with key industry players to develop 'PRISM' - a new housing design app, which is the first of its kind in the world, and which will give a vital boost to the precision manufacturing of homes."

James Pargeter, Senior Director Projects, Greystar Europe said: "As the global leader in rental housing, the natural incentive to choose precision-manufactured construction methods was clear to us. It means we can deliver much-needed, consistently high-quality new homes significantly faster. In addition, we can also reduce construction traffic and waste by up to 80%, benefiting the whole neighbourhood. PRISM will enable people to evaluate their PMH options much more quickly for specific sites, and it should encourage greater knowledge-sharing and collaboration across the whole residential spectrum."



We need to build far more housing in London – and particularly more council, social rented, and other genuinely affordable homes. Even if we had all the investment and powers we need, traditional construction techniques will only take us so far” James Murray, Deputy Mayor for Housing and Residential Development



Jami Cresser-Brown
Architecture Director, Bryden Wood

“

Technology has revolutionised so many sectors from finance to automotive and it is time for the construction sector to do the same. This is the only way that we will be able to meet demand for housing and other social infrastructure. The scale of the challenge is so great that we will only succeed if we work together. We have deliberately opted to make this app open-sourced so that anyone can play a role in the design process and its next stages of innovation” **Jami Cresser-Brown, Architecture Director at Bryden Wood**

“

Modernisation of London’s construction industry is vital if it is to overcome growing challenges in terms of lack of resourcing, skills & training, diversity and poor build quality. This app will enable designers to concentrate on aesthetic quality and placemaking, whilst allowing greater consideration of manufactured building systems and components that can make the homebuilding process more productive and predictable, delivering better outcomes for London” **Mark Farmer, Founder & CEO at Cast**



Mark Farmer
Founder & CEO, Cast

STEEL ROLL FORMING MACHINE MANUFACTURER RECOGNISED WITH TOP EXPORT HONOURS

There's celebrations afoot in the normally quiet scenic burbs of Auckland, New Zealand. Following several years of solid growth, innovative Kiwi manufacturer Howick Limited has just been recognised in the 2019 ExportNZ awards as the best goods exporter of its size in NZ.

Howick makes innovative steel roll forming machines that sell worldwide. The quality and precision of their machines is globally recognised, and the increasing uptake of light gauge steel (LGS) and offsite building methods has meant a strong performance for the company in recent years, with over 15% growth in the last 12 months alone.

Howick's technology is literally helping shape the future of light steel construction, so we caught up with CEO Nick Coubray to get a better sense of how things are shaping up in the world of Howick and modular construction.



2019 Category Winner

So Nick, congratulations on your success at this year's ExportNZ awards. Do you feel like the hard work is paying off?

It's great to get some recognition for the team, but this won't go to our heads. It feels like we're one of those classic long-term over night successes." commented Nick. "We've been in business for over 40 years, and been manufacturing steel roll forming machines since 1993, and all of a sudden, the industry has woken up to the opportunity. Our machines are starting to be seen as the industry standard throughout UK, Europe and the USA, so what we've been working towards for all these years is now coming together.

What is behind the growth in LGS and how are Howick positioned for that?

There's a massive global problem with the cost and shortage of housing and industry skills. Light steel and offsite construction brings many benefits without compromising on quality, so we feel like we can be part of the solution.

Howick is working towards our vision to play a key role in the evolution of the global construction industry. The business focuses on the UK, Europe and USA currently. Globally there's a search for better and more efficient building technology to meet increasing demand.

Offsite construction with LGS has proved to develop results in faster, more efficient builds and precision levels of quality. As a result, growth in the sector has been significant. With this backdrop, Howick sees demand quadrupling by 2023, and we're positioning ourselves now to handle the production requirements this will necessitate, without compromising our own high standards.

Can you tell us a little about your manufacturing processes, and what factors influence those decisions?

All our product design, innovation, R&D and manufacturing are conducted at head office in Auckland, and we employ LEAN principles in our manufacturing processes. That

means we have absolute control over quality, efficiency and outcomes.

All major components are manufactured in-house. We've also invested in more CNC machines in recent months to provide greater control over our manufacturing, planning and quality assurance.

We are careful to choose our software partners to ensure that not only the product, but their business model and principles are aligned with ours, and we have close partnerships with componentry suppliers, which are mostly NZ owned, to ensure timely delivery and delivery of exact specifications.

How do you manage quality assurance and monitor the ongoing performance of your machines in international markets?

All machines we manufacture are subject rigorous testing before shipping and are shipped fully assembled. Once a machine is unpacked it only takes approximately a day to commission. Installation and commissioning of machines is carried



out by highly trained consultants so quality is ensured when the machines are commissioned.

We also have a close relationship with our key customers. With the UK for example, the groundwork for the widespread success and acceptance of our machines was built several years ago when senior managers relocated to our UK office. So our customers are well known to our local support team, but they are also known to us at head office and have direct communication with us here.

Because of this we are able to gauge the performance of our products, what is working, or what needs improvement. We get first-hand information and feedback on our products.

Finally, we provide a 100% money back guarantee on our Howick FRAMA 3200 and 5600 machines to give our customers complete peace of mind - we accept return of machine and issue a 100% refund after its first six months of operation*.

*refer [here](#) for more information

What opportunities do you see coming through?

We're seeing a growing awareness globally in developed countries of the need for advancement in construction methods and the availability of technology to support that progress.

There's greater acceptance coming through of light gauge steel and offsite construction methods in North America. There's also increasing opportunities in UK and Europe, especially with the UK government behind driving initiatives. Offsite / Modular and LGS construction as models of speed, efficiency and reduced wastage, are now being recognised as a better method of construction in the UK. All of these factors bode well for the future growth of LGS and offsite builds.

Finally, can you give us some current examples of the Howick technology in action for your customers?

LGS Solutions literally had their work cut out to deliver for one of their clients, when they needed 36 exclusive residencies built in Melbourne, Australia. To achieve the project deadlines they needed a quick, effective solution that would align with high-end contemporary design and architecture. They achieved completion 30% faster than traditional construction techniques would have allowed using light steel framing built with our machines.

Another example would be Horizon Offsite, who were contracted to supply the full structural system for a multi-unit development in Ramsgate. The 20 units were scheduled to be completed within just 27 weeks. Horizon's highly skilled design engineers used Vertex framing software which quickly and easily translates to the Howick FRAMA machine in their state of the art factory in Cahir, Tipperary, Ireland. Once delivered, the structural systems produced were erected in a few days instead of months. Accuracy is within 0.06%, saving significantly on materials, time, and waste.

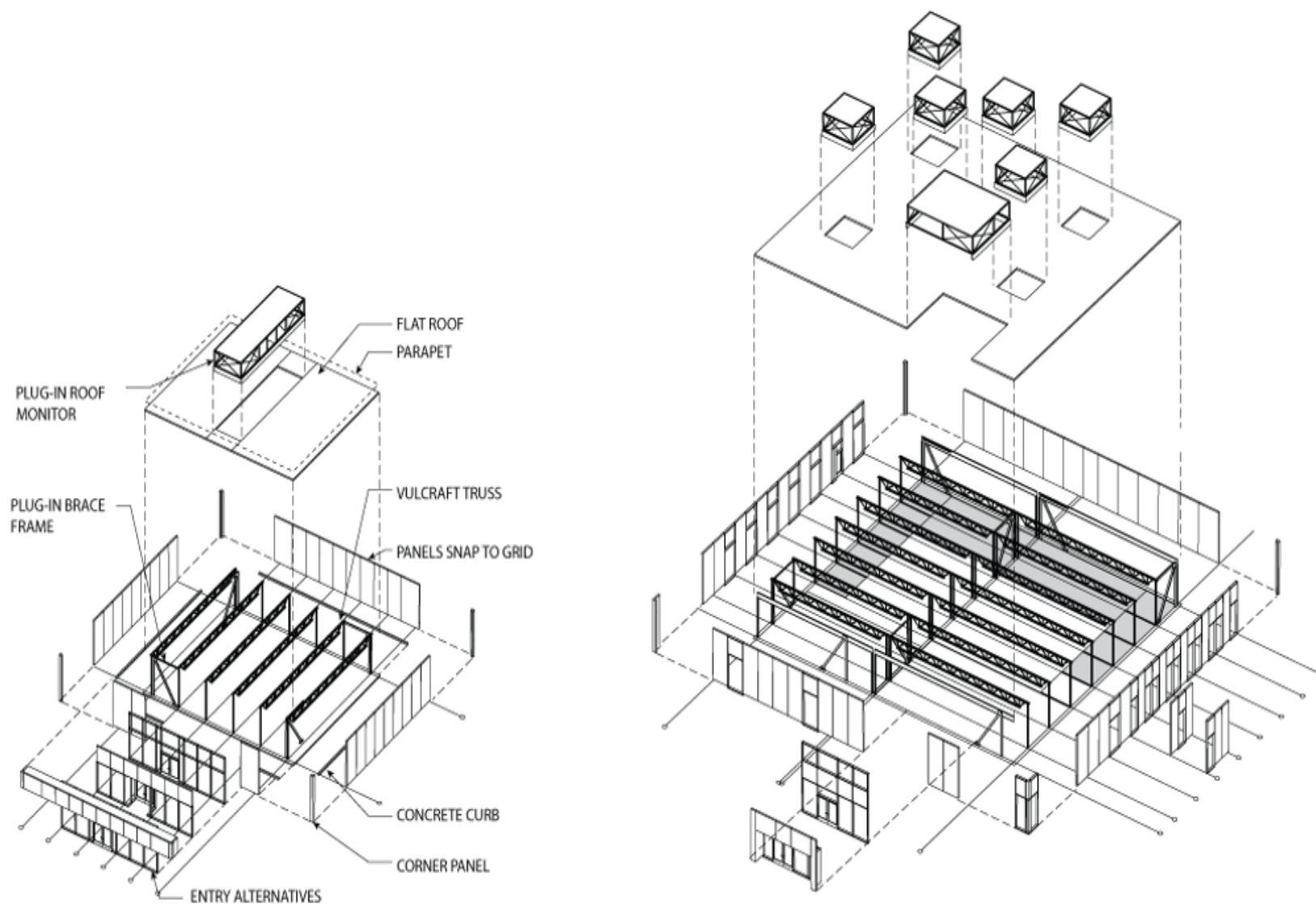
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**Nick Coubray,
CEO of Howick**



CREATING A SMART, SCALABLE PLATFORM TO TRANSFORM, STANDARDIZE AND SIMPLIFY MODULAR CONSTRUCTION



Project Frog is a San Francisco, California based product and technology company offering tailored solutions to the Industrialized Construction (IC) industry. Their solution enables mass customization at scale through the intersection of design, manufacturing and technology. The company's platform enables IC scalability by incorporating automation, data standards and a cloud application ecosystem. Their solution integrates product and technology methodology to automate the design, configuration, manufacturing interface and other redundant processes in the AEC world.

By leveraging cloud software and regionally distributed manufacturing networks to develop prefabricated building platforms or Kits-of-Parts, Project Frog offers customers a pathway to scalable and flexible industrialized construction solutions.

Project Frog is not just a software company - the company has been developing prefabricated building systems or Kit-of-Parts, using an integrated technology approach for over 13 years. Its pursuit of scalable mass-customized building systems led Project Frog to develop cloud-based software connecting design to manufacturing, and BIM to the Cloud. This effort resulted in an investment from Autodesk as part of the Forge Fund in 2017, kicking off Frog's alliance with Autodesk's Industrialized Construction team. The alliance has allowed Project Frog to apply its domain expertise to developing software solutions connecting design to manufacturing and construction workflows, resulting in KitConnect, a Revit-based Cloud solution built on Autodesk's Forge Platform.

KitConnect addresses some of the major challenges associated with creating a scalable DfMA workflow; content management, DfMA standards enforcement and common data use.



Forge's interconnectivity to other AEC applications is singular. The Forge solution allows us to leverage frameworks built around workflows, while enabling data standards and data interoperability with other applications over time. We believe Forge has the potential to be the Android or iOS of AEC, which is why we built our scalable solution on it."

Mike Eggers
VP of Product & Innovation
at Project Frog

First configurable DfMA content authored in Revit (Kit-of-Parts, modules, assemblies, etc.), and the rules/logic/constraints associated with that content, are captured and published to an enterprise cloud library. This central library of repeatable DfMA content can then be shared across multiple projects, allowing changes between the enterprise and project libraries to

be automatically tracked, version controlled and gated from one another. Plugging into a Autodesk's Forge Data Platform overcomes the data management limitations of desktop only BIM.

This solution has broad applications beyond just modular, or DfMA, content and can apply to any of the repeatable and configurable design elements

used broadly in the AEC industry, such as housing units, hospital rooms, office spaces, or even modular furniture systems.

After successfully managing a Kit-of-Parts in the cloud, the next challenge is to make that content available to a design team and, more importantly, ensure the team adheres to the rules and logic of those components as

defined in cloud. Typically, in the AEC industry, it's an ad-hoc team that may not understand how components were designed, or what their DfMA constraints are. In this instance, KitConnect works as a Kit-of-Parts configurator, giving the design team the freedom to create a building using a library of parts, while constraining them to use DfMA standards to configure the components. This allows

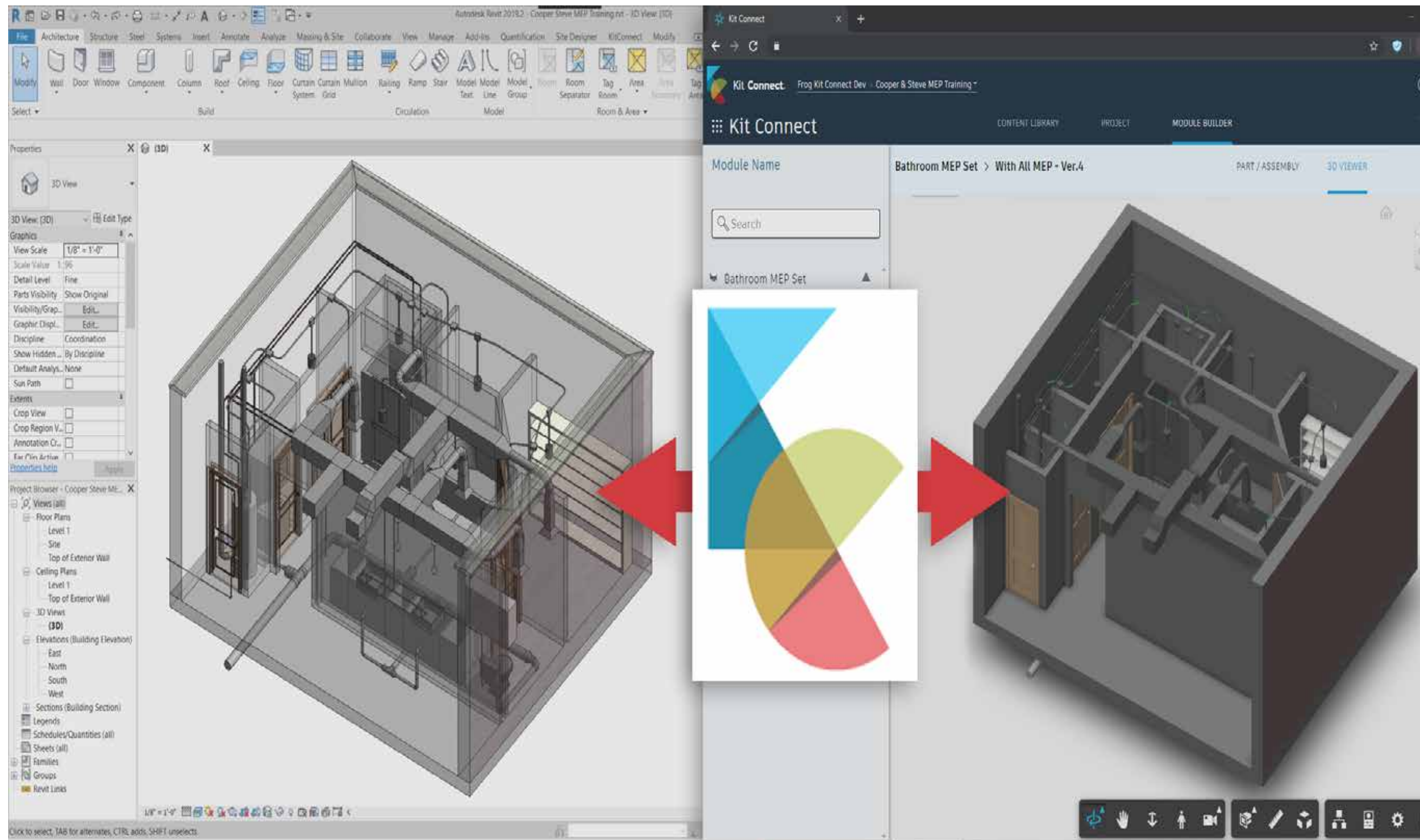
an accurate bill of materials (BOM) to be produced from the Revit model, and ensures the design adheres to specific DfMA criteria, all without reliance on distributed information workflows or design guidelines.

Finally, KitConnect drives data-centric workflows that connect entire project teams, from product

engineers to architects, engineers, consultants, manufacturers and builders. This ensures work from the web to BIM is done using a common data environment. Data typically accessible only in a BIM context can be edited in the web, and passed seamlessly back to Revit. This allows all stakeholders on a project, including builders, manufactures and supply chain managers to participate in a common dataflow. BIM and non-BIM users have access to the same information at the center, accessible through the web or Revit. This ensures high fidelity data exchange, and erodes typical data silos across all phases of a project from design through construction.

Project Frog's reason for choosing the Forge Platform was obvious. According to Project Frog's VP of Product and Innovation Mike Eggers, "Forge's interconnectivity to other AEC applications is singular. "The Forge solution allows us to leverage frameworks built around workflows, while enabling data standards and data interoperability with other applications over time. We believe Forge has the potential to be the Android or iOS of AEC, which is why we built our scalable solution on it."

By creating a combination of data, processes and technology, Project Frog enables a seamless, end-to-end industrialized construction workflow. Their solution integrates product and technology methodology to automate design, configuration, manufacturing interface and other redundant processes in the AEC world. KitConnect launches commercially this summer. Said Eggers, "for anyone focusing on modular construction, and connecting design to manufacturing, fabrication data flow and workflow, we have the solution for you."



OFFSITE BRINGS WEIGHT TO THE CASE FOR RAIL OVERBUILD



Following our research into the benefits of building over rail lines to ease the UK housing crisis, UK strategic growth director Bill Price explores how the lighter solutions of offsite modular construction could benefit rail overbuild projects.

Our report [Out of Thin Air - One Year On](#) explored the potential of rail overbuild to help overcome London's housing shortage, identifying over 2,356 hectares of available rail land in London which could provide new homes.

Rail overbuild is just one of a range of methods to densify and create land for homes. But, using offsite techniques to provide lightweight, modular housing and make the process quicker, safer and more economical is worth a rethink.

For one thing, manufacturing building components to be trucked in for assembly on site means they're less subject to weather damage than at exposed construction areas. It's also a faster building method - you can prepare the site while the homes are being built elsewhere.

Safety is the first priority when building over live rail tracks. Overbuild is achieved by first constructing an encapsulation - a sort of concrete box - around the railway, to separate the overbuild construction works from the operational trains. Building the components for the encapsulation away from the train line, to be put in place when the trains aren't running could further reduce the risks.

Then, there are the homes themselves.

Weight is understandably important when you're building over an existing structure - and the new offsite systems and materials are frequently lighter than those of traditional home-building. Using offsite modular construction methods could cut the weight of a five or six storey overbuild by around 40-50%. The encapsulation and foundations could then be designed to bear less load, with volumetric modular structures or pods quickly assembled onsite and lifted from trucks right onto the overbuild.

Overbuild is a complicated, subtle idea and brings together our experts in everything from rail and civil engineering planning to stakeholder engagement. We talk to colleagues across the world to seek out best practice and continue our research. We're even writing a rail overbuild guide for Buildoffsite to help demonstrate how all the elements fit together to produce better value and quality with lower cost. Typically, we find the more answers we provide, the

more enquiries we get. But we're fine with that.



Bill Price, WSP

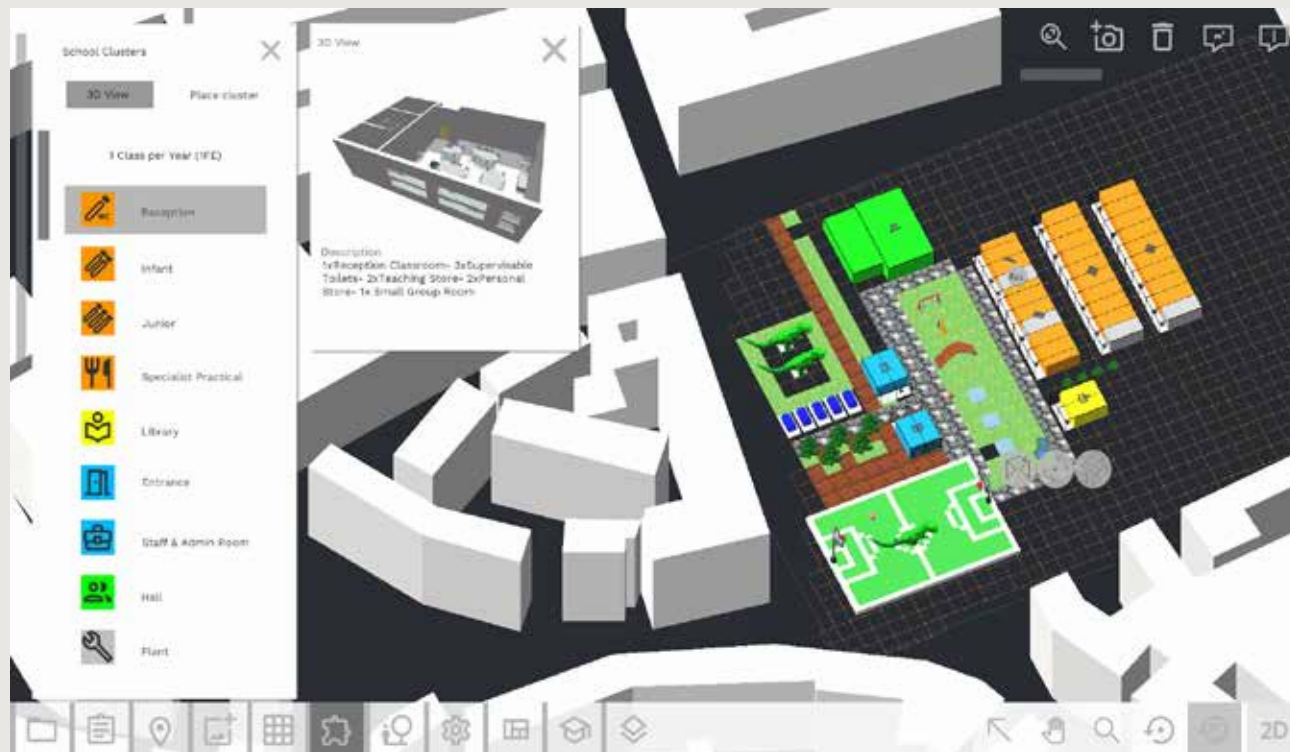
If you'd like to learn more about the guide, please refer to [Buildoffsite's Rail Hub update](#).

TRANSFORMING CONSTRUCTION THROUGH COLLABORATION & INNOVATION

Richard Crosby, Director of construction consultants blacc, looks at how a pioneering consortium could transform the way schools are designed, procured and built offsite.

In the 1970s, the US car industry was severely impacted by Japanese car manufacturers who had perfected a highly efficient production system. The US car manufacturers came together and collaborated to develop a standardised approach to aggregate demand and reduce cost.

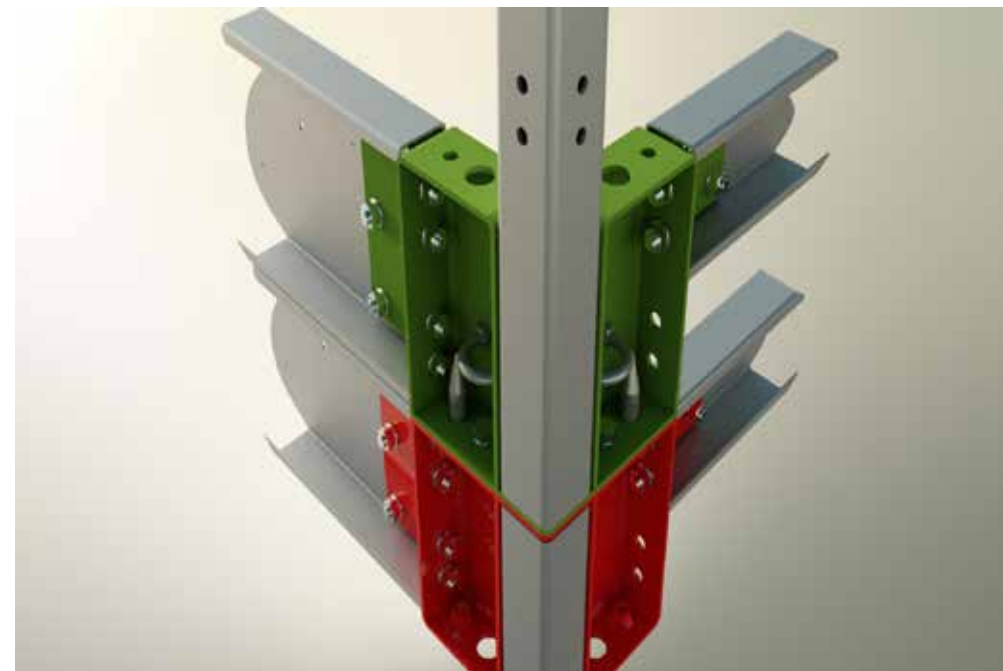
We identified a tremendous opportunity to adopt a similar collaborative approach to improve the efficiency of school construction.



Ambitious Aims

School estates are often made up of mismatched separate buildings developed over time to meet changes in demand, creating inefficient layouts.

Every offsite manufacturer uses a different structural solution so new school buildings have to be redesigned every time to suit each system. Our view was this is an inefficient way of working.



to configure a fully DfE compliant school on a specific site. The intention is to speed up the early feasibility process.

Offsite Framing Solution for Schools

The starting point with the framing solution was to engineer a single, standardised way for The McAvoy Group and Elliott to interconnect their respective modular building systems. An engineered solution has been developed to connect each of the steel frames that make up a module - and to interconnect each module vertically and horizontally to make up a school building cluster.

The overriding aim of the Seismic project was to increase efficiency to reduce cost by standardising the offsite frame dimensions across the industry to create a componentised system for building new schools, beginning with primary facilities.

The aim was also to simplify the design process at the earliest stage - ensuring both feasibility and compliance with Department for Education (DfE) requirements in the most efficient way possible. Our solution would be to develop a digital version of the standardised DfE school clusters that would allow teaching professionals to assess if a compliant school building can fit on a specific site. This tool would use standard module sizes as a kit of parts for designing a school.

The Project Partners

All the partners involved in the project recognised its potential and each invested significant resources to ensure the success of the project.

- The original concept was developed by blacc who also provided project leadership expertise.
- The McAvoy Group and Elliott collaborated to standardise the structural components, with a view to expanding the market and de-risking offsite for clients. These partners worked very well together, successfully combining their offsite manufacturing expertise for the success of

the project.

- The Manufacturing Technology Centre (MTC) co-ordinated the bid submission and acted as the catalyst to create the consortium. The MTC also gave the partners the opportunity to think beyond how schools have been delivered previously and apply more manufacturing principles to the construction of new schools, helping to develop more efficient processes.

- Bryden Wood provided digital expertise and led the development of the technology for the configurator. The project was funded by UKRI through the Industrial Strategy Challenge Fund and Innovate UK.

How to Achieve Greater Standardisation in School Construction

Standardisation and volume are always key for efficient manufacturing. If processes are more efficient and there are fewer components, labour costs are reduced. This means the focus can be on the quality of the materials and achieving best value.

The standardised grid and connecting solution simplify the design process and enable the second part of the project - the configurator tool - that allows a non-construction professional

The result is fewer welded joints and fewer connections - which in turn means less steel, less weight, faster assembly and therefore reduced cost. The frame solution has been standardised around the building clusters developed by the DfE. It has a single width and height, and three length options to suit school buildings - using the same engineered connection solution.

The principle of standardised, manufactured components is that greater volumes will drive down costs and simplify procurement. For example, the DfE can pre-order a series of modules from any manufacturer that will be available 'off the shelf' for faster building assembly when a site receives planning.

The Benefits - Productivity, Cost and Environmental

By rationalising the design of the steel frame, the number of components has been reduced. This means faster module assembly in the factory - increasing productivity by up to 50 per cent. Work on site to interconnect modules is also more efficient.

The partners' research has shown that the new solution significantly reduces the number of frame components and will therefore use 25 per cent

less steel. The reductions in steel components and assembly time combine to generate a cost saving for these elements of up to 25 per cent.

With fewer components, the weight of the modules will reduce by 25 per cent with no compromise on structural rigidity – generating 25 per cent lower carbon emissions for the offsite construction of an average 40-module school. This is equivalent to over 155,000 miles of car driving or 17 flights from London to Sydney.

A Unique Approach to Achieve Unprecedented Economies of Scale

The intention is to offer the series of standardised components freely to the market, with the original design being subject to a patent application. Wide adoption will drive down the cost of the component manufacture and increase productivity across the offsite sector in education and other sectors.

This collaborative, standardised approach will make it easier for clients to procure offsite, for the supply chain to manufacture components and for offsite specialists increase to productivity.

The Seismic School Configurator

The team at Bryden Wood has developed a web app that encodes the spatial requirements alongside guidance for DfMA. Game engine technology was used to build the configurator and to make it as much like a computer game as possible. Games such as Minecraft provided inspiration for the look and feel – the team wanted it to be different to the costly, professional desktop software that architects normally use.

A web app rather than a desktop application was created so the configurator could be as open and widely available for users as possible. This is a tool which is useful for architects who are designing schools in a conventional

way and it will also allow a larger group of stakeholders to get involved. Teachers, parents and pupils can potentially design their own school.

An Open Source Approach

The Seismic consortium has open sourced the app in order to help build a development community around it, so that the maintenance and updates can be a collective effort. It is compliant with DfE planning regulations and has been built so future regulatory changes can easily be incorporated to ensure it stays current and compliant.

The team wants to encourage as many people as possible to get involved. Open sourcing technology is often disruptive – this approach ‘lowers the barrier to entry’ and helps to democratise the design process.

As a result, better schools will be designed and delivered more

efficiently. The team hopes that this app will encourage more designers to engage and use it to deliver their buildings. The app can be accessed via www.seismic-school-app.io

Seismic – A Powerful Example to Inspire Other Innovative Projects

According to Sam Stacey, Challenge Director – Transforming Construction at UKRI, “The Seismic project is a powerful example that the targets set out in the Construction 2025 Strategy are achievable. It is one of the first Innovate UK projects under Transforming Construction to be completed and demonstrates that this level of collaboration is the future of construction.”

“The Seismic initiative has been a tremendous success and it has hit all of the targets for Transforming Construction. The project partners have demonstrated an unprecedented level of collaboration which we hope will inspire other forward-thinking projects to help

innovate in construction and produce more efficient, sustainable and affordable buildings.”

“The focus of Seismic was to realise the Government’s ambition for greater productivity in construction and this has definitely been achieved with the offsite and digital solutions developed by the team. We are in no doubt that these innovations have the potential to change the way primary school projects are designed, procured and constructed, helping to meet the rising demand for school places and increase capacity in the construction industry.”

Next Steps

The benefits are already being realised in new Department for Education procurement frameworks.

The team is in the process of completing testing of the frame solution. The next stage is collaboration with steel fabricators to develop the standardised components and establish a supply chain with a view to making these available to the offsite market in the coming months. This approach will aggregate demand to reduce cost.

The aim is to develop a ‘product family’ for different types of buildings, such as residential. The team also has aspirations to ‘componentise’ other parts of a school building to be able to offer a whole school solution, including walls and roofs. For further information:

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• **Elliott:**

James Cowell, james.cowell@elliottuk.com

• **The McAvoy Group:**

David Clark, davidclark@mcavoygroup.com

• **MTC:**

Susan Hone-Brookes, susan.hone-brookes@the-mtc.org

• **Bryden Wood :**

Jaimie Johnston, jjohnston@brydenwood.co.uk



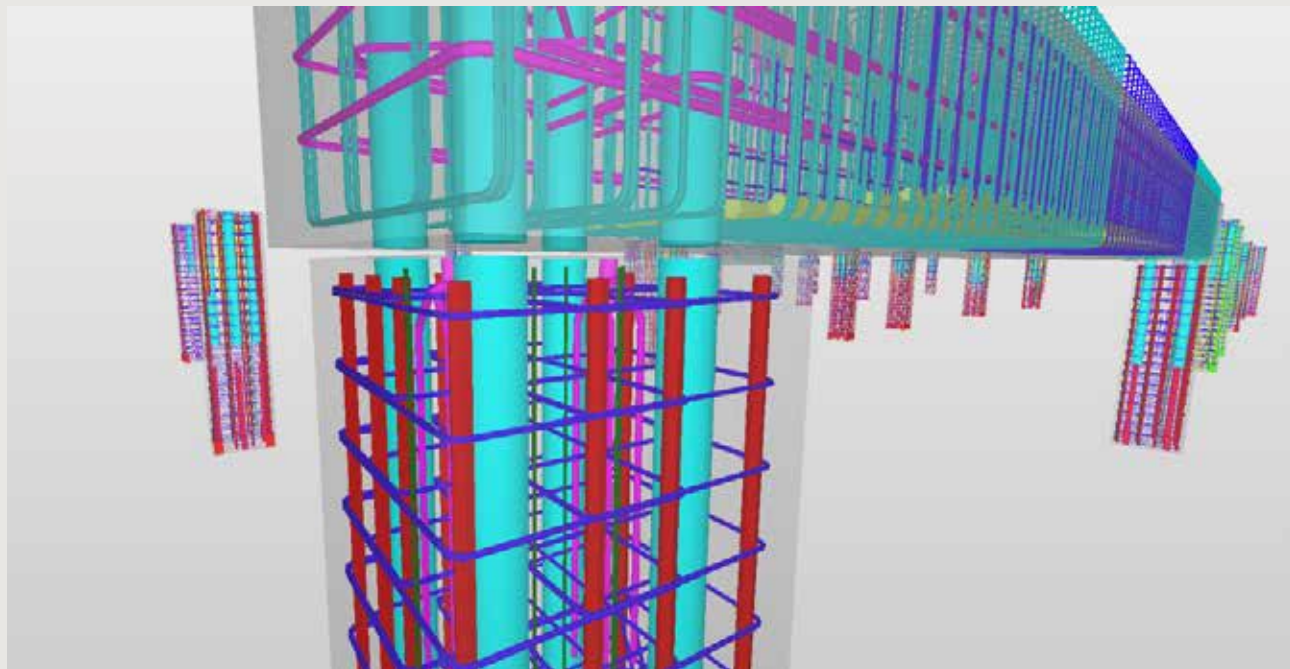
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**Sam Stacey, Challenge Director
Transforming Uk Construction at
UKRI**



LAING O'RURKE USES SOLIBRI FOR MODEL CHECKING PROCESS

Checking the quality of digital information is an essential part of any project at Laing O'Rourke. It begins with initial clash checks, design iteration checks and model revisions, continues by checking the precast concrete products manufactured at Laing O'Rourke's offsite manufacturing facility, Explore Industrial Park (EIP), and concludes with further checks carried out at the project site itself.



Laing O'Rourke is one of the UK's leading construction and engineering enterprises bringing innovation and excellence to the sector through its digital and offsite manufacturing approach. Laing O'Rourke's Explore Industrial Park (EIP) - the most automated concrete products facility in Europe, based in Steetley - is central to its DfMA (Design for Manufacture and Assembly) approach. EIP develops the design models which are then used to create the precast elements required for the individual project at hand.

One of Laing O'Rourke's current projects is a hospital in the North of England, where the team is using Solibri across the entire project. Antony Aucote, Senior Digital Engineer at Laing O'Rourke, describes: "The project team is very keen to use and benefit from Solibri. It's not just us as the digital engineers, we have the commercial team, designer consultants and planners using Solibri for everything, from detailed model checking and clash detection to carrying out their weekly project reviews." The software also comes in handy when creating preparation packs for the operatives on site, including screen shot and sequencing video production, all extracted from Solibri.



We use all the different things that Solibri can do at the different stages of our projects."

**Antony Aucote,
Senior Digital
Engineer at Laing
O'Rourke**

"The value that we get from Solibri is the efficiency," adds Robert Broad, Senior Digital Engineer at Laing O'Rourke. "We're using it for checks that previously would have been quite difficult and labor intensive to do manually." With Solibri, Laing O'Rourke has been able to automate a great deal of their model checking, bringing overall time savings and quality into the checking process. Broad continues: "We're not just using the standard clash detection ruleset, but also most of the advanced geometry rulesets. For example, the component distance check to ensure, say for a cast-in coupling, that the corresponding parts in the other component are within a certain distance." Other examples include the alignment checks and measurements to satisfy minimum requirements for factory production, as well as tolerance and access space checks to ensure a safe assembly on site.

The well-functioning quality assurance process runs in collaboration with all the involved project stakeholders. "Solibri uses a neutral IFC file format," Broad remarks, "So we can federate models from multiple platforms, and that's useful for us because we prefer to select the platform that best suits our precast re-enforcement detailing needs." Not to mention the possibility to bring in models from external consultants. "The MEP manufacturer, for example; we can bring in their model and compare

Laing O'Rourke's state-of-the-art precast concrete facility at Steetley.



it against the precast fabrication model to make sure there are no clashes or other alignment issues," Broad adds.

Laing O'Rourke also makes use of the BCF Connector functionality in Solibri, as well. Aucote describes: "Once the team is carrying out the model review, they're actually publishing any errors or issues that they find straight up to BIMCollab, which is the chosen commenting platform on this project. We find that this built-in functionality is bringing the team together really well, because although the design teams are external to Laing O'Rourke, they can view the issues directly, too, and review them more effectively than the traditional process."

Since there can be many different teams working on multiple elements on each project at the same time, it's inevitable that clashes will show up. That's why Laing O'Rourke values the importance of high-quality model checking throughout their processes. "There has been high level savings by using Solibri early in the process and it has allowed us to rule out faults further down the line," Aucote concludes.



The value that we get from Solibri is the efficiency. We're using it for checks that previously would have been quite difficult and labor intensive to do manually."

**Robert Broad,
Senior Digital
Engineer at Laing
O'Rourke**

CASE STUDY

NEWTON POPPLEFORD PRIMARY SCHOOL, DEVON

Project Title: 1FE - 2 Storey Primary School, Devon

Client: Department for Education / Newton Poppleford Primary School

Value: £3,338,340.74

Start on Site: 27 July 2017

Completion: 25 January 2019

Actual Completion & Reasons: Extension on time granted to 18 April 2019 due to extensive asbestos removal and dark ground uncovered during pre-construction survey and early works packages

Type of Contract: JCT D&B 2011

Reference Details: Stuart Vaughan, Headteacher

Project Summary: Newton Poppleford Primary School, Devon. Full turnkey solution for a new double storey 1FE primary school building including accessible car parking and delivery and maintenance entrance, external works, landscaping, pedestrian pathways and access bridges along with demolition works of the existing school buildings. The new accommodation included 6 classrooms / nursery / reception class / hall / kitchen / toilets / staff room / offices / store rooms / plant room.

Achieved Considerate Constructor Performance Beyond Compliance (38/50), and BREEAM 'Very Good'.

Role: Elliott were the Principal D&B Contractor under the CDM Regulations 2015.

As principal designer, we:

- assisted the Department for Education (defined as the Client under CDM) in identifying, obtaining and collating the pre-construction information
- provided pre-construction information to our design team and contractors
- ensured our design team complied with their duties as stated within the CDM Regulations
- prepared the H&S File

Modules: The building system which has a design life of 60 years is manufactured under a quality management system meeting the requirements of ISO9001. The modules have a suspended floor, mounted on a galvanised steel base frame. External square section steel columns, bolted to the base frame at each corner support the longitudinal steel C section beams which carry the ceiling and roof decking. This method of construction ensures a clear internal span over the whole floor area of the building.

Technical Capability: All the design work was completed in-house, but we partnered with a number of consultants to ensure the scheme was fully compliant to the DfE Facilities Output Specification and statutory regulations, it was our responsibility to ensure that the consultants used had the relevant skills, knowledge and experience to deliver their work. We provided a completed designer's competency for each consultant to the DfE.

We provided a fully integrated BIM model design to Level 2, a detailed Construction Phase H&S Plan, Environmental Plan, SWMP, Traffic Management Plan and We carried out risk assessments to ensure the highest level of H&S existed within the site and access to and from the site areas.



The Site - Access to Site – If any issues how were these resolved?

School Lane was our only access to site and there were times early on in the process when there were sizeable wagons and plant access and egressing which meant restricted parking for residents. When a large crane and a number of large vehicles are required to access site, we employ a specialist traffic management company to implement parking restrictions and road closures if necessary, all in accordance with local authority and highways requirements.

The residents were kept informed of times etc. when this would happen to cause them less disruption.

Delivery to site was through specific timeslots to avoid any disruption and safety of the students, with no traffic movement during school break times and the start and end of the school day. The route through the school playground was cordoned off with heras fenced routes and there was a lockable gate at the entrance to the construction site after driving through the school playground.

CSR - Community / Putting the Customer as a Priority – how was this achieved? How did we involve them in the project i.e. site visits, presentations etc.

A public consultation was set up and attended by residents to see the plans for the new school and have the opportunity to discuss any concerns or to know more about the project with the Elliott Team.

The site manager, Len Smith, produced regular newsletters and distributed these locally to keep everyone informed as to progress on site and any forthcoming major deliveries, craneage etc. and was in constant communication with the school regarding deliveries, noise, dust, etc.

A site visit by Arcadis Exeter was arranged and Len Smith, Site Manager and Richard Senior, Contracts Manager, showed them around the site and explained the off-site process and timescale of the project.

Environment – did we do anything specific?

Although a brownfield site, the team are attentive to environmental issues and have good initiatives in place concerning waste, energy and water management.

VISITOR REGISTRATIONS NOW OPEN FOR OFFSITE CONSTRUCTION SHOW 2019

The UK's "Blue Riband" Offsite Construction Event all set for it's 5th year!

Doors open on November 20th, 2019 at [London's ExCeL](#) exhibition centre for edition 5 of this top class offsite construction event.

A very popular feature of the Offsite Construction Show is the Buildoffsite Seminar Theatre and we are pleased to confirm that it will be making an appearance once again in 2019. The programme is yet to be published but for a flavor of what can be expected, follow this [link](#) to see details of the 2018's presentations in the programme of events.



New features introduced last year were the Buildoffsite Masterclasses and Conversation Area and as these proved to be extremely popular, it is planned to bring them back in 2019.

Show director Steven Callaghan, feels that offsite construction (OSC) is now more in the news than at any time since he launched the show in 2015 in collaboration with Buildoffsite.

"People seem to be talking about OSC more than ever, especially in the context of domestic housing", says Steven.

He believes that shortages of supply in the UK housing market, especially affordable housing, have seen OSC advanced as something that could make a major contribution in solving these particular problems, which

has lead to a wider appreciation of the other benefits of OSC, such as improved quality of the finished product.

"Prominent in the media in recent weeks has been well known developers being hauled over the coals for the number of faults in new build homes," Steven continues, "and I believe this is connected to the lack

of skilled labour in the construction industry that has been causing concern for some time".

Many construction companies are finding that current entrants to the workplace are less enthusiastic about working on a windswept building site than their fathers and forefathers - "this is the digital generation" adds Steven, "and they think differently.

Head of Sales, Maddie Maclellan takes up the story.

"The increase in popularity of OSC leads to the requirement for a rapidly developing supply chain and I find that visitors are looking more and more to The Offsite Construction Show to showcase how this has developed over the past few years".

"For a developer, to use OSC over traditional building methods is a big decision and a major factor is the support of a large and diverse supply chain so I stress to potential exhibitors that the show is performing the role of not simply promoting the concept of OSC but also the detail", concludes Maddie.

The organisers feel that another reason for the show's high turnout and excellent visitor quality is its location in London, one of the Worlds most dynamic cities and the home to many spectacular flagship OSC projects.

"London ExCeL is located in the heart of the Docklands and is a truly World class venue," continues Steven Callaghan, "with superb facilities for visitors and nowhere is this more evident than with it's communication links", he stresses.

"Visiting the show could not be easier," adds Maddie, "whether by public transport or by car. "ExCeL has it's own onsite DLR Stations (Docklands Light Railway) and this is the most popular way of travelling to the show - fast and efficient. However, if you do prefer to come by road, the venue has an underground parking garage with

over 3000 spaces."

According to the organisers, this means that the show has easy access to the many thousands of senior construction, design and specifying personnel based in the capital city, as well as both central and local government.

In 2018 the show was attended by over 4,000 people, a record attendance, and a similar number are expected in 2019, with up to 100 exhibitors anticipated to show at the latest event, ranging from specialist

manufacturers of offsite buildings, construction technology and design to product supply chain producers and the 2019 show will feature at least 20% brand new, first time exhibitors.

"The show is THE place in the UK to do offsite business" says Steven and we cater for all aspects of the process - whether your reason for visiting is to learn more about OSC with a view to incorporating it in your future projects or to look to develop your supply chain, the show has something to offer you," he concludes.

[Registrations are now open!](#)



“The show is THE place in the UK to do offsite business and we cater for all aspects of the process – whether your reason for visiting is to learn more about OSC with a view to incorporating it in your future projects or to look to develop your supply chain, the show has something to offer you” Steve Callaghan, Show Director

MEET OUR NEW MEMBERS



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**For more info please contact:
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MAR Off Site are a solution focused Main Contractor with a lean off-site manufacturing facility, heaps of experience and who believe in adding value to our customers. We specialise in delivering Design & Build Homes for the Residential Market, Schools and more recently Restaurants for Bluechip organisations such as KFC. Our collaborative, proactive approach and mindset from inception to completion sets us apart. Building relationships with our partners and customers is our number one priority.

1. Why you joined?

Buildoffsite are leading the way in our industry to not only change perceptions but also promote the off-site industry. They are the recognised voice for off-site and we are proud to be a part of the group. With so much mis-conception around MMC we must all work together, so by working alongside our 'competitors' and other industry leaders and not against each other, we can start to unlock the real value of off-site by collaborating, to make a real difference for not only our generation but the next generation and beyond.

2. What are you looking to achieve in the sector and how can the Buildoffsite network support in that?

The main thing we are looking to achieve is 'Changing Perceptions'. This is a really important goal to achieve but it is an industry responsibility. We are precision engineering homes and schools to help deliver the governments targets. We are not a flat pack, cheap and cheerful solution and we definitely never use shipping containers. Once we start to change perceptions and the market matures we will see a significant increase in customer confidence, all signs we are beginning to see. The early adopters are realising the advantages of Off-site and delivering high quality homes and schools at speed, whilst the on-lookers will see all of this great work and in turn, want to be a part of the revolution that is MMC. When we start to educate we start to change perceptions so by joining the Buildoffsite group we will be able to participate with other members to educate through; Direction Group Meetings; Hosting and attending Discovery Offsite Tours; Participating at Member to Member Events; Host Masterclasses and much more. Having the support of a group enables us to do more with less, again and again.

3. Who do you want to connect with?

like-minded organisations who align with our values. The innovators of today that can see change as an opportunity and begin to work in collaboration. Forming strategic partnerships with developers, local authorities, housing associations and other government departments including engaging with our supply chain to continually innovate and improve our technology, products and techniques. Building relationships is in our DNA and allows us to, continually develop, increase efficiency and stop reinventing the wheel.

4. What can you offer to Buildoffsite's network?

We offer a different way of thinking from a team of experienced and likeminded individuals. Like no other we are a Main Contractor with an Off-Site Factory with an experienced team made up of 50% Off-Site Professionals and 50% ex-top tier Main Contractor professionals who can add real value to Buildoffsite and our customers. We see things differently, our view and vision is not skewed or biased towards just manufacturing or just being a Main Contractor.



W: www.wsp.com

**For more info please contact: Stephen Jackson,
Director**

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WSP is one of the world's leading engineering professional services consulting firms. We are dedicated to our local communities and propelled by international brainpower. We are technical experts and strategic advisors including engineers, technicians, scientists, architects, planners, surveyors and environmental specialists, as well as other design, program and construction management professionals. We design lasting solutions in the Property & Buildings, Transportation & Infrastructure, Environment, Industry, Resources and Power & Energy sectors as well as project delivery and strategic consulting services.

1. Why you joined?

With offsite manufacturing increasingly being used across the board in the built environment, WSP offers insight and experience from both local and global experts and projects. We see the partnership with BuildOffsite as a key opportunity to lend our voice to the growing momentum behind this field and further understand perspectives and challenges across the industry. With the great work BuildOffsite has already done in this space and as they look to grow their influence it's the perfect time to get involved.

2. What are you looking to achieve in the sector and how can the Buildoffsite network support in that?

Our main goal in this sector is help build awareness and education of the myriad of benefits, from environmental to economic, that offsite can bring. We want to challenge ourselves and the industry to rethink the ways that offsite can be implemented, while addressing and solving issues we still must overcome. However, we fully understand that we cannot operate alone, to achieve the above we need to hear from all areas of the industry and understand the challenges at each level of the supply chain - if one cog isn't working, it can halt the whole machine!

3. Who do you want to connect with?

We believe all players in the offsite environment play an important role if true benefits are to be reaped from offsite manufacturing. Hearing from architects on how they are creating beautiful designs with offsite components, methods that contractors are using to streamline production and the ways that the public sector could incentivise adoption of offsite.

4. What can you offer to Buildoffsite's network?

WSP provide bespoke, impartial advice on all methods of offsite and all materials, allowing each project to reap benefits and arrive at the ideal solution. We can draw on hundreds of case studies from around the world, all with different challenges and intricacies. Because of this knowledge and our broad range of sectors we provide advice at every stage of the project lifecycle, from concept to completion. We operate as an open and collaborative business who sees the value in connecting with other forward-thinkers to solve the big issues the UK are facing.

MEET OUR NEW MEMBERS



STRIDE TREGLOWN ARCHITECTURE

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Stride Treglown is an employee-owned architectural practice of over 300 people. The practice was started in 1953 by two architects, Ray Stride and Gerry Treglown. Ray was a stickler for detail, buildability and process, while Gerry was a socially adept, creative powerhouse. Their personalities live on and define who we are today. We're professional. We're creative. We are not driven by ego. Instead, we focus on the needs of our clients and the people that use our projects, creating inspiring, sustainable spaces that genuinely work. We think. We design. We deliver. We create spaces and places that people love to use.

1. Why you joined?

Stride Treglown believe designing for manufacture is key to our future success. The construction industry will gain efficiencies if it integrates the design process with the build process. Ultimately the goal is to achieve a safer, dynamic, more inclusive and diverse environment within the virtual and physical workplaces. We are discovering that offsite projects are accelerating the automation and digitisation of our service. As designers this is freeing our time, allowing us to concentrate our skills on placemaking, design quality, design compliance and future proofing for the carbon crisis. We see Buildoffsite as a vehicle to accelerate this change.

2. What are you looking to achieve in the sector and how can the Buildoffsite network support in that?

We want to influence industry innovation. Stride Treglown has over £1bn of live construction projects at any one time. Every day we see that construction has to find solutions to deal with the diminishing skilled workforce, the segregation of the supply chain and rising build costs. The government's commitment to modern methods of construction is evident in departmental strategies and funding criteria. It's vital the industry comes together to rise to these challenges. Buildoffsite is a platform for us to discover, listen, learn and share ideas and best practices.

3. Who do you want to connect with?

Suppliers and the supply chain to ensure our innovative ideas are deliverable. Clients who need creative designers free from ego. Other architects who want to collaborate and evolve best practice. The costing community to really understand how value outside capital cost can be quantified. Procurement professionals who are seeking more efficient procurement practices.

Communication across experts and disciplines is key to this sector's success. We want to be an integral part of that conversation.

4. What can you offer to Buildoffsite's network?

We are a 300+ strong architectural practice with 9 UK studios. We are not wedded to one construction method. Over the last 15 years we have designed and delivered a variety of projects in all levels of DfMA. Our long standing pedigree comes from the breadth of sector expertise and supplementary services we hold in house. We want to share the highs and lows of designing for manufacture, learn from others and develop new standards of excellence in the industry. We are interested in new co-creation business opportunities.

SHEPPARD ROBSON



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Sheppard Robson is a 360-strong, award-winning practice founded in 1938, with offices in London, Manchester and Glasgow. Our portfolio of major international projects spans architecture, interior design and masterplanning. Our work has been recognised globally for pushing the boundaries of sustainable design, balancing a drive for efficiency and performance with creativity; this approach adds value to the clients, communities and stakeholders we work with.

1. Why you joined?

We believe passionately that the construction industry has to innovate including moving towards modern methods of construction. As architects we can lead the way by showing that design quality can be higher by using offsite methods and deliver better value to clients and building users alike. Being part of Buildoffsite will allow us to share our knowledge and experience of offsite construction to a network of likeminded companies and raise the standards for the offsite sector.

2. What are you looking to achieve in the sector and how can the Buildoffsite network support in that?

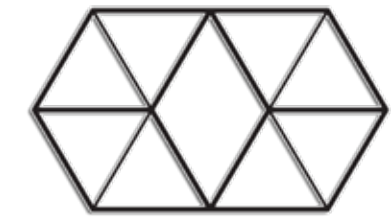
We are looking to contribute to the raising of the design quality and sustainability in the offsite sector. Doing this will hopefully improve the reputation of the industry.

3. Who do you want to connect with?

Developers, contractors, suppliers, technology providers, public sector procurement bodies etc.

4. What can you offer to Buildoffsite's network?

Our experience of designing and constructing buildings using offsite methods. Our time and resources to contribute to design projects within the group. We can also bring clients and other professionals to the group to broaden its membership.



CONSTRUCTION BLOCKCHAIN CONSORTIUM

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CBC is a NFP organisation driven by academic and industry to advance and supports knowledge transfer, arranges commercial and academic presentations, assesses and tests commercial services and technologies, conducts research, and drives policy, regulation, and understanding of the radical consequences of Distributed Ledgers and Blockchain technologies and services. Where required we also develop proprietary technology and services for the consortium members; using both outside contractors, and leveraging academic research projects.

1. Why you joined?

The Construction Blockchain Consortium (CBC) was keen to join Buildoffsite given its leadership in offsite construction and network of likeminded stakeholders keen to accelerate innovations in the sector. The CBC is looking forward to engaging with this membership to promote and develop blockchain technology in the built environment. The CBC is keen to partner with Buildoffsite to expanding both networks and support the development of the construction sector.

2. What are you looking to achieve in the sector and how can the Buildoffsite network support in that?

The CBC exists to alleviate the many challenges the construction sector faces, including fragmentation, high waste output and energy consumption, poor cashflows resulting in bankruptcies, and little accountability. Through the development and adoption of blockchain technologies, we can tackle these challenges such as through automating procurement in construction; ensuring better quality in construction processes and components, creating an accountability chain in the sector; and protecting Intellectual Property. We wish to further our mission through connecting with Buildoffsite members who are interested in joining our undertaking to address industry challenges through DLT and blockchain.

3. Who do you want to connect with?

The CBC is constantly growing our network of [Participants](#), [Members](#) and [Partners](#) with likeminded businesses and organisations looking towards technological solutions for construction sector challenges. We are particularly interested in connecting with anyone using and benefiting from BIM, IoT, Design for Manufacturing, and Supply Chain Management systems to see how DLT and blockchain technology can enhance your operations.

4. What can you offer to Buildoffsite's network?

The CBC can offer state-of-the-art knowledge in blockchain through our [events](#), including seminars, business networks, and our annual conference. Through CBC [Membership](#) and [Partnership](#), there is immediate access to our reports as they are published. We also offer a technology platform which is developing open source software, assessing existing technologies, and enhancing emerging technologies that are already improving the construction ecosystem.

Please [get in touch](#) if you would like to know more.

UPCOMING EVENTS 2019

27
Aug

Digital Hub Meeting

Griffin Court | 15 Long Lane | London | EC1A 9PN

27
Aug

Buildoffsite Summer Drinks Reception

Butchers Hook & Cleaver | 61 W Smithfield | EC1A 9DY

02 - 03
Sep

Direction Group Dinner & Meeting

Autodesk | Small Heath Business Park | Talbot Way | Birmingham | B10 OHJ

10
Sep

DesignOffsite Group Meeting

Griffin Court | 15 Long Lane | London | EC1A 9PN

18
Sep

BOPAS Breakfast Briefing

Lloyd's Register | 71 Fenchurch St. | London | EC3M 4BS

10
Oct

Rail Hub Project visit - Twickenham Station Overbuild

Twickenham Station | London Road | Twickenham | TW1 3SX

22 - 23
Oct

Direction Group Dinner & Meeting

Lucideon | Queen's Rd | Stoke-On-Trent | ST4 7LQ

20 - 21
Nov

Offsite Construction Show 2019

ExCel | Royal Victoria Dock | 1 Western Gateway | London | E16 1XL

18
Dec

Direction Group Meeting followed by Christmas Lunch

Browns | 82-84 St Martin's Ln | Covent Garden | London | WC2N 4AG

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