CIOB
The Chartered Institute of Building

CONSTRUCTION MANAGEMENT

OCTOBER 2023
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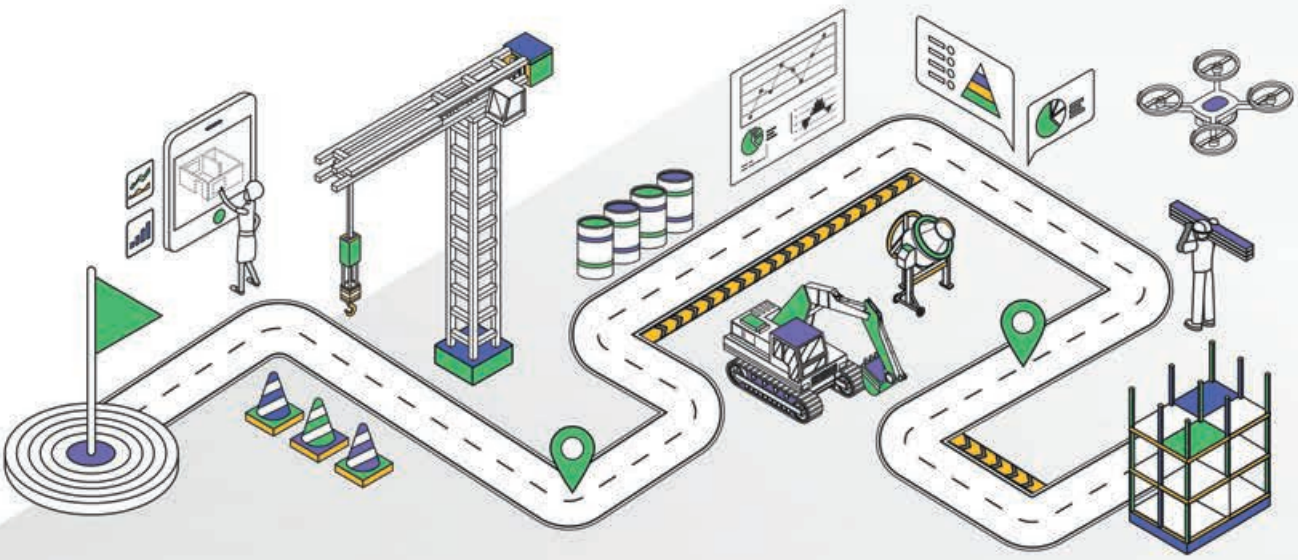
MODERN IN THE CITY

BRITISH LAND'S LYNN SUMMERFIELD ON TRANSFORMING LONDON'S HISTORIC NORTON FOLGATE

RAAC AND AI | ECOFUEL ON HS2 | STRUCTURAL STEEL DESIGN AWARDS

CIOB

Mapping your digital transformation



Autodesk and the Chartered Institute of Building (CIOB) partnered to survey 65 companies from across the built environment to see how companies are embracing digital transformation.

The result? An in-depth insight report that enables you to benchmark yourself against your industry peers and plot your next steps on the road to digital maturity.

Read the report:
www.autode.sk/ciob-insight-report

AUTODESK

10/23

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First lake dredge in a century at Blenheim Palace

Over nine months Land & Water dredged 300,000 cu m of silt from the Queen Pool at the World Heritage Site using several pieces of equipment specifically commissioned for this large restoration project, including three diggers on a floating platform and six hoppers bringing the silt to land.

Greatworth's 'green tunnel'

HS2 is assembling what will be the project's longest tunnel, at Greatworth in Northamptonshire. Unlike a bored tunnel, the shallow 2.7km tunnel is being built using a 'cut and cover' process using more than 5,000 giant concrete segments assembled on site. Once finished, it will be covered by earth, trees and shrubs to blend with the landscape.

Arun Thaneja, technical services and sustainability director at Winvic Construction, spoke at a round table on how digital can help construction decarbonise (see p28-32)

▲ Repairing 18th century Bubwith Bridge

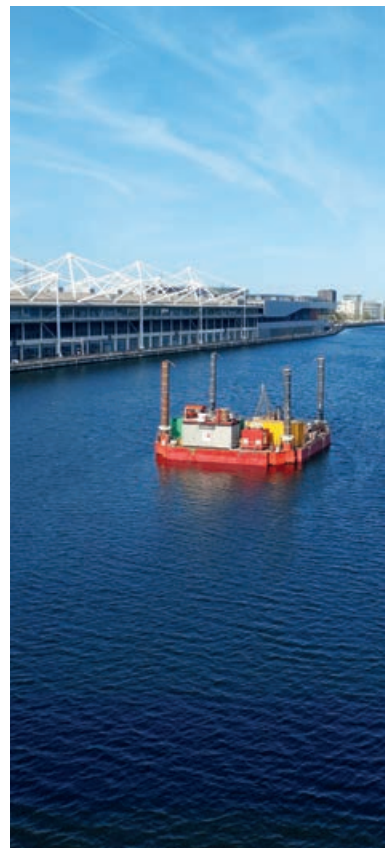
Esh Construction is leading major restoration works of a Grade II-listed bridge across the River Derwent, linking North and East Yorkshire. The structure was hit by a car in September 2022, causing significant damage to the headwall and parapet.

▼ Living seawalls installed in Plymouth

A series of specially designed concrete panels have been installed on the edge of the Plymouth Sound National Marine Park to make new habitats available to a variety of marine flora and fauna. The installation is the largest of its kind in the UK to date.

▼ New cycle track made with lower-carbon asphalt

A section of Everton Park has been turned into Liverpool's first purpose-built facility for children to learn cycling. The project was the first large-scale application trial of Shell's Bitumen CarbonSink, a new bio-component binder which locks carbon into asphalt.



UNIVERSITY OF PLYMOUTH

▲ Investigation work at the Royal Victoria Dock

Geotechnical company Structural Soils carries out an investigation from a barge ahead of the construction of a 305m pedestrian and cycle bridge in London's Docklands. The project involves the team drilling to a depth of 45m to carry out testing of materials.

RAAC problems highlight importance of 'golden thread', CIOB says

Institute working on response to RAAC crisis in collaboration with other industry bodies including CIC and CLC

The current concerns about reinforced aerated autoclaved concrete (RAAC) highlight the need for a 'golden thread' of information about our built assets, CIOB has said.

The institute is working closely with other construction organisations in response to the RAAC crisis, which emerged after nearly 150 schools had to shut buildings in August due to the presence of the material.

Eddie Tuttle, director of policy, research and external affairs at CIOB, said: "CIOB has agreed to respond to the RAAC crisis in collaboration with other industry bodies and we support the recent statement from the Construction Industry Council (CIC) and Construction Leadership Council (CLC) on the need for alignment across the construction industry.

ANDREW MASON

CIOB has joined a panel of technical experts to fully understand the impact of RAAC, to support the government in its response and to develop appropriate guidance
Eddie Tuttle, CIOB

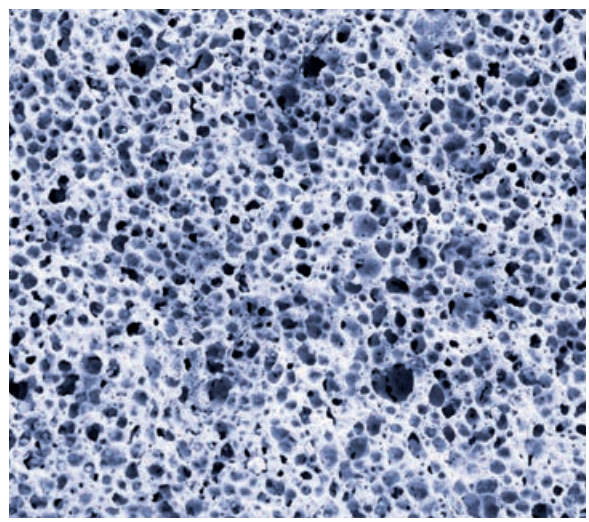
"CIOB has joined a panel of technical experts to fully understand the impact of RAAC, to support the government in its response and to develop appropriate guidance for the wider construction industry as well as impacted building owners.

"We also recognise that the emergence of RAAC showcases the pressing need for the creation and maintenance of the golden thread of information related to fire and structural safety of buildings."

RAAC is an aerated lightweight form of concrete with no coarse aggregate. The material properties and structural behaviour therefore differ significantly from 'traditional' reinforced concrete. Tens of thousands of RAAC structural panels exist across a broad cross-section of buildings, many constructed in the 1950s, 60s and 70s. Many are showing signs of and deterioration.

The government announced in early September that 147 schools had buildings containing RAAC that required mitigation measures, although around 10% of England's schools (1,500) had not returned surveys sent out by the Department for Education.

The Department of Health and Social Care (DHSC) said that the NHS has a mitigation plan in place for hospital buildings with confirmed RAAC and plans to eradicate the material from the NHS estate entirely by 2035. The seven most affected NHS hospitals will be replaced by 2030 through its New Hospital Programme.



▲ RAAC is an aerated concrete with no coarse aggregate

However, the number of trusts and hospitals with confirmed RAAC may increase as structural surveys continue. RAAC is also known to be present in courts, theatres and university buildings.

CIOB has asked any members or other industry professionals concerned by the potential impact of RAAC in their buildings to refer to a Q&A created by *CM* along with Loughborough University CIOB members Chris Gorse and Chris Goodier. It can be found at: www.constructionmanagement.co.uk/reinforced-autoclaved-aerated-concrete-raac

CIOB and BSI to explore making PPE inclusive

#PPEthatfits campaign launched by CIOB earlier this year to highlight inadequate PPE provision

▲ CIOB president Sandi Rhys Jones (top) and BSI's Stephanie Eynon are working on the campaign

CIOB and BSI are to explore options for enabling buyers of PPE to more consistently provide PPE that fits all wearers.

In July, CIOB's new president Sandi Rhys Jones launched the #PPEthatfits campaign, to drive awareness around the lack of inclusive PPE in the market.

Many personal anecdotes indicate that PPE does not take account of gender, religious or ethnic considerations – which Rhys Jones is anxious to address.

"At the Chartered Institute of Building, we are determined to make a difference in this area," she said.

"These are people's issues," Rhys Jones added. "It's particularly important for women, but there are men [who are important to this change] as well. We don't want to be exclusive, we want to be inclusive."

"That's why it is important we examine the standards and guidance for PPE manufacturers and buyers in this vital area, with a view to improving on what is currently available where needed. There are already manufacturers producing inclusive PPE and we want to highlight these suppliers to PPE buyers in construction and other relevant industries."

Stephanie Eynon, head of standards-makers engagement and inclusion at BSI, added: "We are happy that CIOB has invited us to work with them on this campaign. Our experts from relevant organisations have already started to examine the current standards for PPE and how they can play a role in driving progress on this issue. We know the challenge impacts many industries and all around the world, not just in the UK and we have the opportunity to change that, benefiting individuals, organisations and society."

CIOB, in partnership with CM and CIOB People, is using the #PPEthatfits campaign to highlight the issue of inadequate PPE provision across the industry, as well as highlighting positive examples of inclusive and adaptive PPE.

#PPEthatfits

#PPEthatfits directory launched

Buyers can search for manufacturers of inclusive PPE

The #PPEthatfits campaign has launched a dedicated website which includes a global directory for buyers looking to purchase inclusive PPE.

The directory lists companies that currently provide PPE which, in line with the goals of the campaign, "fits the wearer properly, regardless of their gender, culture, religion, size or shape, is safe and compliant with health and safety regulations".

Companies listed include MSA Safety, Leo Workwear and Pulsar.

The directory was compiled by attendees of the #PPEthatfits launch event (covered in *CM*'s July 2023 issue), including CIOB president Sandi Rhys Jones and Katherine Evans, founder of women in construction support network Bold as Brass.

The new website, which also provides general info on the #PPEthatfits campaign and how to get it involved, can be found at: www.ppethatfits.com.

Show your support for #PPEthatfits

We want to hear from *CM* readers about your experiences with PPE – whether it's PPE that doesn't fit properly or innovative manufacturers which are producing inclusive PPE. Get in touch with nadine.buddoo@atompublishing.co.uk or cristina.lago@atompublishing.co.uk. Alternatively, share your stories on social media and support the campaign, using the hashtag #PPEthatfits.

Interested in joining one of the CIOB Advisory Panels? Email: policy@ciob.org.uk

CIOB unveils client champions

Initiative will help clients and construction companies by curating and sharing best-practice resources

CIOB has announced a line-up of 19 client champions who will support the institute's push to raise professional standards across the built environment.

The initiative aims to help less experienced construction clients by curating and sharing best-practice digital resources which will help them achieve improved project outcomes. The work is led by the CIOB client steering group (CSG), chaired by CIOB past president Mike Foy and supported by Linda Stevens, CIOB head of client development.

> **We are delighted to announce the first of our CIOB client champions**
> **Mike Foy, CIOB**

The client champions, who are recognised for delivering excellence in their sectors, will help CIOB create resources that will benefit other clients, construction companies, end-users and society at large.

Stevens said: "We are delighted to announce the first of our CIOB client champions – senior clients and influencers across the industry, and experts in their particular roles – who have agreed to share their knowledge and expertise, to help less experienced clients achieve better ways of working and improved project outcomes.

"The extent of their involvement is down to the individual, but may include participating in client surveys and round tables, contributing to articles and case studies for publication on the CIOB website, and speaking at conferences and events. They will help the CIOB Client Strategy keep up to date with developments and encourage greater collaboration in the industry."

One of the champions, CIOB past president Rebecca Thompson, director of property at St Paul's

Mike Foy OBE MBA FCIOB FCMI
Past president CIOB (2021-22), chair of client steering group

Sandi Rhys Jones OBE FCIOB
Owner, Rhys Jones Consultants, president CIOB

Jennifer Makkreel MCIOB
Member of CIOB client steering group, deputy head of capital projects, University of Oxford

Virginia Borkoski FCIOB AIA RIBA
Former CIOB trustee, member of CIOB client steering group

Jon Enever
Chief client officer, Gleeds, member of CIOB client steering group

Kenneth Kinsella Hon RIBA
Director of capital development, estates division, London School of Economics and Political Science

Ola Obadara BA(Hons) MSc FCIOB MAPM
Property projects group director, city surveyor's department, City of London Corporation

Paul Nash FCIOB
Director, Paul Nash Consultancy, past president CIOB (2016-17)

Sarah Williams BA (Hons) DipArch MA (Cambs)
RIBA client adviser

Paul Morrell OBE
Former chief construction adviser to UK government

Kunle Barker MA
Property expert, writer and broadcaster

Ayo Allu FCIOB MAPM
Director of design, technical and innovation, Clarion Housing

David Haimes MCIOB
Director, David Haimes Consultants

Graham Watts OBE
Chief executive, Construction Industry Council (CIC)

Cathedral, said: "I am very happy to be a CIOB client champion. This comes at a perfect time to support our president Sandi Rhys Jones, who calls for collaboration across construction, education and policymakers. Successful projects are led by people with excellent communication, collaboration and inclusion.

"At CIOB we improve the quality of life for those using and creating our built environment, we set the standards and nurture the experts of the future. Clients are a critical component of every project and are key leaders for positive change in the built environment and society. Bringing the client and CIOB together to share our global expertise and leadership will enhance our built environment and the society we live in."

> **Clients are a critical component of every project and are key leaders for positive change in the built environment and society**
> **Rebecca Thompson, client champion**

Bill Davis CEng MCIBSE
Property directorate, technical standards team, Ministry of Justice

Rebecca Thompson MA BSc (Hons) FCIOB IHBC MQSi (Hon)
Director of property, St Paul's Cathedral

Toby Ward
Head of estates development, Sheffield Hallam University

Jamie Quinn
Sustainability director, Argent (Property Development) Services LLP

Jamie Strathearn MBA MRICS MCIOB
Head of cost, programme, procurement, pre-construction, Marks & Spencer, CIOB trustee

Interview: David Philp, chair of CIOB's innovation panel

CM interviews David Philp FCIOB, chief value officer at Cohesive Group, about the work of CIOB's innovation panel, which he chairs

What's the role of CIOB's innovation panel?
Innovation is crucial to transforming the built environment to meet increasing pressures such as carbon reduction, assurance and productivity.

The CIOB Innovation Panel's mission is both to promote new practices that will support better outcomes and to give insight into the issues that should be focused on at a CIOB policy and public affairs level. We want to ensure that we promote the priority change agenda across the built environment in all corners of the globe from digital, modern methods of construction to change management.

Who is on the panel?
The panel includes CIOB members and co-opted subject matter experts from the institute's global regions. The group brings together industry, academia and data science specialists to give a broad set of capabilities.

The panel was born from the previous CIOB digital and asset management specialist interest group who have produced various reports and guides including digital journey planning and mindful security guidance for those in construction management roles.

What are you working on currently?
We are currently working on a paper scoping the opportunities that advancements in artificial intelligence (AI), data science and machine learning will have on our sector. This paper will help individuals and organisations explore prospects and plan their journeys using data-science based approaches coupled with AI applications.

CIOB sustainability guide published

New guide for built environment professionals focuses on practical tools and strategies

CIOB has launched a sustainability guide for built environment professionals.

The guide covers topics including sustainability development goals, green financing, embodied and operational carbon, biodiversity and social value.

It offers tools and strategies to help readers embrace sustainable practices during the planning, construction and operation of a building to support national and global efforts to reach net zero, while improving the environment for surrounding communities.

Dr Gina Al-Talal FCIOB, head of technical and standards development at CIOB, said: "This is specifically tailored to the construction profession so will be an extremely valuable resource for our members and the wider sector.

"It provides a reference point at every stage of a construction project and emphasises the importance of integrating sustainable practices and the difference this can make to the environment and local communities."

A Guide to Sustainability in the Built Environment will be available from ciobacademy.org/publications from 4 October at £50 (£40 CIOB members).

Caroline Gumble
CIOB

How do we upskill our heritage professionals?

The Building Conservation Certification Scheme offers CIOB members a path to becoming certified conservation specialists, writes **Caroline Gumble**

ENGLISH HERITAGE

▲ English Heritage has started major conservation works on Marble Arch in London

One of the privileges of my role is that I get to undertake occasional site visits to see behind the scenes of some of our unique heritage buildings. I have been lucky to have heritage and conservation experts from among our membership talk me through the specific challenges that can come with a restoration project, especially of a high-profile, nationally important building.

Over the years, CIOB has supported those professionals who work on the conservation of the built environment – about 25% of the UK's building stock qualifies as traditional and most construction professionals will work on historic buildings at some point in their career.

Careers in our sector are constantly evolving, but the need to provide pathways for those who want to specialise remains

Since 2017 we have run a Building Conservation Certification Scheme, in association with English Heritage, the National Trust, Historic Scotland and the Welsh government's historic environment service, Cadw. As with our chartered membership routes, this scheme validates the experience and competence of built environment professionals but with a focus on the skills needed by those who work on historic buildings.

The need to support specialist heritage and conservation skills has been in the news recently with English Heritage launching a programme to "save flint-working from extinction". Highlighting the continuing need to recruit and support heritage and conservation professionals is also very much in keeping with the headlines in our corporate plan, with its theme of modern professionalism and goal of helping to reduce the skills gap, prioritising skills where there is a significant shortage.

Careers in our sector are constantly evolving, but the need to provide pathways for those who want to specialise remains. Built environment professionals who want to develop their careers and seek qualifications to support them in their chosen field can become certified as conservation professionals with CIOB.

There are three levels within our scheme, each with different entry requirements and each leading to a place on a CIOB-managed and verified register. Professionals can progress through the Building Conservation Certification Scheme by providing examples of the depth of their experience and knowledge. To become certified, conservation specialists are also required to show an understanding and proof of their commitment to a holistic approach to sustainability and energy efficiency.

I am pleased to see that there is an acknowledgement from English Heritage and others that we need to pay attention to the skills required for our historic buildings and endangered specialist skills. ●

Caroline Gumble is CEO of CIOB.

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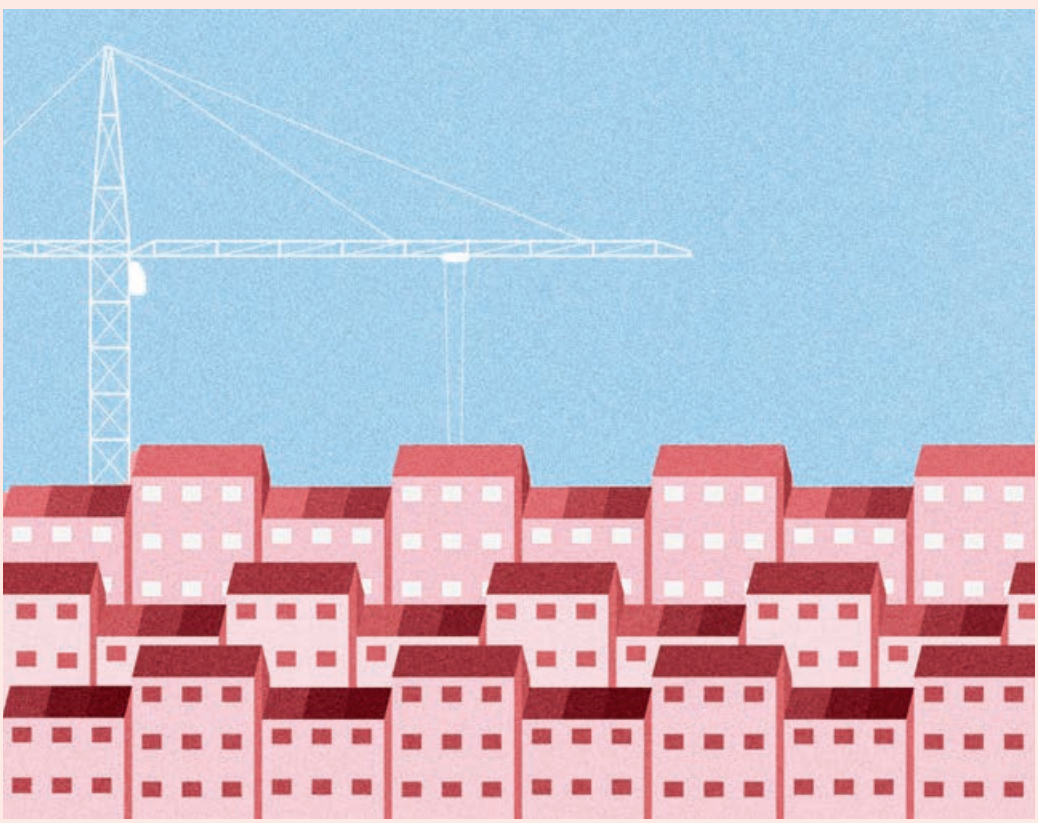
Why UK housing must balance cost pressures with long-term priorities

Despite the financial hardships impacting the industry, homebuilders should avoid rolling back on quality and sustainability, writes **Pablo Cristi Worm**

Since the government's introduction of the Help to Buy equity loan scheme (H2B) in2013, private housing new orders have been on a gradual upward trend.

The loan was brought in to support the recovery of housebuilding following the global financial crisis as well as reverse declining homeownership rates via affordable finance. Economy forecaster Capital Economics estimates that H2B increased the construction of new homes by 10-15%, resulting in 15,000 new builds a year and 135,000 in total.

The end of the scheme in March this year was always likely to impact new builds, but a bigger challenge is the uncertain economic environment. In its efforts to bring inflation under control, the Bank of England has raised interest rates to a 15-year high. As a result, average mortgage rates have increased from 2.0% in Q1 2022 to around 6.0% currently, leading to a decline in mortgage approvals as prospective buyers face affordability difficulties.



A further downside is the continued higher cost of new-build homes compared with existing stock: data from the ONS revealed the average price of a new-build property in April 2023 was £407,265, up 19.3% on the year, compared with £277,679 for existing resold homes.

The market is seeing ups and downs: private housing new orders did rise in Q2 2023 by 3.6%. However, they still remain 11.7% lower than pre-pandemic levels overall. As developers pause or delay ongoing projects, output in private new housing is also down by 3.3% in the quarter.

Following the autumn 2022 mini-Budget, the largest housebuilders reported that the number of reserved new builds actually being sold (ie, net sales) during Q4 2022 halved in the quarter.

This decline is attributed to weak demand, which is expected to persist due to high property prices and limited affordability. However, in 2023, net sales rates are expected to stabilise at a higher level on average per site, though they will still be one-third lower than the exceptionally strong figures of 2022.

Homes fit for the future

In the short term, most developers are in good financial shape due to unprecedented demand over the past few years. However, elevated labour and material costs, as well as high land values, are placing upward pressure on build costs. The knock-on effect of these combined challenges on selling

55

New homes registered in South East England – percentage fall in Q1 2023 compared to Q1 2022

Contractors are becoming more risk-averse, particularly when taking on large-scale housebuilding projects, favouring simpler projects to mitigate cash-flow exposure

prices could deter new supply until confidence returns.

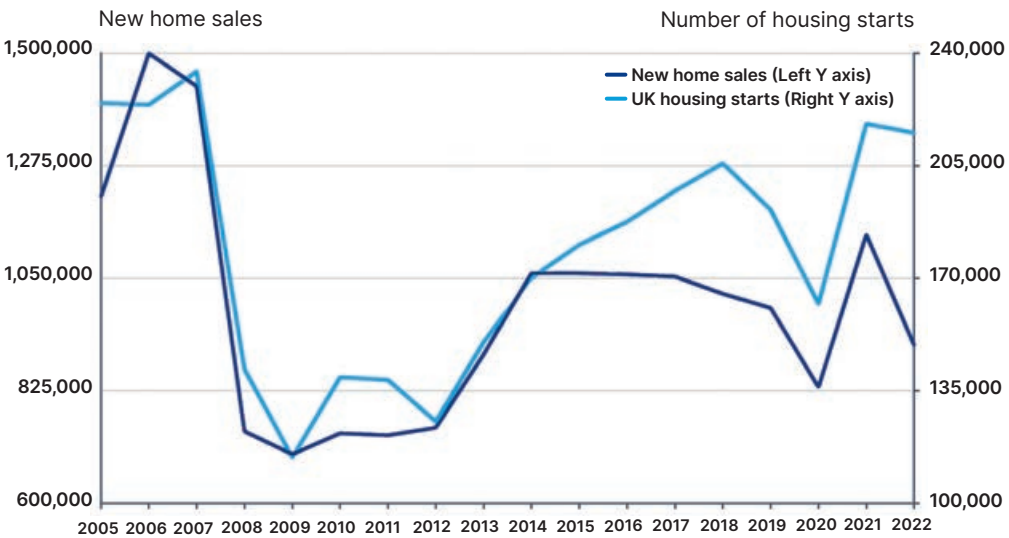
With these inflationary pressures and strains on borrowing, construction insolvencies within the supply chain have surged. Levels are now at the highest on record since inception of the measure in Q1 2010. Against this backdrop, contractors are becoming more risk-averse, particularly when taking on large-scale housebuilding projects, favouring simpler projects to mitigate cash-flow exposure.

Maintaining in-flight schemes must be a priority to deliver on the UK's housing needs amidst a dwindling pipeline of new projects. Doing so comes down to positive supply chain partnerships, but also demonstrating that the homes we are building now are fit for the future.

In the current economic climate, homebuilders need to steer clear of any temptation to trim back on quality and environmental credentials. These matter not only to make sure that the industry hits its commitments when it comes to net zero but also to reassure buyers that their purchase is futureproofed.

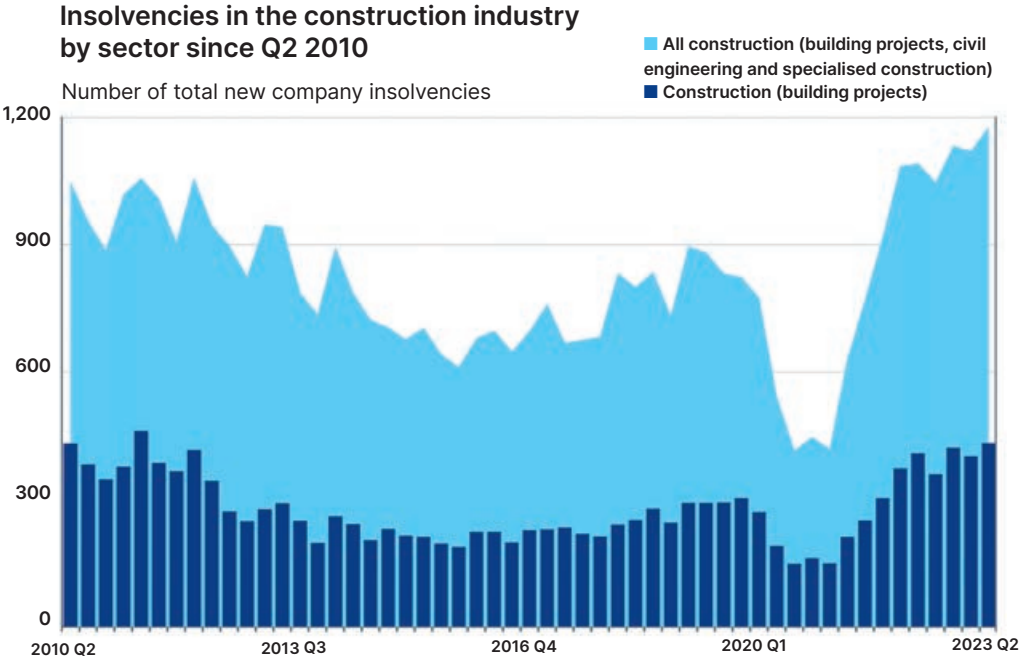
Pablo Cristi Worm is a senior economist at Turner & Townsend.

New homes sales and housing starts



SOURCE: MINISTRY OF HOUSING, COMMUNITIES AND LOCAL GOVERNMENT, DEPARTMENT FOR LEVELLING UP, HOUSING AND COMMUNITIES AND HAVER ANALYTICS

Insolvencies in the construction industry by sector since Q2 2010



SOURCE: INSOLVENCY SERVICE

LOUGHBOROUGH UNIVERSITY

CIOB members build a 'RAACbot'

CIOB members at Loughborough University have been working on an artificial intelligence tool to help solve problems associated with reinforced aerated autoclaved concrete (RAAC). **Will Mann** spoke to them

21st Century Construction podcast
Hear more from the Loughborough University team about their RAAC AI tool on our latest podcast episode:
rss.com/podcasts/21cc

21CC Podcast
21st Century Construction

From left: Chris Goodier, Karen Blay and Chris Gorse of Loughborough University

'Crumbly concrete' has been at the top of the news agenda over the past few weeks.

When the government announced – just before the new autumn term – that nearly 150 school buildings would have to close due to the presence of reinforced aerated autoclaved concrete (RAAC), it started a chain reaction across the built environment, as estate managers dusted off old records to check if the material was in their structures.

But a group of CIOB members at Loughborough University had known about the risks of RAAC for some time, and had already carried out extensive research into the material – also developing a machine learning tool to help mitigate the problems it can cause.

Aerated concrete

RAAC is an aerated lightweight form of concrete with no coarse aggregate, hence its material properties and structural behaviour are different from 'traditional' reinforced concrete. It has been used in the UK since the 1950s, but it is only recently that concerns over its tendency to 'crumble' – usually due to maintenance issues or water ingress – have emerged. A report by the Standing Committee on Structural Safety, issued in May 2019, highlighted a significant risk of failure in RAAC panels.

> **We trained the AI tool to identify cracks, using 85,220 images of concrete, of which 1,800 were RAAC – taken from the estates of the NHS trusts we were working with**
> **Karen Blay, Loughborough University**

"It is essential that those responsible for the management, maintenance or alteration of buildings know whether their buildings contain RAAC," says Chris Goodier MCIOB, professor of construction engineering and materials at Loughborough University.

"If they do not know, they should seek appropriate expert advice. If not properly managed, RAAC structural building components have significant safety implications."

In 2021, the Loughborough team were called in by the NHS to examine RAAC issues in seven hospitals.

"The NHS commissioned us to try and understand how RAAC behaves and look at their survey methodology and how data is captured," explains Dr Karen Blay MCIOB, senior lecturer in digital construction and quantity surveying at Loughborough University.

"Also, co-develop a solution with the maintenance team for predictive maintenance – understanding what the risks are and what they need to do differently."

The Loughborough team looked at how AI could be used to identify RAAC defects – but with very little data out there, the first task was to build up a library of photographs that the machine could 'learn' from.

"Initially we trained the AI tool to identify cracks, using 85,220 images of concrete, of which 1,800 were RAAC – taken from the estates of the NHS trusts we were working with, including timestamps of the pictures," Blay explains.

Identifying cracks

Using that base data, when new RAAC images were scanned by the AI tool, the machine was able to identify cracks in RAAC with an accuracy level of 95.8%, she adds. The machine learning tool was created at Loughborough using the Python-based PyTorch tool.

"What we are now looking to do is integrate use of the tool within the survey processes of the NHS trusts estate teams," Blay says. "Using this machine learning solution, we can generate insights and predict the behaviour of RAAC panels, which will help us make better decisions and put in place 'fail-safes'."

The AI tool could also help with the requirements of the Building Safety Act and the golden thread of information.

Chris Gorse MCIOB, professor of construction engineering and ▶

Nearly 150 school buildings had to close due to the presence of RAAC

150

▲ Queen Elizabeth Hospital King's Lynn, built in 1980, has RAAC present in 79% of its buildings

management at Loughborough University, and chair of the CIOB sustainability panel, says: "AI has been given a lot of bad press. But one of the things that it is able to do is recognise things relatively easily and sort through thousands of sets of data. Here, it has the ability to recognise changes in RAAC panels and that is going to be very useful.

"And this project aligns wells with the Building Safety Act. We know about Dame Judith Hackitt's idea for a golden thread of information. What became apparent with the Grenfell tragedy was that we just haven't got a good enough knowledge of our buildings and the products used to construct them and how they perform."

Looking ahead, Blay says that the Loughborough team is examining how to create a RAAC digital twin. "We are going to have to live with RAAC, so we need to be able to understand the changes that will occur in RAAC panels," she says. "A digital twin will help facilitate that."

> **AI has the ability to recognise changes in RAAC panels and that is going to be very useful**
> **Chris Gorse, Loughborough University**

RAAC estate management Q&A

Advice from the Loughborough University team on how to respond if RAAC is found in your building

Is there a recommended process for identifying if RAAC is present in a building?
The Institute of Structural Engineers (IstructE) has provided guidance on RAAC inspections and surveys and provides some illustrations and photographs that show the aerated nature of RAAC.

Further research is being undertaken and new guidance is also emerging. The main concern with RAAC is its bearing. So it is important that the bearings of the RAAC panels are inspected. The IstructE recommends a bearing of 75mm. If this bearing cannot be assumed through drawings or simple observations, then it is important to physically establish the bearing distance and position of the reinforcement bars. Transverse reinforcement bars must be evident over the bearing.

How can you identify an RAAC panel?
RAAC is lightweight and much more malleable than traditional concrete. A screwdriver or drill will relatively easily penetrate the structure. If, when inspected, a sharp instrument can be pushed into the concrete, then this is likely to be RAAC rather than traditional concrete.

If RAAC is present in a building, what actions are required?
The end bearing must be inspected. If it cannot be determined that a 75mm bearing exists then physical inspection is necessary, probing into the RAAC using a drill or sharp implement to discover the position of the transverse reinforcement and depth of bearing.

If transverse reinforcement is over the bearing and the manufacturer's recommended bearing is achieved (40mm-50mm), then the RAAC would be expected to perform. But if bearing is not sufficient, then end bearing supports should be provided along with other remedial action.

Is there a reason why RAAC is of particular concern, compared to other forms of concrete?
It is RAAC from the 1950s, 60s and 70s that is of main concern, especially if it has not been adequately maintained. RAAC examples have been found with bearings (supports) which aren't big enough, and RAAC with the steel reinforcement in the wrong place, both of which can have structural implications. Prolonged water ingress (not uncommon on old flat roofs) can also lead to deterioration.

The ease with which RAAC can be cut and damaged does render it more prone to abuse during maintenance or operations. You can see RAAC that has been cut through to accommodate services with little consideration for the structure. Reinforcement bars that have been hammered out of position, excessively deflected or distorted beams can be a result of the way RAAC has been loaded, handled and serviced.

RAAC is not an inherently bad material, but some manufacturing and assembly processes have resulted in insufficient bearing and reinforcement over the bearing – inadequate bearing is the main risk.

BCSA

Make sure your Steelwork Contractor is RQSC approved

Image courtesy of William Hare Limited

Specify an approved company from the Register of Qualified Steelwork Contractors for Buildings, to ensure your project meets the Building Safety Act requirements. As of October 3rd 2023 it will become mandatory in the NSSS 7th edition, 1st Revision that all Steelwork Contractors are RQSC approved.

Tel: 020 7839 8566
Email: postroom@bcsa.org.uk
Web: www.bcsa.org.uk/buildings-directory

RQSC

The Register of Qualified Steelwork Contractor **Buildings**

Modern in the City

At Norton Folgate on the edge of the City, British Land is bidding to preserve the past while catering for the appetites of corporate office clients. **Kristina Smith** met the developer's project director Lynn Summerfield

Walking around the site at British Land's Norton Folgate development, which lies between Liverpool Street and Shoreditch in east London, is somewhat disorientating. Led by British Land project director Lynn Summerfield FCIOB, we flit around the six different plots that make up this scheme, through buildings that are old, new, rebuilt or with retained facades.

"Every week I ask to walk around the site with someone different, and everyone has this bounce in their step because I think they know we're doing something special," says Summerfield.

It could just be that the bounce in Summerfield's step is infectious. She is definitely a construction enthusiast, having learned her craft largely with Kier before moving to British Land in 2017, and it's easy to see why this project enthuses her. There is a smorgasbord of different building ages, styles and technologies on this site, compounded by the fact that there are four architects – five, if you count the landscape architect – working on it, employed by British Land to bring a range of characters to the scheme.

Once complete, the development will provide 300,000 sq ft (27,870 sq m) of office space, 30,000 sq ft (2,790 sq m) of retail or food and drink and 15,000 sq ft (1,400 sq m) of public realm. The retained buildings are those that were considered of historic interest, not only those that are listed.

Within the development site, only the cobbles on Fleur de Lis Street are listed but there is local listing of buildings on Folgate and Elder Street. And the whole site sits within the Elder Street Conservation Area with the southern part of the site lying within the boundary of the scheduled ancient monument of the Priory and Hospital of St Mary Spital.

On paper, the additions to the site look somewhat overwhelming: high office blocks towering over the lower heritage buildings. On the ground, it seems to work. The scale feels human, with the new office space cleverly designed and located so as not to dominate. Streets and passages through the area will provide routes for members of the public to wander through and perhaps stop for a coffee.

▶ British Land's Lynn Summerfield: "Everyone knows we're doing something special here"

▼ Restored Victorian warehouses on Blossom Street, which runs through the scheme, with new-build offices and retail behind

Steeped in history

This area of east London, known as the Liberty of Norton Folgate, is steeped in history. Archaeology that took place during the enabling works unearthed a treasure trove of finds from Roman burials to medieval tiles reused in Tudor drains to cesspits.

When British Land applied for planning permission, there was considerable opposition to this ▶

▼ The chimneys of the washhouse on Blossom Street were propped, retained and restored as part of the project

scheme, led by the Spitalfields Trust which was set up to protect historic buildings in the area. A protest in 2015 saw some 500 people joining hands around the area. Tower Hamlets Council rejected the scheme, but was overruled by the then mayor of London, one Boris Johnson.

In response to consultation with local people and the Spitalfields Trust, the mayor of London required British Land to preserve more buildings than it had initially intended, says Summerfield. Most of the Victorian warehouses on Blossom Street, which runs through the centre of the scheme, were in poor repair before the project began, with some used occasionally for events. The oldest of these, built in 1887, is in the best condition and has been retained in its entirety – others in part or only the facades.

Short rows of existing buildings, predominantly Victorian with just one Georgian building, have been retained on roads bounding the scheme: Shoreditch High Street, Folgate Street and Elder Street. The Georgian building was in worse condition than anticipated. "We wanted to keep it, but we found that the front facade was not connected to the dividing walls, so we ended up having to carefully take it down and rebuild it using the original materials," explains Summerfield. A rather less visually pleasing 1970s office building, known as Loom Court, is also being updated. Originally earmarked for 40 residential units, this will now be an office.

Norton Folgate

Client: British Land

Project cost: £225m

Form of contract: JCT MPCC 2016

Start date (main works): January 2021

Completion: December 2023

Main contractor: Skanska

Project manager: M3 Consulting

Cost consultant: Alinea

Architects: AHMM, Stanton Williams, Morris+Company, DSDHA

Structural and civil engineer: AKT II

MEP engineer: Arup

Trade contractors

Concrete frame: AJ Morrisroe

Structural steelwork: Kilnbridge Construction Services

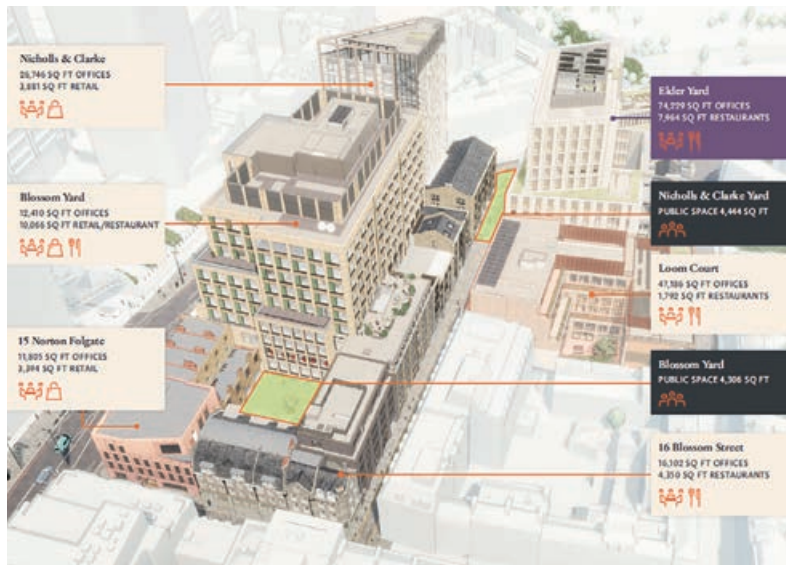
Glazing, cladding and roofing: Prater

Precast facade: Thorp Precast Concrete

Brickwork: Lyons and Annoot

Unitised cladding: Lindner Prater

Facade restoration: Paye Stonework & Restoration



Skanska selected

Although Kier had initially been tipped to take the main works contract, following on from Cantillon which had an enabling works contract that included demolition and facade retention, British Land awarded it to Skanska in 2020, starting on site in 2021. There was speculation that this was due to Kier's financial woes at the time.

In selecting a contractor, British Land was looking for a company with the right track record and competence and the right values, says Summerfield. The core values of the scheme are her values, she says: being open and honest, having difficult conversations early and doing what's right for the project, not what's easy. The project team, including a project charter group made up from the client, contractor and some consultants, adopted those values.

One of the challenges for a project with so many elements – and hence so many consultants and contractors – is communication. To counter this issue, the team set up a system of half-hour updates for everyone: big information dumps over Teams to make sure everyone is up to date. "It's one-directional but then the team can ask questions. We use an app so questions can be anonymous, which encourages people to ask them," says Summerfield.

This is really several projects rolled into one, running concurrently and on top of each other. And each of the six plots has a section of retained building and a new build. "We are working across five or six

225

The cost of the entire Norton Folgate project was £225m

plots all at the same time, all with their own rhythms and details," says Skanska project director Graham Mercer. "The whole coordination piece was the biggest challenge."

Skanska removed some onsite activity by replacing the significant amounts of hand-laid bricks required with precast panels. British Land had considered this approach, says Summerfield, but calculated that too much space would be lost and too much weight added. The solution was ultra-high-performance concrete (UHPC) from Thorp Precast Concrete, which meant the panels could be slimmer.

As well as a 12-week time saving, using precast added other value too, says Mercer. Scaffold wasn't needed, there were fewer people on site and fewer health and safety risks, as well as fewer vehicle movements in a congested and restricted area and assured quality. "In pounds per square metre terms it is more expensive but holistically it is cheaper," says Mercer.

That's not to say that there are no bricklayers on site. There's plenty for them to do, restoring, enhancing and adding to existing brickwork. One of Summerfield's favourite details is a brick wall, rebuilt using engineering bricks faced with a brick slip cut from the existing bricks because the original bricks alone could not have taken the weight. Elsewhere beautiful old washhouse chimney breasts have been retained, propped up while the structure below them was demolished. An internal light yard in Blossom Yard is clad in a mixture of old and new white glazed bricks.

The Georgian building's front facade was not connected to the dividing walls, so we ended up having to carefully take it down and rebuild it using the original materials
Lynn Summerfield, British Land

Aside from juggling restored and new-build structures, this ▶

◀ Plan of the Norton Folgate site

▼ Facade propping at Elder Yard

▼ Lynn Summerfield at the nearly completed Norton Folgate, with the Blossom Street warehouses and Elder Yard offices in the backdrop

project has thrown up some interesting issues related to building regulations and building services. For instance, fireproofing between floors of existing buildings has been a painstaking job. Airtightness standards for the old parts have sometimes been tricky to meet.

"There is a campus approach to the design of the building services for the scheme, designed by Arup," explains Mercer. Basements have been created under two of the new buildings at Blossom Yard and Elder Yard to accommodate plant. Blossom Yard's basement runs under Fleur de Lis Passage, requiring extensive propping and the reinstatement of the original paving after it was complete.

"This is far more challenging from an M&E perspective than a single new-build development," says Mercer. The different layouts, technical requirements and lighting designs mean that there are many more products on the building services schedules.

Tomorrow's occupants

One of the concerns from opposers to the Norton Folgate scheme was that this was yet another corporate development that would drive out small companies from the area.

British Land says that the variety of spaces mean that spaces could go to big or small firms – or both. And in the triangular corner of the Nicholls and Clarke building, once a sanitaryware firm, it will carry out a category B fit out and make the space available for shorter-term lets.

That said, the first big tenant signing has gone to law firm Reed Smith for one-third of the scheme's total space, the majority of the 126,800 sq ft (11,780 sq m) Blossom Yard & Studios. Though some may complain that Norton Folgate's latest rebirth has changed its character, it is the retention of character that makes it attractive. Companies which are vying for talent and looking for ways to attract staff into the office are looking for something more from their future working spaces.

> **There is a campus approach to the design of the building services for the scheme, designed by Arup**
> Graham Mercer, Skanska

CV: Lynn Summerfield FCIOB

Lynn Summerfield FCIOB credits her father with her choice of career. "He was a head teacher and he brought me and my sister up to believe we could do anything we wanted to do. I wanted to do something practical but academic and I spent all my time as a kid working on the house with my dad."

After studying a building, management and technology degree at the University of Liverpool, Summerfield started work for Kier in 1999. Apart from a brief spell with BAM, she stayed with Kier until 2017, when she moved to British Land. She had acquired a taste for developing when, returning from parental leave, she was seconded to Argent LLP.

Aside from Norton Folgate, Summerfield's most memorable project to date was the Sainsbury Laboratory for the University of Cambridge, which was built in the Botanic Gardens and went on to win the Stirling Prize for architecture. "That's the project where I learned most about how to create a team that functions very well," she says. "I learned a lot from the client and from the professional team there."

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Deborah Graham-Wilson
Eland Cables

How to specify sustainable electrical cables

Deborah Graham-Wilson explains how contractors can procure cables while keeping their carbon footprints low

With modern construction focused on sustainability and energy efficiency, electrical cables are as fundamental as bricks and mortar. It's more than just bringing power into a building – it's about creating smart, efficient buildings, increasingly powered by renewable energy and battery storage systems. The challenge is that there's no common language for how we talk about sustainability – it can be different depending on where in the build process we are.

Considering embodied carbon

Global cable standards state that virgin materials must be used for cable manufacturing, so we are still reliant on mining for these scarce resources. We can't pull out a cable that's been under load for 20 years, recycle the materials and make new cables from it, so we're faced with the extraction and processing, followed by the cable manufacturing, combining to create the bulk of the embodied carbon. What it does mean is that sustainable procurement and operations are influenced by a combination of smaller variables, with the consultants and contractors in the driving seat.

Sustainability is now a key driver in design and procurement, so having to return to site for unplanned maintenance, or to replace a cable that prematurely fails, increases the carbon footprint as well as financial and labour costs

Specification

Sustainability is now a key driver in design and procurement, so having to return to site for unplanned maintenance, or to replace a cable that prematurely fails, increases the carbon footprint as well as financial and labour costs. It's about selecting cable infrastructure that will last the course.

If you balance the performance demands, the installation design and environmental challenges, plus it meets the standards and regulatory compliance – and that should be verified through laboratory or quality assurance testing – the result is efficient operations, with less strain on the system, pulling less energy from the grid. Longevity follows as a result.

Safety is another consideration. The Health & Safety Executive (HSE) suggested back in 2015 that around 5% of cables in the marketplace were sub-standard or non-compliant. It's still an issue and complacency risks operations. Even now, there are still incidents making the headlines on large-scale, high-profile power projects.

Supply chain

Your supply chain is reflected in your SECR (Streamlined Energy and Carbon Reporting) Scope 3 emissions reporting – so, on top of needing to assure quality and compliance, they should be taking steps to reduce their carbon emissions and aiming for net zero.

International standards and frameworks are a helpful pointer – ISO 14001 Environmental Management is one many people hold, but others are ISO 50001 Energy Management, ISO 14064-1 Carbon Footprint Verification. You could also ask if they have signed up to the Science Based Targets initiative, the UN Global Compact Sustainable Development Goals and whether they are rated on platforms like EcoVadis.

Other sustainability wins include a delivery fleet that uses EVs or HGVs run on HVO not diesel. 'Cut-to-length' cables save time on onsite installation – less plant equipment and fewer manhours is another sustainability goal. You also want the post-supply service to be proactive, offering cable drum collections and ensuring packaging is recycled and recyclable, plus cable recycling services for your waste and legacy cables.

Deborah Graham-Wilson is head of ESG at Eland Cables.

Building with bamboo

Hong Kong-based CIOB student member **Tony Or** has been working on the design of a living complex for the elderly built almost entirely of bamboo, supported by the institute's Construction Innovation Scholarship

Many countries in Asia and the Pacific region face an incoming 'silver tide' in the form of an ageing population. The Asian Development Bank predicts that the number of people over the age of 60 in the region will triple between 2010 and 2050, reaching close to 1.3 billion people.

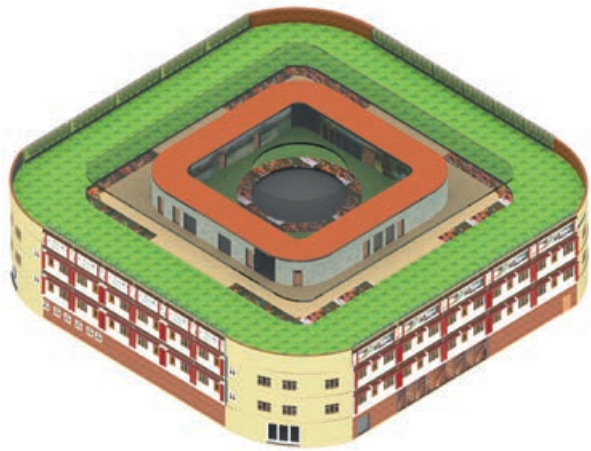
In Japan, it's estimated that about a third of citizens will be elderly by 2035. In many cities, waiting lists for elderly public housing are growing.

We believe that a thoughtful approach should be taken to address the housing needs of these distinguished generations.

They deserve homes that are pleasant and accessible. Equally, the homes we build should be economical and climate-friendly. We owe it to all species and generations to avoid creating yet more carbon-spewing concrete forests.

For these reasons, we conceived and designed a three-storey apartment block made almost entirely of engineered bamboo. Our project was made possible by CIOB through its Construction Innovation Scholarship, which sponsors research to improve quality of life.

We were supported by the Department of Architecture and Civil Engineering at City University of Hong Kong. We are recent graduates of the university, representing the disciplines of surveying, building services engineering and structural engineering.



Compared to conventional concrete construction, we calculated that a non-modular bamboo building would take half the time to build and save at least 30% of the construction cost

Why bamboo?

Bamboo is a promising green structural substitute. Manufacturers can make elements including slabs, walls, beams, columns and roofs through a process of sterilizing, steaming, compression and laminating.

Engineered bamboo is composed of multiple layers of different thicknesses and grains to produce excellent strength and durability. It is versatile, lending itself to any number of configurations.

Its climate credentials are very good. This hardy plant absorbs carbon dioxide all through its journey to maturity, and the energy needed to make engineered bamboo is far less than that needed to make concrete. Similarly, the emissions created by making it are smaller.

Unlike concrete, bamboo requires no destructive mining for aggregate. It is widely available, with many species common across Asia, Africa, Central and South America. It grows quickly and crop-yield is high compared to timber.

What we did

We began with a literature review before moving on to design and calculation. We created digital and physical models for the architecture and structure. We tested the physical and mechanical properties of engineered bamboo elements to prove its suitability for residential structures.

Faster and cheaper

Our theoretical bamboo development was designed for a site in Yuen Long, New Territories, Hong Kong.

It consists of five, three-storey apartment blocks, each 8,100 sq m in construction floor area and containing 44 one- and two-bedroom apartments on the first and second floors. On the ground floors are social, dining and reception areas. Roofs are used for building services and gardens.

We designed the blocks to be built in a modular fashion, specifying prefabricated elements for faster construction. We used products from Bamboo International Limited for our physical models and for testing.

Compared to conventional concrete construction, we calculated that a non-modular bamboo building would take half the time to build and would save at least 30% of the construction cost. These savings are explained by avoiding concreting and formwork and the relative cheapness of bamboo.

If we use a modular approach with extensive prefabrication, the time and savings get even better: 30% less time compared to the non-modular scenario above and 10% less cost.

▲ Model of the three-storey bamboo block

▼ The team conduct a bamboo compression test

A more sustainable future

We believe at least one-sixth of older people in modern cities could be living in bamboo flats by the 2050s.

The challenge is to get government approval to build in this way. More research will help prove its suitableness, so local authorities could help by approving pilot projects. With government support, developers will be more willing to adopt this method and we could harness their commercial power.

It was an honour to receive this international scholarship for a large research project. We're grateful to the Department of Architecture and Civil Engineering at City University of Hong Kong for supporting the modelling and testing. ●

Our team was Tony Or, Yik-ming Cheung (Ming), Crystal Zhao and David Ng. We thank our supervisors, Professor CW Lim and Dr Ivan Fung, and our CIOB contract manager Hassana Ahmed, senior qualifications liaison manager.

‘Digital is key to cutting construction carbon’

If the construction supply chain is to decarbonise, it must embrace digital technology. That was the verdict of an expert panel from contractors, suppliers and academia, brought together by CM editor **Will Mann**

PHOTOGRAPHS: JULIE KIM

In association with HILTI

Sustainable construction sounds complicated, but at its basic level it just makes good business sense
Michael Cross, Willmott Dixon

Will Mann: What are the biggest challenges in reducing carbon emissions in the construction supply chain?

Michael Cross: The fragmented and occasionally adversarial nature of the supply chain doesn't help with creating a sense of collaboration, which could help begin to address some of the environmental issues our industry must deal with.

There needs to be more innovation in terms of the materials we use to build with, but innovation can in turn be limited by clients being cost conscious and risk averse, especially around things like fire safety, where strict controls have understandably been introduced in the wake of events such as Grenfell.

Properly understanding the issues around sustainability is important. Sustainable construction sounds complicated, but at its basic level it just makes good business sense.

Carol Williams: There can be unintended consequences when we adopt sustainable solutions without fully understanding what it will entail or what it leads to. For example, some people are switching back to fossil fuels because they aren't getting what they expected from their investment in electrically powered equipment.

We need better data around how we can be more sustainable. And we need to research and invest in 'whole life' materials and products to help us deliver better outcomes. Yes, solar panels are good, but what happens to them at the end of their useful lives? If they are not reused in some way then there is the risk of creating a waste problem.

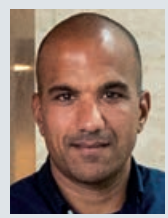
◀ Clockwise from left: Carol Williams; Cristina Lago; Arun Thaneja; Chris Gorse; Thibaud Lefebvre; Michael Cross

Arun Thaneja: Many engineers and architects in the industrial sector have done things the same ways for years and are reluctant to try new methods and use new materials because this may mean a project takes longer to deliver. This attitude needs to change.

Regarding the supply chain, we've worked with partners and helped them set baselines where they measure their efficiencies and carbon reduction targets. There will always be challenges, including cash flow, but everyone has got to want this for it to work.

Chris Gorse: As an industry we work to tight deadlines and budgets, and we normally deliver quality buildings. We're extremely skilled at delivering complex projects against all the odds. But we do have an issue around some of the information on products, services and what goes into certain materials.

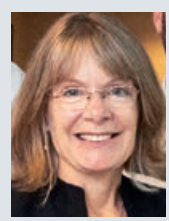
We used to lead the way in terms of product development and testing, but we've forgotten some of the fundamental properties that we want in our buildings. Better data, along with better communication, can help us understand the properties of various materials ▶



Arun Thaneja
Technical services and sustainability director, Winvic Construction

Michael Cross
National head of sustainability, Willmott Dixon

Thibaud Lefebvre
Vice president, Hilti (Great Britain)



Carol Williams
Head of procurement, Laing O'Rourke

Chris Gorse
Head of CIOB Sustainability Panel and professor of construction engineering and management, Loughborough University

Chair: Will Mann
Editor, Construction Management magazine

Cristina Lago
Deputy editor, Construction Management magazine

AI can help with design, analysing what is required, breaking it down to make it easier to fabricate off site in a modular, standardised way
Carol Williams, Laing O'Rourke

and help us make better decisions. There are good systems out there, but we need to work with bigger institutions, bigger product suppliers, to get that specialised information to those that need it.

Thibaud Lefebvre: There is a marked lack of knowledge and education around how sustainability can work in the construction sector. As people have said, how do we assess where we are if we don't have the data we need to make informed decisions about sustainability?

Along with better information, we also need more unified standards and frameworks, and better collaboration among various stakeholders. People look at the upfront cost of a material, but less so at the whole life of the product which those materials make. We need to look at that too.

WM: What changes in working practices and innovations do you think will do most to reduce carbon emissions?

MC: Two things will help. Greater use of modern methods of construction (MMC), helping to improve the way we deliver materials and put them together on site. And secondly, applying digital platform design solutions to more projects.

Carol Williams: "We have to work with government"

It's a massive opportunity for some clients, particularly those delivering projects in education or healthcare, where a standardised approach makes sense in terms of carbon reduction and reduced costs.

It also allows for faster design, faster delivery, and makes your material use much more efficient, so that you're not using more than you need, or spending valuable resources on stuff that is unnecessary.

CW: I agree. Take a hospital. We see a lot of bespoke design when what is needed are common facilities, eg operating theatres, wards. Standardising some elements, like these, will help enormously in terms of carbon reduction goals.

Meanwhile AI can help with design, analysing what is required, breaking it down to make it easier to fabricate off site in a modular, standardised way. Systems thinking is needed around the provenance of products and product data as standardisation becomes more widely used.

Public expenditure will make a lot of difference to how this progresses, which is why we have to work with government to enable the industry to invest.

AT: Transporting material to site is another issue which can be addressed. We've acquired bigger articulated trailers that can carry more steel and therefore cut down the number of deliveries that are necessary. We're also addressing waste and how we can reduce this.

But these remedies can impact the bottom line, so we need to assess what works best to start with and work from there.

We're also linking BIM to carbon calculators, so we're automatically plugging carbon factors into the BIM model. This can be useful when, as often happens, a client changes their mind about something. The use of digital technology is going to be a key factor in helping us reduce carbon.

CG: Standardisation, MMC and prefabrication play an important role for those wanting both repeatable and bespoke structures. But the circular economy argument falls off a cliff if you can't return a product to the supplier for reuse. If you can argue the case for that, and commercialise that process, you've got a powerful argument for the circular economy.

Also, we shouldn't fear technologies like AI. Yes, the data needs to be spot on, but we've got the skills to assess whether a particular design will work, what materials will or won't be suitable and how we assemble them to make the project work. As an industry we're dealing with some pretty complex problems. We might not be moving as quickly as some clients would like, but we're getting there.

TL: It's clear that embracing digital ways of working is a no-brainer. Also, doing more with less. The principles of circularity should be integrated into every aspect of a project, where possible.

The electrification of job sites also needs to go further. We want to not only reduce CO_2 emitted during the production of our tools, but look at how we reduce the CO_2 emissions of the tools during their lifetime.

If you can combine sustainability with safety and productivity, and keep costs down, then people will buy into that. It's challenging, but we are on the right track.

WM: Focusing on digital, what tools can help with decarbonisation at all stages of the project process?

MC: Implementing digital platforms, integrating them with one's supply chain, which can in turn lead to a project being delivered more quickly than traditional methods.

We should also be looking at how other industries, such as automotive, have taken technologies on board and adopted them. Then there's reuse. As an industry we should be much better at identifying materials that have been used and look at how they can be used elsewhere, in other projects, when the structure where they were originally installed is being torn down.

CG: As has been said, looking at how other sectors use technology can be enormously helpful. We need to move closer to the example of aerospace, especially when maintaining the operability and condition of products.

In the aerospace sector, engineers would work on different iterations of a design, and learn about what worked and what didn't as it progressed. In construction, where projects last a lot longer, that opportunity to learn as much as our colleagues in aerospace isn't there.

Then there's data. The Building Safety Act requires the storage and updating of a baseline of data, but I'm not sure how that will play out. In construction there have been too many ways to get around putting in the correct solution.

CW: When the construction sector delivers a hospital or a school, or rail infrastructure or a nuclear power station, we follow an architectural process. But when it comes to operations and data and technology enablers, things are less clear. Where is the design to optimise the use of materials? How can we optimise our use of plant machinery so ▶

> **We're linking BIM to carbon calculators, so we're automatically plugging carbon factors into the BIM model**
> **Arun Thaneja, Winvic Construction"**

▼ Arun Thaneja: "Digital technology will be a key factor"

▲ Thibaud Lefebvre: "It comes down to data-gathering"

▼ The panel agree on the importance of using digital to reducing carbon

that we don't have more than we need at any one time?

We ask ourselves: "What is the technological architecture that this industry needs?", but in practice it's different stakeholders using different apps. If we create a technology strategy across the industry, and if we were able to better collaborate with the supply chain in that space, it would make a massive difference to both productivity and reducing our environmental impact.

AT: You can't consider the circular economy without the availability of appropriate data. A supplier could say they have a sustainable product, but can they prove that when we try and track that product back through the years? Have you recorded lifecycle assessments?

I can order a robot that on paper claims to be the most efficient, sustainable piece of equipment, but if there's no data to back that up, you've got nothing.

One of the biggest issues we're seeing right now is around the validity of data for carbon assessments, so anything that can improve our data collection and analysis can only be a good thing.

TL: There is a lack of awareness around how to make sustainable decisions. And part of that is due to the lack of available data. As I mentioned earlier: how do we know where we're at if we don't have access to reliable, actionable information to hand? It comes down to the sort of technology and data-gathering techniques being used, and these need to be more robust.

CG: When it comes digital platforms, our customers still struggle. One of the main issues is the lack of an integrated solution. If different software platforms don't or can't speak to each other there will be a duplication of effort. It's better than nothing, but it's inefficient. When it comes to materials,

There is a lack of awareness around sustainable decisions. And part of that is due to the lack of available data. How do we know where we're at if we don't have reliable information to hand?
Thibaud Lefebvre, Hilti

such as combustible products, and what we can use and where, BIM comes into its own.

We have to take a lead on working out which products and services work and why they don't. And if we get the building design right, get the right construction processes in place, partner with asset managers or digital platform people, we can get into predictive maintenance and controls where we take some responsibility from facility managers and building operators – then we'll be better positioned to benefit from the front-end investment.

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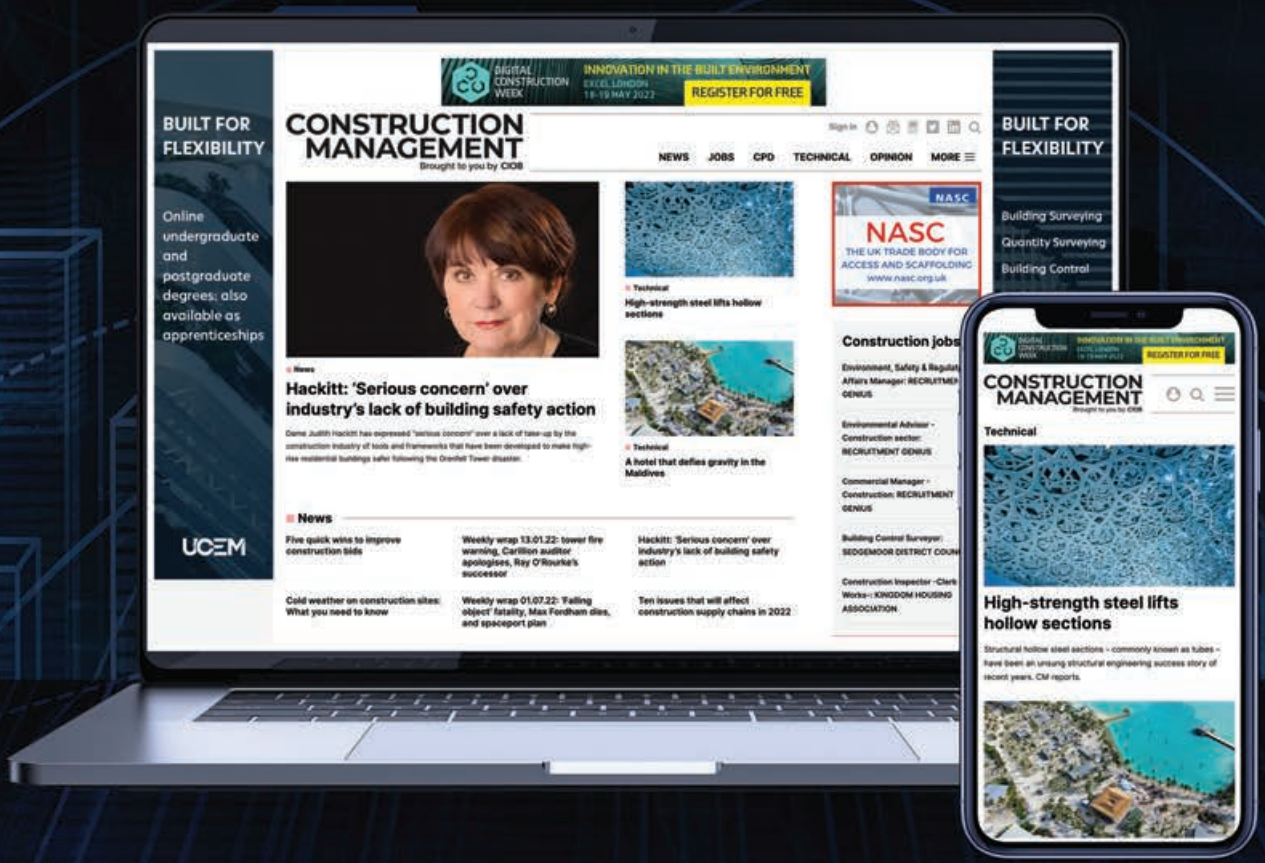

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PHOTO: HUFTON+CROW

Structural Steel Design Awards 2023

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Introduction

Celebrating their 55th year in 2023, the Structural Steel Design Awards continue to shine a light on examples of innovation and excellence in modern steel construction

Jointly sponsored by the British Constructional Steelwork Association (BCSA) and Steel for Life and celebrating their 55th year, the 2023 Structural Steel Design Awards (SSDA) have once again highlighted and rewarded many of the best examples of excellence, ambition and innovation in our built environment.

The entries this year reflect the wide geographical spread of steel's appeal for a variety of projects, which include prestigious mixed-use schemes, office buildings, entertainment venues and beautifully designed footbridges.

The judges were particularly interested in projects that reflected a reuse of existing structures and showed a commitment to lessening a project's embodied carbon.

Twenty-one projects made the shortlist, from which the judges presented five awards, six commendations and three merits.

The SSDA's cross-industry judging panel includes: chairman Professor Roger Plank and Sarah Pellereau representing the Institution of Structural Engineers; Chris Nash, Bill Taylor and Oliver Tyler representing the Royal Institute of British Architects; Richard Barrett representing the steelwork contracting industry; Paul Hulme and Emily McDonald representing the Institution of Civil Engineers.

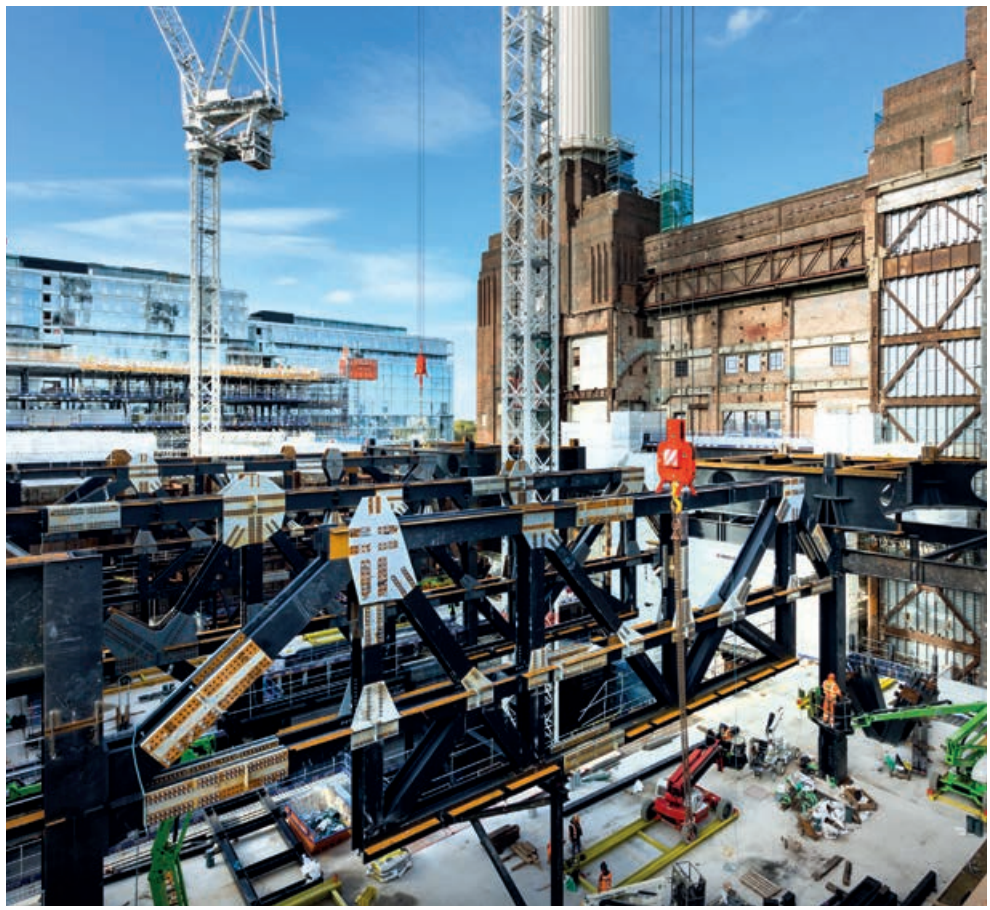


PHOTO: WILLIAM HARE

London icon reborn

Structural steelwork has been extensively used to transform Battersea Power Station into a multi-use destination that sits in the middle of a large swathe of regenerated land on the capital's south bank

Completed in two phases either side of the Second World War, Battersea Power Station has been one of the capital's iconic landmarks for decades. Its four chimneys are instantly recognisable to millions of people.

Before being decommissioned in 1983, the Grade II*-listed power station once supplied around one-fifth of London's electricity needs, consuming more than one million tonnes of coal annually.

Having stood derelict for many years and after a number of failed attempts to redevelop the site, the landmark structure has now been transformed into a huge mixed-use scheme, which is served by the

▲ Steel trusses are positioned within the former power station

Award: Battersea Power Station, London
Architect: WilkinsonEyre
Structural engineer: Buro Happold
Principal structural steelwork contractor: William Hare
Architectural structural steelwork contractor: CMF Ltd
Main contractor: Mace
Client: Battersea Power Station Development Company

Northern Line underground extension and sits at the heart of 17ha of regenerated former brownfield land.

The construction programme included rebuilding the four iconic chimneys and the retention of the building's exterior. Inside the structure, new steelwork, sitting alongside more retained elements, forms space for 252 apartments, restaurants, shops, cinemas, six floors of office space and an entertainment venue capable of accommodating 2,000 people.

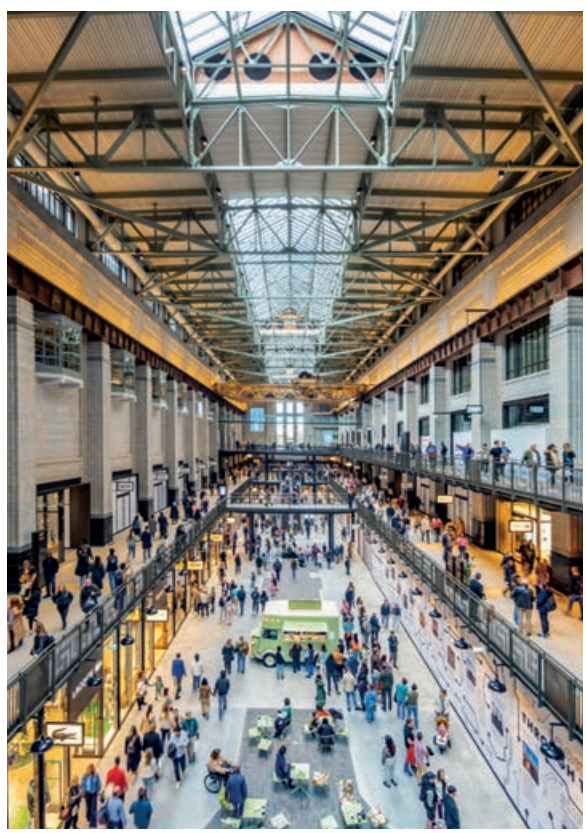
The building can be divided up into a number of elements, including a central boiler house, turbine halls, a switch room and annexes on both sides – east and west. Each element is separated from the adjoining areas by internal walls, largely retained from the original building.

Erecting new steel-framed elements was not a straightforward procedure. The entire programme had to be coordinated around a vast array of temporary works and bracings that were installed to support the existing structure after a partial demolition programme had been completed.

Within the boiler house there are five different elements, including car park, retail, public/event spaces, offices and residential apartments – all stacked vertically on top of one another. Each required a different column grid pattern and, through frame optimisation and organisation of spaces, these stacked usages were achieved with only two structurally super-efficient transfer levels, one of which doubles as a plantroom.

In the historic turbine halls, a new structure was introduced behind the retained heritage fabric, allowing features such as the new retail gallery decks to be introduced.

Pinpoint accuracy was required to introduce columns set 75mm away from the existing structure that support new cantilevering turbine hall walkways and a new 13-storey building infill inside the adjacent boiler house.



▼ Cantilevered interior walkways were installed in the turbine halls

PHOTO: JOHN STURROCK

From robust steel tree columns supporting heavy loads to intricate tensile restraint frames and footbridges, every element exudes an elegant touch showcasing a harmonious blend of design and functionality
SSDA judges

To facilitate this proximity without compromising existing foundations, buried concrete-encased 24 tonne steel beams cantilever over new piles to support the new columns.

At the northern end of the boiler house, framing the entrance to the main retail zone and events space, is a large 27m-long x 2.6m-deep plated girder weighing a massive 62 tonnes, which is positioned at the underside of the fifth floor. As well as helping to create the large open space below, it also transfers a load in excess of 2,000 tonnes down the building, while supporting eight floors above.

The beam – one of the largest single pieces of steel manufactured in the UK in recent times – was brought to site in one section.

Working in conjunction with the large beam, and also helping to create the events space's column-free interior, are two feature 12m-high steel trees that each support a 30m x 30m floor area.

Summing up, the judges say the newly revealed steel structures reflect the industrial legacy, seamlessly integrating with the building's aesthetics. From robust steel tree columns supporting heavy loads to intricate tensile restraint frames and footbridges, every element exudes an elegant touch, showcasing a harmonious blend of design and functionality.

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PHOTOS: HUFTON+CROW

Golden bridge signposts regeneration

An eye-catching 49m-long steel bridge connects Swansea city centre with its seafront and a large urban regeneration scheme

Creating a highly visual statement, a gold-painted pedestrian and cycle bridge connects Swansea city centre to the Copr Bay phase one scheme, which includes a state-of-the-art 3,500 capacity arena, a new public realm including the city's first new coastal park since Victorian times, new social housing and retail space for local businesses.

Designed by local artist Marc Rees and architectural practice ACME, the single span bridge is 12m wide x 7.5m high and has a structural skin of 15mm-thick steel plate. Featuring a distinctive gold paint finish, the side panel plates are perforated with numerous laser-profiled cut-outs and pressed into complex shapes.

The design is said to balance a contemporary aesthetic with references that celebrate the city's heritage. The 2,756 laser-cut origami-inspired shapes, dispersed across the panels, create a visually interesting pattern. The perforations are abstracted and exploded silhouettes of swans, inspired by the emblematic Swansea bird.

▲ The perforated and gold-painted bridge links the city centre with the Copr Bay scheme

The bridge structure offers a degree of protection from the elements. The steel has been

Award: Copr Bay Bridge, Swansea
Architect: ACME
Structural engineer: Ney & Partners
Steelwork contractor: S H Structures Ltd
Client: City & County of Swansea

rolled into a double curved surface and butt-welded into a single tube. Openings have been cut into the sides where the structural stresses were lower, offering glimpses across the road, the arena and the new coastal park and to allow the bridge to glow at night from within.

ACME design director Friedrich Ludewig says: "The iconic arch stabilises the super-slender bridge deck and creates a new urban space floating over the road, enclosed by patterned steel offering glimpses across the road, the arena and the new coastal park.

"Steelwork was chosen primarily because of its structural properties and ability to span large distances. It gave the design flexibility to work with an interesting structural solution – essentially a deformed bow truss formed of plate steel – allowing the creation of the sculptural form, super-thin bridge deck and the opportunity to create a clear identity through the development of perforations in the truss walls and application of a gold paint finish."

The 140-tonne bridge was fabricated, supplied and installed by S H Structures on behalf of the main contractor. It was delivered to site in sections, consisting of four deck pieces, six roof sections and 11 side panels. The roof sections measured 10.5m x 4.1m x 600mm and the side panels were 2.8m x 6.9m x 15mm.

The largest steel elements to be transported to site – and also the heaviest – were the deck sections, measuring 24.5m x 6m x 2m and weighing 24.6 tonnes each.

Once on site, the bridge deck was assembled on temporary works adjacent to the bridge's final location. The curved plates, which form the sides, arch and roof, were then welded into place, before the complete structure was given its final topcoat of gold paint.

The completed structure was then lifted onto self-propelled modular transporters (SPMTs) and manoeuvred onto its two concrete abutments during a Saturday night road closure.

Rees says: "It has been the thrill of a lifetime to be involved in such an iconic part of the regeneration of my hometown. Dylan Thomas infamously described Swansea as an 'ugly, lovely town' – whatever the merits of that when he said it, Swansea's aspiration to change, grow and flourish is more than apparent now."

In summary, the judges say the Copr Bay Bridge provides a dramatic new gateway to Swansea, with its striking form and colour acknowledging the bay's history as a centre of coal and copper production.

The Copr Bay Bridge provides a dramatic new gateway to Swansea, with its striking form and colour acknowledging the bay's history as a centre of coal and copper production
SSDA judges

▼ The perforations are abstracted and exploded silhouettes of swans

Dublin shops for steel

Department store refurbishment creates new city-centre destination

Commendation: Clery's Quarter, Dublin
Architect: Henry J Lyons
Structural engineer: Waterman Moylan
Steelwork contractor: Kiernan Structural Steel Ltd
Main contractor: Glenbrier Construction
Client: Oakmount

A major refurbishment has brought back to life Clery's department store, a Dublin landmark that originally opened in 1853, but closed in 2015.

The building has been vertically extended to create a new mixed-use scheme. New third, fourth and fifth levels have been added, along with a glass cylinder atrium, lift cores and a bespoke curved roof structure.

The floor area has increased from 10,000 sq m to 16,500 sq m. The new steel frame had to be threaded through the existing structure and supported on new micropile foundations. Perimeter columns were positioned behind the old facade to minimise their impact.

"The scheme could only have been realised utilising a structural steelwork framing system," says Waterman Moylan associate Anthony Byrne.

"The ability to retain over 60% of the existing structure through application of the steel framing meant that the upfront embodied carbon for the development was limited to approximately 400kg CO_2e/m^2."

Produced by the BCSA and Steel for Life in association with Construction Management

PHOTO: GRANT SMITH

Getting taller

An outdated 1960s tower block has been reimagined with the addition of 13 new steel-framed upper floors and enlarged lower-level podiums

Just north of the City of London's northern boundary and a short walk from Old Street station, a tired 16-storey office block has been refurbished by stripping back the original concrete frame and adding 13 new steel-framed floors to create a 21st century 29-storey tower.

As well as enlarging two podiums adjacent to the lower levels of building, the existing cores were removed and replaced, while substantial strengthening works were undertaken to allow the existing columns to support the new upper floors.

Overall, the scheme delivers flexible workspaces together with 25 units of affordable housing, and introduces a new public arcade with shops, cafes and restaurants.

▲ Thirteen new steel-framed floors have been added to create a 29-storey tower

The decision to refurbish and enlarge the building, instead of demolition, had a number of benefits.

AKT II associate Michael Hynd says: "It is more sustainable to refurbish and enhance the building as opposed to undertaking a large demolition programme, which was something the local authority and the client was keen to avoid."

This solution has doubled the leasable area, from 12,000 sq m to 25,800 sq m, while saving 35% of the 'upfront' embodied carbon in comparison with an equivalent new construction.

Information on the existing building was compiled from a series of engineering record drawings, and a fundamental redesign of the existing building followed an exercise which back-analysed the structure, verifying initial assumptions.

This showed that the original building had residual capacity within the floor slabs – believed to have been designed to accommodate printing works on some floors – and also the large diameter under-ream piles, which meant that large portions of the existing building, basement and foundations could be retained and reused.

"This analysis, with finite element modelling of the existing structure and foundation system, were key to delivering the 13-storey extension. The whole project represents a best practice approach for the retrofit and large-scale retention and expansion of existing structures," says HCL managing director Stephen Cherry.

Structural steelwork was chosen for the new upper floors due to the material's lightweight attributes, which minimised the additional loading and speed of construction.

▼ The beams are all custom-made plate girders

Award: HYLO, London
Architect: HCL Architects
Structural engineer: AKT II
Steelwork contractor: Bourne Group Ltd
Main contractor: Mace
Client: CIT Group

> **This exemplary transformation of an obsolete 1960s concrete 'monolith' was made viable only by the ambition of the client**
> SSDA judges

From level 16 upwards, new steel columns were installed on top of the existing concrete members. However, the existing grid pattern is based around a column spacing of 6.1m × 7.6m. This was deemed restrictive for the new floorplates, so some column positions have been omitted: the upper floors have just one row of internal columns and spans of up to 12m.

All steelwork is standard S355 grade, and the beams are all custom-made plate girders, with depths ranging from 525mm to 665mm. Modular pieces for the perimeter, weighing up to 7 tonnes, were introduced to reduce crane lifts. The floorplates are generally repetitive up to level 25, but level 26 has a step-back, creating a terrace.

As the line between corporate and creative becomes more integrated, HYLO delivers a workplace that offers flexible spaces that embrace collaboration and connectivity.

In summary, the judges say this exemplary transformation of an obsolete 1960s concrete 'monolith' was made viable only by the ambition of the client, the skill of the team and the use of structural steel. Unrecognisable today and 13 floors taller, this now elegant and permeable building creates high-quality spaces both internally and externally in the surrounding neighbourhood.

PHOTO: MICHAEL COCKERHAM

Steel adds up

Unique steel structure provides support for Ed Sheeran world tour

PHOTO: CUNDALL

Commendation: Ed Sheeran Mathematics Tour
Architects: Mark Cunniffe Ltd, WonderWorks
Structural engineer: Cundall
Steelwork and main contractor: Stage One Creative Services Ltd
Client: 1325 Productions

Ed Sheeran's recent Mathematics world tour featured a unique steel structure that allowed the artist to appear in the round, with the audience surrounding the stage – adding intimacy to each performance.

It consists of six 30m-tall steel truss masts, positioned around the central stage, supporting a 60m-span cable net constructed of 22mm diameter galvanized steel spiral strand cable.

This in turn is used to suspend the central 21m-diameter, 45-tonne circular transparent LED screen over the stage, as well as 10 tonnes of audio systems.

Additional audio systems and double-sided LED screens shaped like plectrums, both weighing 22 tonnes, are suspended from the top of each mast, adding cutting-edge production.

The entire structure was trial erected and load tested one month before the start of the tour. This provided an opportunity to practise the erection process and hone the erection riggers' experience to achieve the fastest possible build time – 15 hours for 180 tonnes of steelwork.

Produced by the BCSA and Steel for Life in association with Construction Management

Exposed frame presents a city first

Part of phase two of Birmingham's Paradise masterplan, a 13-storey steel-framed office block, spans one of the city's main thoroughfares

PHOTO: GREG HOLMES

Featuring an expressed steel exoskeleton on all four elevations, Birmingham's One Centenary Way is a standout commercial development in more ways than one. Below ground level, the steelwork is equally impressive. Just over 60% of the total footprint sits on top of a series of storey-high trusses that span the A38 dual-carriageway tunnel.

"One Centenary Way is an important building for Birmingham, not least for its green credentials, but it's also the first commercial exoskeleton building in the region," says Dav Bansal, partner at Glenn Howells Architects.

Approximately 1,950 tonnes of the 7,450 tonnes of structural steelwork was used to fabricate the 12 trusses, which are up to 34.5m long and weigh up 130 tonnes.

Fabricated at BHC's Lanarkshire facility, the trusses were transported to site as complete sections, up to 6.15m wide. On site, a 1,200-tonne capacity mobile crane – one of the largest in the UK – erected the trusses.

The trusses form part of the basement level and their top chords help create a platform to support the majority of the building's structural frame. One of the two basement levels is accommodated within the trusses' depth. This upper basement floor houses a well-equipped and accessible cycle hub for the estate.

Award: One Centenary Way, Birmingham
Architect: Glen Howells Architects
Structural engineer: Ramboll
Steelwork contractor: BHC Ltd
Main contractor: Sir Robert McAlpine Ltd
Client: MEPC

The result is a high-quality office building with excellent sustainability credentials which has helped transform this area into a pedestrian friendly campus
SSDA judges

Due to the tight site constraints, a typical load-bearing core with columns going into the ground to hold the building up and give it stability was not an option. The project's design team's solution was to use the building's facade to provide the stability in the form of a Vierendeel exoskeleton.

As well as the stability provided by the exoskeleton, a centrally positioned steel braced core provides rigidity. "The exoskeleton on its own doesn't provide enough stiffness for the overall structure, so the two stability systems work in tandem," explains Ramboll principal engineer Daniel Yoxall.

The project used a steel core, instead of a concrete one, as a lighter solution. This was important, as the core had to be positioned on top of the trusses, so it could sit in a central position within the building to satisfy the internal office layout.

The Vierendeel exoskeleton is formed with a series of vertical and horizontal steel sections forming 12m-wide rectangular boxes. The rectangles incorporate 3m-wide horizontal windows, encased within an exposed structural steel facade.

The interior of the building offers large office floorplates, as well as retail space at ground floor level. The column grid is based around a 12m × 9m spacing, as this layout requires minimal internal columns, to provide an open-plan office layout.

The ground floor also has a triple-height reception area with a floor-to-ceiling height exceeding 9.5m. To accommodate this impressive reception, the first floor does not cover the entire building footprint. The upper floors have a standard 3.8m floor-to-ceiling height.

Summing up, the judges say this elegant, exposed steel structure springs off a system of trusses spanning a busy road tunnel. Despite depths of over 6m and the biggest weighing 130 tonnes, the trusses were transported to site and installed fully assembled.

The result is a high-quality office building with excellent sustainability credentials, which has helped transform this area into a pedestrian-friendly campus.

PHOTO: SRM

▼ 3m horizontal windows are incorporated in the 12m rectangular boxes of the exoskeleton

Steel celebrates industrial heritage

Exposed steelwork creates new offices, retail outlets and a warehouse in Shoreditch

PHOTO: TIMOTHY SOAR

Commendation: Montacute Yards, London
Architect: Allford Hall Monaghan Morris
Structural engineer: Heyne Tillett Steel
Main contractor: ISG Ltd
Client: Brockton Everlast

Montacute Yards celebrates the industrial heritage of Shoreditch through the creation of a two-storey warehouse featuring a steel exoskeleton. Two new office and retail buildings with a glazed connection are also being created, while an adjacent Grade II-listed townhouse has been refurbished.

A steel-framed solution was chosen as it provided the desired industrial look, was lighter than alternative solutions, suited the transfer structures that frame the elevations of the building and reduced the foundation costs.

Structural thermal break pads, carefully detailed into the connections at the facade, allow the exoskeleton to be achieved without affecting thermal performance.

The heavily constrained site and limited loading space required a building that could be erected quickly, with bulk deliveries at appropriate times – which again suited a steel-framed solution.

For fabrication and erection, the structural frame was modelled in 3D in both analytical and BIM formats, allowing coordination between the design team to be fed back into the structural design model seamlessly.

Produced by the BCSA and Steel for Life in association with Construction Management

PHOTO: PETER SANDGROUND

Community asset

Funded by the Scottish Government through Sustrans, and Glasgow City Council's Vacant Derelict Land Fund, a new bridge reconnects the communities in north Glasgow and completes the last link in the Forth and Clyde Canal towpath

Allowing pedestrians and cyclists to cross a canal at towpath level, instead of having to use a potentially dangerous road tunnel, the £13.7m Stockingfield Bridge has opened up routes for leisure and employment in Glasgow.

The 3.5m-wide bridge comprises two curved single-span decks suspended on a network of cables connected to a single inclined pylon situated on the east bank of the canal.

The client was keen that community engagement played a vital part in the project's ultimate success. Residents and community groups were consulted from concept to completion, giving them a real sense of ownership. High on the residents' original wish list were attractive landscaping, a viewing point and the inclusion of public art, all of which have been provided.

▲ The Stockingfield Bridge crosses the Forth and Clyde Canal in Glasgow

In addition, to ensure that the space is safe for female users, the project team worked with a Glasgow violence against women and girl's charity, Wise Women. As part of this collaboration, local women visited the site and provided feedback on lighting, access and layout.

Following the initial community engagement 14 submissions were received for potential artwork to be included on the site and eight were selected. These include ceramic

Award: Stockingfield Bridge, Glasgow
Structural engineer: Jacobs
Steelwork contractor: S H Structures Ltd
Main contractor: Balfour Beatty
Client: Scottish Canals

panels and paving stones based on community-produced artworks.

The steel fabrication and assembly of the bridge and mast presented a number of challenges. Heavily plated structures, such as the bridge's curved, tapering, trapezoid-shaped twin decks, are prone to weld shrinkage and distortion during fabrication.

The use of bespoke jigs, welding control and dimensional monitoring were all employed to eliminate the risks. The project team also redesigned the internal stiffening configuration of the bridge decks to reduce the number of longitudinal stiffeners and transverse diaphragms, used to control plate buckling, by up to 50%.

This reduced not only the steel weight, saving both cost and carbon, but also, crucially, the amount of welding required, which in turn reduced heat-induced distortion.

"Other materials for the bridge were considered, such as concrete and timber," says S H Structures sales director Tim Burton. "Steel was selected as it was the most structurally efficient and cost-effective solution."

The construction team considered various options for the installation methodology. Taking into consideration time, cost, safety and environmental issues, the solution chosen required the temporary closure of the canal. The waterway's sides were protected with sheet piles and, using carefully selected fill material, temporary working platforms, or causeways, were created within the waterway to facilitate the bridge construction.

The desire to reduce carbon within the project's construction programme played an important part in the design and the selection of materials.

Various initiatives were introduced to reduce the project's carbon footprint. As well as the redesign of the bridge decks' internal stiffening, these included the reuse of the temporary causeway material as part of the site's landscaping, the use of recycled materials in the asphalt and sustainable cement replacements in the concrete mixes.

Summing up, the judges say this is a well-conceived, finely executed project providing significant practical and social value, with new links between disconnected communities and much-needed pedestrian and cycle routes across a canal and adjacent road.

This is a well-conceived, finely executed project providing significant practical and social value, with new links between disconnected communities and much-needed pedestrian and cycle routes
SSDA judges

▼ The curved single-span decks were fabricated off site

That's entertainment

Music, arts and culture are at the heart of a four-building development in central London

Commendation: The Outernet, London
Architect: Orms
Structural engineer: Engenuiti
Steelwork contractor: Severfield
Main contractor: Skanska UK
Client: Consolidated Developments Ltd

Entertainment spaces form a key element of central London's The Outernet, which provides around 23,230 sq m of mixed-use space, spread across four buildings and a large combined basement.

The largest venue is the Urban Gallery, a four-storey column-free space that forms part of Building A, which is a seven-storey steel-framed structure that also contains hotel, office and restaurant spaces. It is a flexible, interactive events space that contains one of the world's largest LED screen installations.

"The Urban Gallery's concept is built on the musical and creative past of Denmark Street and provides a venue relevant for the 21st century," says Andrew McEwan, project architect and associate with Orms.

"A series of sliding doors allow the Urban Gallery to be open to the general public or closed for private events, while the moving three-storey-high louvres situated above the doors can be open for most of the day and evening, allowing the gallery to essentially be a covered outdoor area. They bring a real sense of theatre to the building."

Produced by the BCSA and Steel for Life in association with Construction Management

PHOTO: CENTRALPHOTOGRAPHY.LONDON

Midlands' longest railway bridge

Steelwork forms Birmingham's HS2 line approach

Commendation: SAS13 Bridge Replacement, Birmingham
Structural engineer: Tony Gee & Partners LLP
Steelwork contractor: Severfield
Main contractor: Skanska UK
Client: Network Rail

Located close to Birmingham city centre on the Stechford to Aston (SAS) line, the SAS13 bridge is a single-span weathering steel Warren truss structure spanning 92m.

With limited time available to install the bridge, the scheme was designed to make the structure buildable within a short rail blockade. This led to the decision to build offline and use self-propelled modular transporters (SPMTs) to lift and transport the bridge into its final position.

The replacement bridge comprises 1,095 tonnes of weathering steel, chosen because it will require less maintenance in the future compared to other grades of steel.

Once the steel bridge structure was assembled offline, it was jacked up to a height of 5m from a build height of 1.5m. The fibre-reinforced concrete deck slab, upstands and walkways were then cast, comprising 3,601 cu m of concrete, which added a further 1,600 tonnes to the overall weight of the bridge.

Once the deck was completed, 18 SPMTs were used to lift and transport the bridge into its final position.

Twin offices for Dublin

Two modern office blocks are connected at ground, third and fourth floor levels

Commendation: Tropical Fruit Warehouse, Dublin
Architect: Henry J Lyons
Structural engineer: Torque Consulting Engineers
Steelwork contractor: Steel & Roofing Systems
Main contractor: PJ Hegarty & Sons
Client: IPUT Real Estate

Incorporating much of the fabric of an original 19th century structure, the Tropical Fruit Warehouse project comprises a five-storey (Block 1) and a two-storey (Block 2) office block that are connected via a two-floor glazed link bridge as well as a ground floor atrium.

Block 2 has been constructed over the footprint of an existing two-storey protected warehouse, with minimal structural columns to allow the structure to cantilever over the structure to achieve the appearance of a floating glass box.

Six fabricated plate girder columns and one central concrete core provide structural support to the building, which measures approximately 19.5m x 40m in plan. The longest cantilevers are on the north-east and south-east corners of the building and measure 10.35m on the diagonal.

For Block 1, a steel-framed solution was chosen to facilitate the long spans and shallow depths required to meet the client's brief and keep within planning constraints for building height.

PHOTO: ENDA CAVANAGH PHOTOGRAPHY

Other National Finalists

- Arbor, Bankside Yards, London
- Church of Oak Distillery, Ballykelly, Co. Kildare
- Dukes Meadows Footbridge, Chiswick
- Farringdon Crossrail Station, East & West Ticket Halls
- The JJ Mack Building, London
- M8 Footbridge, Sighthill, Glasgow
- The National Robotarium, Edinburgh

PHOTO: GG ARCHARD

Rolling bridge

Complex and unique engineering challenges were overcome to design and install a new steel bridge spanning the entrance to Cody Dock

Merit: Cody Dock Bridge, London
Architect: Thomas Randall-Page
Structural engineer: Price & Myers
Main contractor: Gasworks Dock Partnership
Client: Gasworks Dock Partnership

Complex engineering challenges were overcome to install a new steel bridge spanning the entrance to Cody Dock in east London.

With a brief for a footbridge that would not hinder the movement of vessels within the tight confines of a dock entrance, a unique rolling design, where the deck can turn upside down, was chosen.

The footbridge is a simply supported structure with a monocoque steel deck spanning 7m over the dock mouth and tapering in depth from 400mm to 550mm at midspan.

Two 5.5m rounded square portals at each end allow it to roll along undulating concrete abutments, cast into the existing masonry walls. The upper section of each portal is counterweighted so that the centre of gravity is raised to the midpoint of the frame.

Most of the structure is weathering steel, which offers strength, durability and minimal maintenance requirements.

PHOTO: DAVE SHOPLAND/ SHUTTERSTOCK

Stand up for Fulham

With little road access, steelwork for Fulham's new stand arrived by river

Merit: New Riverside Stand at Fulham FC
Architect: Populous
Structural engineer: WSP
Steelwork contractor: Severfield
Client: Fulham FC

A new stand at one of the country's oldest continuously used football grounds was constructed while the club carried on playing at home.

"One of the main challenges for the design team was the extremely tight site, flanked by the pitch to the north and the river to the south, as well as designing a stand that would contribute and enhance the heritage and historic nature of the ground," says Populous principal Marian Moravek.

To overcome the constrained nature of the site, a significant portion of the steel frame, all precast concrete elements and a large quantity of the cladding was transported by river, reducing the impact of road traffic on the neighbourhood.

Steel roof trusses, spanning 35m, were assembled in pairs at Tilbury Docks and fitted with roof finishes and MEP. They were then lifted onto barges, sailed up the river before being craned into position.

Shipbuilders stand tall

A pair of 10m-high stainless steel figures celebrate a rich shipbuilding heritage

Merit: Shipbuilders of Port Glasgow
Sculptor: John McKenna Sculptor Ltd
Structural engineer: Narro
Main contractor: John McKenna Sculptor Ltd
Client: Inverclyde Council

Located in Coronation Park, Port Glasgow, two steel figures of workers about to strike their hammers has been installed to pay tribute to the area's shipbuilding history.

The structural form of the large figures echoes the technique of building ships. The surface skin is made up of steel plates that are welded to a steel subframe and associated ribs. This aims to maximise the mass of the structure, while minimising the weight of steel required to create it.

The primary skeleton comprises a series of circular hollow sections (CHS), with flanged bolted connections. Welded to this are square hollow sections (SHS) and steel rod secondary elements that act as outriggers to reach the SHS tertiary outer sub-frame located just under the stainless-steel faceted surface 'skin'.

"The use of steel bolted connections to join the segments of the primary frame together meant that test builds could be carried out at sculptor John McKenna's workshop, prior to them being transported to site in segments and reconnected," explains Narro senior associate Ian Downie.

Alternatives to diesel generators in construction

This CPD explores how the combination of advanced gas combustion technology, solar power and battery energy storage helped HS2 reduce emissions by 95%. By **CM**

Imperial College London estimated that in 2019 toxic air contributed to the premature deaths of 4,000 Londoners

4,000

Diesel generators are a significant contributor to air pollution from construction sites. The National Atmospheric Emissions Inventory (NAEI) highlights the construction industry as being a key source of air pollutants across the United Kingdom, with exhaust emissions from non-road mobile machinery (NRMM) diesel equipment being a significant contributor. And a 2020 study by Imperial College London – as yet unpublished – found that generators were the highest source of oxides of nitrogen (NOx) emissions from non-road mobile machinery (NRMM) on HS2's phase one early works programme.

According to the London Atmospheric Emissions Inventory (LAEI) 2019, construction was responsible for 4% of NOx, 30% of PM10 (particulate matter with particle sizes lower than 10 micrometres) and 8% of PM2.5 emissions within London. The fine particulate matter in diesel engine exhaust is classed as being carcinogenic to humans and in 2004 the World Health Organisation (WHO) advised that there is no evidence of a safe level of PM exposure. Imperial College London estimated that in 2019 toxic air contributed to the premature deaths of 4,000 Londoners.

A development programme, funded by Innovate UK under the government's Clean Air Programme, set out to create the Clean Air Gas Engine (CAGE) as a direct alternative to diesel generators for construction. The aim was to significantly reduce emissions of the pollutants outlined above together with carbon emissions.

The objective of the Clean Air Gas Engine concept is to run a precise combustion regime using lean air-fuel ratios, which leads to NOx emissions being very low

◀ Trials of the engine began on HS2's site at Euston, London, in 2020

▶ The Clean Air Gas Engine is an alternative to diesel generators

OakTec Power, which develops fuel efficiency and emissions reduction technology, joined forces with generator manufacturer Sutton Power Engineering and site welfare specialist Advanté to develop a low-emission, off-grid, electricity generator which is built into a welfare cabin. Powered by solar panels, with backup from the bio-liquid petroleum gas (bioLPG) generator, the site cabin solution is aimed at construction contractors.

Costain Skanska JV (CSJV) trialled the new technology at its HS2 Enabling Works site in Euston. Onsite testing by Imperial College London quantified the emission-saving potential of this solution in comparison to conventional diesel alternatives. The results were impressive, delivering up to a 95% reduction in emissions.

Clean Air Gas Engine technology

Large-scale industrial gas engines with low emissions already exist. However, the engines used on site for generators, pumps and other machines are relatively small and clean gas engines of that size are not currently available.

To plug that gap, the CAGE development programme focused on engines between 2kW and 60kW, taking various pieces of technology developed for other applications and putting them together so they could be applied to commercially available engines. The rationale behind this approach was that it would be too costly to develop brand new engines and would take too long – when the technology is needed now.

The CAGE concept takes advanced digital control combustion strategies for gas fuels and applies them to simple industrial engines. The objective is to run a precise combustion regime using lean air-fuel ratios, which leads to NOx emissions being very low. The precise control of load demand, ▶

▲ The CAGE was integrated into an Advanté welfare unit on HS2's site at Euston station

fuelling and ignition together with a fast response to external conditions allows the combustion to be held in a narrow band of air-fuel ratio over the full operating cycle of the engine.

This combustion strategy eliminates carbon monoxide (CO) emissions and significantly reduces NOx at source while keeping hydrocarbons and particulates to a minimum. Hence, a basic low-cost industrial engine can be transformed into a highly sophisticated and precisely controlled gas engine with digital control of fuelling, ignition and load, and intelligent response to ambient conditions.

The bioLPG engine was integrated into Advanté's patented telemetry-controlled solar battery hybrid power system to create off-grid site welfare units built for the project. The site cabins optimise the use of renewable energy while minimising engine operation hours and, through use of battery power storage, allow the engine to only operate at its cleanest and most efficient.

The hybrid solar and bioLPG system reduces engine use from 24/7 for a conventional diesel system to between one and three hours per day, the highest use being in midwinter. The engine only engages when the battery state of charge is low.

BioLPG, sometimes called biopropane, is created from a range of biological feedstocks including cooking fat, animal fat, vegetable oil and food waste. It has the same chemical composition as LPG but a carbon footprint up to 90% lower.

Results from the trial

Trials of the engine integrated into the Advanté welfare unit began on CSJV's HS2 site at Euston in November 2020 and ran for 12 months. The onsite welfare unit consisted of an office area, canteen, charging and drying room and toilets and was extensively used by the site teams throughout the trial.

The welfare cabin operates silently on stored energy and uses Advanté's EcoLogic curfew

The hybrid solar and bioLPG system reduces engine use from 24/7 for a conventional diesel system to between one and three hours per day, the highest use being in midwinter

technology to limit noise during unwanted hours to further reduce negative environmental impacts for operatives on site and people living in surrounding local communities. The trial delivered a total power consumption of 359kWh over the period, with 74kWh or 21% of the power consumption coming from the CAGE and the remaining 79% coming from solar energy.

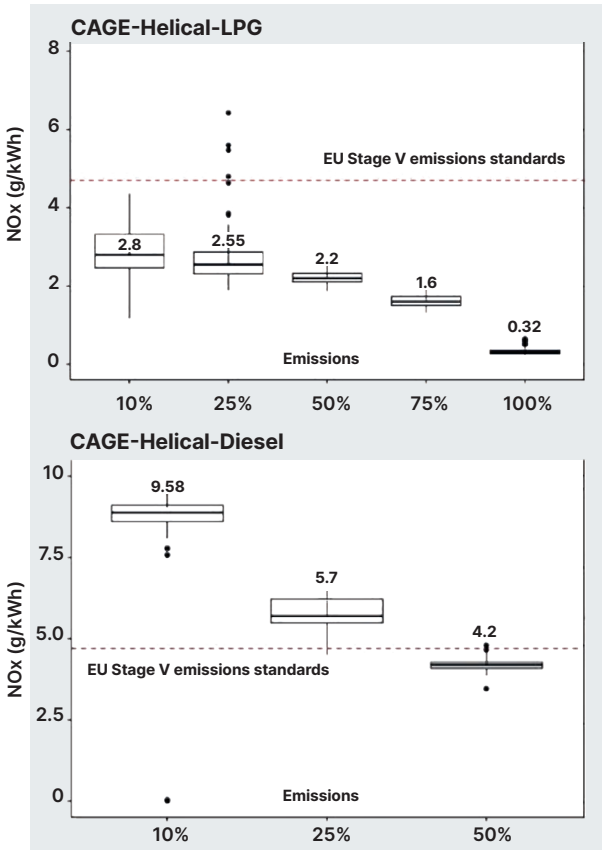
Load profiles and gas usage on the trial were remotely monitored. Emissions were measured on site by Imperial College London and in the laboratory at the Helical Technology research facility, so that emission savings compared to a diesel-powered generator could be calculated.

The CAGE trialled on HS2 emitted 20% of the emissions allowed by the EU Emission Stage V standards without requiring costly after-exhaust treatment systems to be fitted. Stage V is the current, and most stringent, emission standard set by the EU, which has been ramping up emission standards for engines over the past two decades through a series of directives.

For the Stage V emissions test, an aggregate of the components of CO, hydrocarbons (HC) and oxides of nitrogen (NOx) are taken from the exhaust emissions during a regulated engine test cycle. The CAGE was tested on this cycle and benchmarked against a directly comparable liquid-fuelled engine that meets the 2020

The CAGE trialled on HS2 emitted 20% of the emissions allowed by the EU Emission Stage V standards

20



NOx emission testing comparison between the CAGE and diesel equivalent engine

Stage V standard. Tailpipe sum total emissions reductions of CAGE vs the Stage V engine were as follows: CO 99.5%, HC 86%, NOx 20%.

The results demonstrated that the CAGE was below the EU emission Stage V standards – 4.7g/kWh for NOx and HC (indicated on the graphs above by the dotted red line). The diesel engine was above the same emission standards for the first two load points.

When the CAGE was integrated into the solar hybrid system with automatic stop-start, there was an overall emission reduction, including CO_2 of up to 95% compared to a conventional diesel engine running in the same application.

BioLPG, sometimes called biopropane, has the same chemical composition as LPG but a carbon footprint up to 90% lower

Future developments

In addition to reducing harmful emissions, including carbon, this combination of solar energy and bioLPG allows the generator to run continuously with no downtime needed for refuelling. It is also currently cost competitive with red diesel, according to OakTec.

The trial was the first of a series of gas engine innovations and emission reduction technologies which OakTec is developing for the construction sector. The next step was a higher output multi-cylinder engine, a development of the latest three-cylinder Jaguar Land Rover automotive unit tested in a 27kW generator at Euston in 2022. Rather than diesel, it uses directly injected bioLPG and automotive standard after-treatment.

A new OakTec company, CAGE Technologies, was formed to commercialise outputs from the CAGE project and those of parallel biogas and hydrogen-related development programmes. The project also saw the establishment of a dedicated laboratory to enable certification of industrial engines, the first of its kind in the UK. This is based within the Helical Technology research facility.

CAGE technologies could have widespread applications and can be used in many applications currently served by diesel and petrol engines within construction and other sectors. Building power systems using CAGE CHP (heat recovery) is another major opportunity for the technology.

CPD Questions

1) What percentage of PM10 was construction responsible for in London in 2019?
a) 4% b) 8% c) 30%

2) How many Londoners were estimated to have died prematurely due to air pollution in 2019?
a) 2,000 b) 4,000 c) 6,000

3) What was the welfare cabin developed by this programme powered by?
a) BioLPG
b) Solar
c) Both bioLPG and solar

4) What percentage of power for the cabin came from the clean air gas generator?
a) 21% b) 79% c) 25%

5) How did the CAGE compare to a Stage V-compliant diesel engine with respect to emissions?
a) Comparable performance
b) 20% lower emissions
c) 95% lower emissions

To test yourself on the questions above, go to www. construction management.co.uk/cpd-modules

OakTec is now working with hydrogen engine prototypes to develop a complete net zero solution that would work in applications such as welfare units.

The authors of the original paper are: Andrea Davidson, air quality manager, HS2 (Jacobs Engineering); Neil Wait, head of environmental sciences, HS2; Daniel Marsh, programme manager, Centre for Low Emission Construction, Imperial College London; Carl Desouza, PhD research assistant, Centre for Low Emission Construction, Imperial College London; Paul Andrews, founder and CEO, OakTec; and Stan Chapman, research and development director, Advanté.

Mark Newton
Decipher

How does 'acceleration' work in contracts?

This month's contract clinic question comes from a contractor worried about whether it can claim for working overtime to deliver a school project in time for the new term. **Mark Newton** explains

THE QUESTION

We're a contractor on a school project in the north east. The project was running behind, so we brought in more resources so the school could reopen in September. We managed to get the school back on track, but now the employer is refusing to cover the cost of the extra resources. What can we do?

THE ANSWER

To determine the next steps for the contractor, it's important to understand the term 'acceleration' in contractual terms, and the different types. First, acceleration may mean different things to different people. One helpful definition comes from the Society of Construction Law (SCL), which defines it as being:

"The application of additional resources or alternative construction sequences or methodologies seeking to achieve the planned scope of work in a shorter time than planned or execution of additional scope of work within the original planned duration."

If the employer has caused delay (knowingly or not), you may be entitled to recover the costs associated with accelerating the works

Essentially it can be encapsulated as a period where you have increased productivity to complete the works either before the completion date or to mitigate any delays to the project which you may be culpable for.

It is important to establish why the project is running behind. It may be that the contractor caused a delay to the project. If so, it is likely that the reason for accelerating is to complete the works by the contractual completion date. In doing so the contractor may avoid liquidated damages being levied by the employer. This form of acceleration is commonly referred to as voluntary.

Alternatively, if the employer has caused delay (knowingly or not), you may be entitled to recover the costs associated with accelerating the works, provided the acceleration has been instructed. Typically, there are two types of acceleration associated with employer-led delays: agreement and constructive.

Agreement acceleration

Agreement or express acceleration is where the employer formally instructs the contractor to accelerate their works, to achieve the contractual completion date. Most standard forms of contracts include a provision to accelerate the works.

If it is a state school project, the possibility is that you're working under NEC. The NEC 4 provides for agreed acceleration under Core Clause 36. Private schools and other projects are most likely under JCT. JCT provides for the same process under its Schedule 2 Variation and Acceleration Quotation Procedures.

Be sure to check what your contract says and whether it's been amended or not.

Constructive acceleration

Generally, it is more difficult to recover monies associated with constructive acceleration.

Here, you may accelerate to complete the works by the contractual completion date when the employer has caused a delay they do not recognise. In such a scenario they may refuse to award an extension of time. In this scenario, the contractor accelerates the works to prevent the employer from applying liquidated damages for finishing late.

When dealing with constructive acceleration, it is worth highlighting the Society of Construction Law (SCL) Delay and Disruption Protocol advice:

"Where the contractor is considering implementing acceleration measures... the contractor should first take steps to have the dispute or difference about entitlement to an extension of time resolved in accordance

Question for contract clinic? Email construction-management@atompublishing.co.uk

▲ Acceleration has brought the school project back on track

with the contract dispute resolution provisions."

Each scenario detailed has differing outcomes on the ability of the contractor to recover the costs associated with accelerating the works and achieving the contractual completion date. With voluntary acceleration, you will not be able to recover the costs associated with this form of acceleration. The contractor is culpable for causing the delay to the completion date initially.

Agreement acceleration means the parties have agreed to accelerate the works and an acceleration quotation has been accepted and engrossed into the contract. If the employer refutes acceptance of the agreement, the contractor can seek to recover costs through dispute resolution procedures in the contract. Be careful though. Even if an agreement to accelerate is in place, keep contemporaneous records, in case you don't achieve acceleration for any reason.

Even if an agreement to accelerate is in place, keep contemporaneous records, in case you don't achieve acceleration for any reason

Constructive acceleration carries an inherent risk for the contractor. This is because there is no formal agreement in place for the employer to pay out any costs associated with the work being accelerated. In addition, the courts in England and Wales have not taken kindly to constructive acceleration. It would be more favourable for the contractor to have pursued the decision to accelerate on the refusal of the employer to award a genuine entitlement to an extension of time.

Key to all of this, as always, is the maintenance of good records. To prove an entitlement to time or money and to prove both the cause of any delay and the result of any acceleration, you will need good, detailed and contemporaneous records. The better and more precise the records, the more likely that time or money will be recovered.

Mark Newton is consultant QS at Decipher.

‘Be part of the change you want to see’

Dylan Harvey FCIOB, director at steelwork specialist CMF, tells **Nicky Roger** about the value of education and giving your time to influence change

Is there a specific project or achievement you are most proud of?
I’m proud of a number of projects with a common theme running through them all: challenge, complexity and problem solving. It’s what made me passionate about construction early on in my career and what makes me approach each new project with excitement now.

It’s these challenging projects I’ll never forget. Projects such as: the Olympic Stadium and Velodrome; Heathrow T5 and T2; many parts of Crossrail, especially Liverpool Street station; London Bridge Station, which was Thameslink; Battersea Power Station over multiple phases and years; and more recent projects such as the Whiteleys redevelopment.

I’m very proud of my master’s – getting the place as well as completing it, with no bachelor’s degree. I’m proud too of my CEng, secured without an engineering degree. Also recently I’ve attained CEnv through CIOB and the Society for the Environment (SocEnv).

> **It’s important to engage with the wider construction community and recognise your contribution to it**
> Dylan Harvey FCIOB, CMF

Is there anything in your career you would do differently now?
I’d have gone through higher education and become professionally registered sooner. It’s important to engage with the wider construction community and recognise your/our contribution to it, but also to be part of the change for the better you want to see.

Especially from a specialist contractor background, there is a propensity to focus only on your specialism and lose sight of what is happening in the wider construction industry. Specialist contractors and subcontractors are the backbone of construction, bringing all the skill needed to deliver complex designs.

What advice would you give to someone starting in construction today?
To make sure they get any experience at all on their CV while still studying – by working as site labour over holidays or other entry-level roles. It will give them an understanding of the industry and an edge on their CV.

What one thing would you change to make careers in construction more appealing?
It’s critical that we make construction careers more visible to those at school age. There are so many opportunities in construction, with a huge amount of diverse roles, but little of this is perceived by students.

What has changed the most about construction since you’ve been working in it?
Digital technologies have brought much change in construction but, at the same time, much of construction is completely unchanged in the past 50 years. There are a number of entrenched mechanisms that feed this stagnation that will take another 50 years to change themselves.

Only truly transformational change – such as digital improvement – has a chance to make any impact and contribute to lasting change.

However this is why it’s important to be a small part of influencing the improvements in construction. There are many ways to do this

It's important to be a small part of influencing the improvements in construction. Being involved in professional bodies such as CIOB is a good starting point
Dylan Harvey FCIOB, CMF

but being involved in professional bodies such as CIOB and others is a good starting point.

I spoke at Digital Construction Week last year about how the evolution in technology has made it far easier to donate our time and help others. I was in Australia last December courtesy of CIOB for the international forum. I also volunteer with the Institution of Engineering and Technology (IET), and last year was a judge for its kids STEM programme, Lego League. It made use of my construction skills but was all great fun to be part of.

Giving time like that makes it possible to influence change. It's great to be given a chance to make use of many different opportunities.

What's the most valuable training you've received and why?
I did an HNC early in my career but only latterly went back and did a master's and thereafter sought various professional registrations.

Dylan Harvey CV

- **Associate director, design and innovation, CMF, 2019 to present**
- **Head of design projects (consultant), Trueform Group, 2018-19**
- **Regional head of design, Lakesmere Group, 2015-18**
- **Design, project and engineering manager, Trueform Group, 2014-15**
- **Project and design manager, Lee Warren, 2009-14**
- **Senior designer/ designer, Graham Wood Structural & Architectural, 2001-09**

Doing my master's was a real challenge: it was very difficult to prove experience in lieu of a bachelor's degree to even get accepted – and, once on it, it was hard to get through it with family life and work challenges.

Halfway through my course, the company I was working for went into administration, while working on Crossrail Liverpool Street. Via a phoenix company we went on to recover the programme loss, solve the myriad complexities of the project and generally have a resounding success. And I completed my master's with a merit.

I used this experience as part of my direct entry to FCIOB application and received very positive feedback. However, having done my master's, I do wish I'd done it sooner.

Do you have a motto that applies to your work and, if so, what is it?
Add value in everything you do, in every choice you make. It's taken from 'Lean' – many other industries have lessons to teach construction.

CIOB Community

Global Student Challenge open for entries

Student teams from around the world can now enter CIOB's annual competition to test their professional skills by creating a simulated construction project online

CIOB is again looking for the next generation of construction industry leaders from around the world to take the crown in its coveted Global Student Challenge competition.

Now in its 10th year, the challenge sees teams of students studying built environment qualifications pit themselves against one another as they create a virtual organisation to plan and deliver a fictional construction project.

The competition opened for entries in September this year to give teams more time to enter and make the contest more inclusive for universities around the globe.

The competition is designed to test creativity, planning skills, entrepreneurial spirit and communication – all vital assets when delivering a construction project.

An all-expenses-paid trip to CIOB's annual Members' Forum is up for grabs, where the winners can gain vital feedback from some of the industry's brightest minds.

The winning team lands a £2,000 cash prize and cash sums also go to the second and third placed teams.

Kate Macbeth, marketing director at CIOB, said: "This rare and unique competition gives the industry's top prospects a chance to show they are the modern professionals of the future and test their skills in a lifelike simulation of a construction project. I can't wait to start receiving entries for 2024 and seeing which team will come out on top."

The 2024 challenge will again use SimVenture Validate – an online platform used by a wide range of universities to build employability and enterprise skills.

Last year's competition saw a team of four construction students from Universitas Indonesia scoop the top accolade – fending off competition from 37 other teams. They said the competition "will be our first step in entering professional careers".

Registration closes on 31 January 2024 and the competition will take place between February and April. The winning team will be announced on 18 April 2024.

For more information or to register, visit https://gsc.ciob.org.

▲ This year's challenge winners, Universitas Indonesia: Juan Fidel Ferdani, Nada Laili Nurfadhilah, Elgrytha Victoria Tybeyuliana and Evan Ariel Christoper

Tomorrow's Leaders set out strategy for Northern Ireland

Chair and representatives devise plans for way ahead

The Northern Ireland Hub has created a strategy for Tomorrow's Leaders (TL) in the area.

Hub chair Jonathan Payne FCIOB, Nouman Qadir, Ronan O'Neill MCIOB and Julie Fitzsimmons met in the capacity of TL representatives to discuss how the TL community and TL champions will align with the chair's vision.

The outcome is that:

- **champions will work to promote construction as a career choice among the younger generation through arranging visits at primary/secondary schools, and delivering presentations;**
- **a champions' strategy document for the Northern Ireland Hub will be shared for feedback and to enhance engagement;**
- **a TL community and champions social and information session will foster networking; and**
- **there will be a monthly online meeting with all champions.**

TL offers talk and tour of Birmingham's Digbeth

Visit to the city-centre site will be followed by networking

Birmingham & Northampton Tomorrow's Leaders are holding an informal evening of talks, tours and networking on 12 October.

The event, Tomorrow's Leaders Sites & Social: Digbeth Masterplan will include a presentation from the team at Oval Real Estate on its vision for the regeneration of the land and nearly 40 buildings within this historic part of Birmingham.

After the talk, a tour of the estate will take members round the Custard Factory, Fazeley Studios, The Bond TV Studios, Brunel's Viaduct and many other smaller buildings in the neighbourhood.

The evening will conclude with drinks, food and networking at Baked in Brick.

The event is sponsored by Oval Real Estate, Quantem and Rider Levett Bucknall.

For more information or to book your place, please contact gfloyd@ciob.org.uk or visit www.ciob.org/events.

> **After the talk, a tour of the estate will take members round the Custard Factory, Fazeley Studios, The Bond TV Studios, Brunel's Viaduct and smaller buildings in the neighbourhood**

▼ The Digbeth masterplan for regeneration in Birmingham

50%

Discount on Educator Pathway

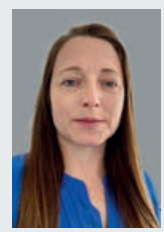
Educators keen to become chartered can take advantage of a 50% discount on the CIOB's Educator Pathway.

The pathway is designed to help academics in construction research or teaching (at Level 4 or above) to become chartered members of the CIOB.

The Educator Pathway is for anyone with a bachelor's degree, master's or doctorate (or equivalent), and over five years' experience researching or teaching a construction-related subject. For details log on to www.ciob.org/membership/become-a-member/educator.

What does it mean to be competent? Nottingham has the answers

Hub event will cover the new BSA requirements



▲ From left: Peter Dawber FCIOB and Nicola Markall FCIOB

Competency in the wake of the Building Safety Act will be discussed at a Nottingham Hub event this month at The Derby Chocolate Factory.

Held on 18 October, Building Safety Act: Are you Competent? will focus on what it means to demonstrate professional competency and the impact it could have on you and your organisation.

Peter Dawber FCIOB, a member of the newly established Industry Competence Committee (ICC), will open the session and give an overview of the competency requirements within the Building Safety Act and for the individual.

He will be followed by Nicola Markall FCIOB, technical compliance director with Sir Robert McAlpine (SRM), who will touch on what competency looks like at an organisational level.

The speakers will also discuss any secondary legislation implications and provide useful tips. The remainder of the session will be driven by an audience Q&A, followed by a networking lunch. For more information or to book your place, please contact gfloyd@ciob.org.uk or visit www.ciob.org/events.

Your unique skills are long overdue the recognition they deserve, that's why we've created our new TechCIOB grade.

Find out more about our technical membership at **ciob.org/techciob**

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Site Managers
Assistant Site Managers
Foremen
Regeneration Officers
Electrical Engineering Supervisors
Technical Support Supervisors
Building Services Engineers
Civil Engineering Technicians
Demolition Supervisors
Drainage Engineers
HVAC Engineers
Rail Engineering Supervisors
Technical Co-ordinators

CIOB
The Chartered Institute of Building

The rainbow JCB was on show at Manchester Pride

Building Equality celebrates Manchester Pride

CIOB played a role in this summer's event as part of the construction industry alliance

CIOB was once again supporting and contributing to Manchester Pride over the August Bank Holiday as part of Building Equality, the construction industry's LGBTQIA+ alliance.

Building Equality is a multi-discipline organisation comprising many professional bodies including CIOB. Hazel Yorke, CIOB business development manager for the north, continued her volunteering role as business development manager for Building Equality Greater Manchester.

This year Manchester Pride celebrated 10 years since the Equal Marriage Act. Building Equality joined thousands of people marching through the city centre, following its iconic 'GayCB'.

The rainbow JCB was adorned with 'just married' bunting, with replica tin cans pulled behind in the trans flag colours.

Seventy representatives from companies in the built environment industry across the north-west came together to celebrate and raise awareness of the lack of equal marriage rights still facing some of our LBGTQIA+ friends, family and colleagues.

70 representatives from different companies in the built environment industry across the North West came together to celebrate and raise awareness of the lack of equal marriage rights

This includes non-binary people not being recognised, benefits being removed from disabled people and people needing a Gender Recognition Certificate to marry in their authentic gender.

Building Equality (Greater Manchester) also held its annual Outreach Day on Friday 25 August, parking Flannery's rainbow JCB on Market Street to talk to people about the changing attitudes and perceptions in the industry.

Building Equality is a community organisation driving inclusivity in the built environment industry. Supported by volunteers, the group has regional committees across the UK. It educates and encourages positive conversations around sexuality and gender identity, with bespoke free resources.

These include an LGBT+ inclusion toolbox talk and poster campaign designed to facilitate inclusion both on site and in the office.

www.buildingequalityuk.com

Promotion for fellow at Vinci

Tony Grindrod becomes Midlands regional director at Vinci Building

CIOB fellow Tony Grindrod (pictured) has been promoted from contracts manager to regional director for Vinci Building's Midlands region.

Grindrod has worked for Vinci Building for over four years and led the successful delivery of the New Victoria residential project in Manchester.

Vinci Building managing director, John Roberts, said: "Tony's appointment will enhance our business, ensuring we continue our strong presence within the Midlands."

Vinci Building's Midlands region has an annual turnover of circa £80m. Its projects include the reconfiguration of Birmingham Airport, the residential regeneration of Perry Barr, the Harborne Hospital at the Queen Elizabeth Hospital site in Birmingham, and Staffordshire University's Catalyst building in Stoke-on-Trent.

Station catacombs await Glasgow members

October tour of Glasgow Central will reveal its hidden underground tunnels

▲ Glasgow Central station's concourse roof has 48,000 panes of glass

Members in Glasgow are offered a tour of Glasgow Central station, including its hidden tunnels, known as the catacombs, on 12 October.

The station – the largest of the two mainline railway terminals in Glasgow – opened in 1879. It is steeped in history, including underground tunnels, catacombs and a glass roof consisting of 48,000 individual panes of glass.

The Glasgow Central Station Tour will share the building's secret places and its history followed by networking and drinks in the Platform Cafe Bar.

Register at www.ciob.org/events/glasgow-central-tours-offer-you-the-chance-to-explore-behind-the-scenes-665169709507.

CIOB hubs seek to work together

Guernsey visits Jersey, while Bristol, Exeter and Cornwall meet up to brainstorm ideas

CIOB hubs have been exploring the opportunities offered by collaboration over recent months.

Guernsey members took a trip across to Jersey to visit its CIOB members. Over lunch the two groups discussed common issues affecting the Channel Islands.

These included inflation, the housing market and house prices, as well as general confidence in the market, plus labour and material resources.

The Jersey Nightingale project was a key conversation point, as was the success of the Design, Engineer, Construct! (DEC!) course, which is creating a pipeline of Jersey students accessing construction.

The hubs discussed how this could be replicated in Guernsey to allow the two islands to work together, sharing experience, knowledge and resources.

Collaborative committee meetings also took place recently among Bristol, Exeter and Cornwall Hubs.

They met to network and brainstorm ideas for next year. The success of the meeting has led to plans to make this an annual event.

The meeting was held prior to a CPD on social value and allowed the committees to network with all the attendees.

One to watch

Charlie Kistnen Facade and architecture technician, Laing O'Rourke

Why did you choose a career in construction?
My passion for architecture and construction led me to pursue a career in building envelope and facade design, and I couldn't be more excited to be working on the various building envelope and facade types at the New Everton Stadium.

Being enrolled on the Laing O'Rourke programme has given me the opportunity to develop capabilities and continue to learn on a live construction project. I was thrilled to have the opportunity to work on a prestigious construction project such as the New Everton Stadium.

What do you love about your job and what challenges you?
As a part of my new role, I have been working on various facade types, including curtain walling, precast brick facades and metal panels.

Each facade type requires different technical skills and knowledge, and I've had to adapt to the specific requirements of each package. It has been challenging but extremely rewarding to see the progress of each subcontractor as we work towards the result of a complete stadium.

Working in a team has been an excellent experience. I've been able to communicate effectively with other professionals, such as architects, engineers and subcontractors. Being adaptable and able to problem-solve on the fly has been a crucial aspect of my job, as construction projects often present unexpected challenges.

The exposure to the latest technology, materials, and methodologies has been invaluable; it's been challenging, but the experience and knowledge I've gained has been invaluable. I'm excited about the future and the possibilities that my career holds for me.

What are your career ambitions?
My career ambitions revolve around pursuing a role as a facade manager in prestigious construction projects.

I am drawn to the complexity and artistry involved in creating visually striking and functionally efficient building exteriors. I am motivated by the opportunity to work on high-profile projects that push the boundaries of design and construction.

What do you do in your spare time?
I prioritise fitness and the gym. The gym is my sanctuary, where I push my limits and set personal goals. Outside of the gym, I like running and boxing to enhance my endurance. This requires focus on nutrition too. It's a constant journey of self-improvement and maintaining my healthy, active lifestyle.

Shared vision

A West Midlands CBC's work on an assisted living project shows the value of collaboration

When property developer Greg Dickens embarked on a project to build six new flats on a plot of land in Dudley in the West Midlands, he hadn't expected to need to change contractors part way through.

Thankfully, a building company which shared his vision for collaboration between builder and clients was on hand to deliver a project that is now helping adults with complex needs to have a place to call home.

Unhappy with the building contractor he had originally appointed for the Tudor Court project, initially designed to be six regular flats, Dickens turned to Ben Dunn from Solidbond Projects, a CIOB chartered building company (CBC), to take over.

Thanks to Dickens' links with a number of care providers in the area, the project evolved from a block of flats to an assisted living facility. This meant several last-minute changes to ensure the flats were accessible for people with physical disabilities and their care providers.

> **Having so many parties involved was at times difficult but we all wanted the same outcome: quality long-term accommodation for people who need help and support**
> **Greg Dickens, Dunclent Properties**

Dickens, who knew Solidbond's work, said: "From day one Ben and his team were brilliant to work with and their professionalism and high standard of work was evident every step of the way. It turned out to be a challenging project, due to the switch from six regular flats to ones suitable for people with 24/7 complex care needs."

He added: "Collaboration between Ben, myself and the care provider, Complesso Healthcare, as well as Future Housing Solutions, who are the lead tenants, was vital. Having so many parties involved was at times difficult but we all wanted the same outcome: quality long-term accommodation for people who need help and support but also a sense of having their own space to call home."

Dickens' development portfolio comprises social projects such as care homes and accommodation for people escaping domestic violence. He says that using contractors who share his passion for delivering social value and are approved by a professional body is now key for him.

He explained: "Having now completed one successful project with Ben and the Solidbond team, they'll be my go-to for any future projects for sure."

He added: "The Tudor Court experience has proven how important using accredited building companies, such as a CIOB company member, is if you want a safe and high-quality project – delivered by professionals for whom it's more than just a job."

▲ From left: Kai Wilson, site manager, Solidbond Projects; Andrea Smith, housing manager, Future Housing Solutions; Greg Dickens, client/employer, Dunclent Properties; Suzanne Webb, Stourbridge MP; John Harper, managing director, Complesso Healthcare Solutions; Ben Dunn, director, Solidbond Projects

Dunn said: "It's amazing now to see the building finished and providing a safe and accessible home for people who would otherwise struggle to have their own place.

"It was a great project to work on, and the end result is all down to the strong working relationship the Solidbond team, managed by Kai Wilson, had with Greg and the care providers who now use it."

He concluded: "Collaboration between builders and clients is vital – and the more that happens, the better a project will be for everyone involved, including the end users, which in this case was clearly more important than ever."

Collaboration between builders and clients is vital – and the more that happens, the better a project will be for everyone involved
Ben Dunn, Solidbond Projects

Tudor Court was officially opened by Stourbridge MP Suzanne Webb on 8 August.

In association with CIOB

Shaping the future

Tomorrow's Leaders is supporting the construction industry with a series of webinars on current challenges

In a three-part free webinar series, representatives of our Tomorrow's Leaders Community, alongside CIOB senior members and industry experts, will explore and discuss the key issues and challenges the built environment is facing, starting with technology, then covering diversity and inclusion, and sustainability.

In the series, Shaping the Future as a Modern Professional in Construction Management, our panellists will share their insights and opinions on how our leaders of today and tomorrow can navigate their way in an ever-changing environment.

Leading the way to a technologically advanced future
16 October, 12-1pm (BST)
Drawing on over 10 years of industry experience, CIOB Trustee and project management and wellbeing specialist Rachael Keeble will chair the first session in the series, which will focus on technology.

The panel of industry professionals will explore how we use technology now, its impact on future ways of working, and how projects are completed and maintained. They will discuss what future careers will look like to meet the changing needs and challenges facing the built environment.
https://ciob.me/mpcm1

Leading the way to a diverse and inclusive future
13 November, 12-1pm (GMT)
In part two of this series, CIOB Trustee and business consultant Noel McKee will lead a lively discussion with other experts, focused on diversity and inclusion. They will share views, tackle preconceptions and showcase successes and case studies on how the industry is promoting a more diverse and inclusive workforce and how implementing EDI into our built assets is benefiting end users living in, working in and visiting our environments.
https://ciob.me/mpcm2

Tomorrow's Leaders is a cross-membership community within CIOB, which focuses on building professionalism, developing skills and sharing knowledge at every career stage while enhancing the pipeline of high-quality construction talent

Leading the way to a sustainable future
11 December, 12-1pm (GMT)
In part three of the series, chaired by CIOB Trustee and senior project manager Sam Dibaj, the panel will discuss the importance of sustainability in the sector, sharing knowledge needed to lead sustainable practices for the future of society.

The event will provide a platform for participants to engage with industry experts, share ideas and discuss challenges and opportunities related to sustainable construction. It will also give an opportunity to question how industry contributions will have an impact on net zero carbon goals.
https://ciob.me/mpcm3

Our global Tomorrow's Leaders community is a cross-membership community within CIOB, which focuses on building professionalism, developing skills and sharing knowledge at every career stage while enhancing the pipeline of high-quality construction talent. If you are an organisation that would like to support one of these webinars through sponsorship, please contact sponsorship@ciob.org.uk.
For further information regarding Tomorrow's Leaders please visit www.ciob.org/tomorrows-leaders or contact tomorrowsleaders@ciob.org.uk.

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Diary dates

Highlights of the CIOB Calendar for the coming month

Site visit & CPD: Bodmin Jail Hotel
▶ 5 October, 3-5pm, Bodmin
This site visit and CPD covers the renovated Bodmin Jail Hotel in Cornwall. In a complex £50m project that took five years, the Grade II-listed former prison was transformed into a boutique hotel that preserves much of its heritage.

Gary Osmar-Smith, the hotel's guest relations manager, will talk on the site's history, while Colin Norman FCIOB, director at Sutherland Construction Services and vice chair of the Cornwall & Plymouth Hub, will discuss the construction.
Contact: estreames@ciob.org.uk

Site visit: College Square scheme
▶ 10 October, 1-2pm, Dublin
Join CIOB Republic of Ireland Hub for a visit to this new commercial office development on the site of Apollo House on Tara Street, Dublin.

The College Square scheme includes a new double-storey basement with car parking, tenant shower facilities and associated core areas, as well as a venue space.

Above ground, the works will consist of a new 10/11-storey LEED Platinum Version 4 office block of approximately 47,000 sq m over the basement, surrounded by landscaped spaces. At ground-floor level there are retail spaces.
Contact: shallinan@ciob.org

Tomorrow's Leaders Sites & Social: Digbeth Masterplan
▶ 12 October, 3.45-7pm, Birmingham
Hear about the Digbeth masterplan from Oval Real Estate and the ESG (environmental, social and governance) roadmap underpinning the regeneration.

A tour of the Digbeth estate will be led by the Oval team: Steve Sanders (head of development); Jo Salmon (head of estates); and Moe Ali (asset manager), with an opportunity to meet occupiers.

Drinks and food will be available at 5.30pm at Baked in Brick, The Custard Factory.
Contact: sshort@ciob.org.uk

Site visit: Glasgow Central Tunnel Tour
▶ 12 October, 5-10pm, Glasgow
Experience the Glasgow Central tunnel tour. The station, which opened in 1879, is steeped in history – with amazing architecture, incredible tunnels, catacombs and a fantastic glass roof consisting of 48,000 panes of glass.

The tour reveals its secret places and shares stories of its past, with complimentary refreshments at the Platform Café Bar.
Contact: wmarshall@ciob.org.uk

Building Safety Act: Are you competent?
▶ 18 October, 11.30am-2pm, Derby
This CPD and networking event will explore the Building Safety Act, focusing on what it means to demonstrate professional competency and the impact it could have on you and your organisation.

Peter Dawber FCIOB, a member of the new Industry Competence Committee (ICC), will open with an overview of the competency requirements. Nicola Markall FCIOB, technical compliance director at Sir Robert McAlpine (SRM), will focus on what competency looks like at an organisational level. They will discuss secondary legislation implications and useful tips.

The remainder of the session will then be driven by you, and we would like to invite you to pre-submit your questions. There will also be an opportunity to ask live questions on the day.
Please send your questions in advance to Georgina Floyd gfloyd@ciob.org.uk

Site visit: Spirax-Sarco Project Oak
▶ 20 October, 2-3.30pm, Cheltenham
A 1960s extension was demolished to make way for the four-storey BREEAM Outstanding extension to Old Charlton House, Spirax-Sarco Engineering's Cheltenham HQ.

This build comprises CFA piled foundations, an RC frame, high-performance glazing within curtain walling, masonry walls with dressed stone, rainscreen cladding, render and hot melt roofing. The finished building will include office space, a central atrium and welfare facilities.
Contact: nbreakspear@ciob.org.uk

AR and BIM in the Construction Industry
▶ 25 October, 12-1pm, online
Join XYZ Reality mission critical director Waleed Zafar to discover how AR and BIM not only enhance visualisation but also revolutionise project controls.

Learn how they enable real-time monitoring, data integration and seamless collaboration, driving efficient decision-making and risk management. A construction company will also explain how it has benefited from the use of AR.
Contact: shallinan@ciob.org

For a full list of events and to register visit www.ciob.org/events.

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architectural acoustic finishes

SonaSpray fcx in the Hard Rock Hotel, London.

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David Mason, Director of Scott Brownrigg Architects.

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