

MAY 2023

Precast & Masonry

Casting the fabric
of Britain



Safety and fire resistance built-in

**Masonry enables fabric
first approach**

**Precast takes centre stage in new
UK infrastructure**

Feature contents

- 4 | Safety and fire resistance built-in
- 7 | Spotlight on sustainability
- 12 | Masonry enables fabric first approach
- 14 | Casting the fabric of Britain



Photo credit: Midland Heart

Project 80 is delivering the first homes in the UK that meet the Future Homes Standard, meaning they use up to 80% less carbon in construction and in their lifetime. The homes were constructed using traditional methods to demonstrate the scalability of decarbonisation.

Our collective challenge

Joining a new industrial sector, even one to which I have had a close relationship with as a civil engineer, has led me to seek guidance from the membership on the challenges we face collectively. From these discussions, I think that our activities as construction product manufacturers must be shaped by two seminal challenges: building safety; and climate change. What is also clear is that with strong voices advocating for alternative material choices, these challenges require collective action and a clear unified voice.

Thankfully, tragedies on the scale of the Grenfell Tower are rare, but they rightly have far-reaching impacts on the way that we design and construct buildings. As described in Dame Judith Hackitt's report, there are a number of layers of protection needed to prevent public harm. For fire safety, the choice of materials used in building design is the key one. It may seem obvious, but by using non-combustible materials in construction, industry can create safer, more resilient buildings. For this reason, it is so important that we demonstrate and highlight the non-combustible nature of concrete and this is particularly important in façades, which have been under great scrutiny. Earlier this year we saw the culmination of fire test work carried out by MPA Precast with the publishing of the successful BS 8414 fire test report and supporting video. This is a powerful example of the precast sector, supported by UK Concrete, reaching a wide stakeholder audience, including the insurance market.

"I think that our activities as construction product manufacturers must be shaped by two seminal challenges: building safety; and climate change."

Jon Prichard | Chief Executive, Mineral Products Association



Our second collective challenge is implementing a net zero transition. UK Concrete and MPA Cement have provided leadership through the publication of the Beyond Net Zero Roadmap, but it will require unified and concerted action in all of our product groups to meet this challenge. I am encouraged that the latest MPA data shows a 53% carbon footprint reduction since 1990 for this product sector. MPA Precast and MPA Masonry will continue to collaborate on sector data collection and decarbonisation efforts.

Although our members cannot achieve net zero without the support of Government and the wider value chain, through MPA, together we can provide leadership for our sector. What has struck me from conversations with both members and external stakeholders, is that a net zero construction sector, supplied by secure local materials, can only be achieved through the evolution of the mineral products sector, rather than via a rushed adoption of alternative and less appropriate solutions. In the housing sector specifically, many of the competitor products, such as lightweight modular housing, lack resilience against the expected impacts of climate change or even the economic or geopolitical upheaval we have seen in recent years. MPA Masonry is working closely with The Concrete Centre and The Future Homes Hub to ensure that concrete products are at the heart of the future homes delivery plan which sets out the roadmap to 2030 and the implementation of Future Home Standard.

Those are just two of many collective challenges that we face but I am reassured that with MPA Precast and MPA Masonry as part of the wider MPA family, we are well positioned to meet them. For that reason, I would like to end by thanking all of our full and associate members for their continued support and engagement, without which our collective endeavours would not be possible.

Jon Prichard | Chief Executive, Mineral Products Association

You can find details of our members and the products they make in our centrefold buyers guide or online www.mpaprecast.org/buyers-guide

Safety and fire resistance built-in

Tried, tested and true

The 2017 Grenfell Fire has had a seismic effect across the UK construction industry, fostering a sea change in the way we design and build and prompting the Government to introduce tougher regulations to ensure such a catastrophe never happens again.

Last year's Building Safety Act and Fire Safety Act promise to achieve a safer built environment and a more transparent construction sector, with the aim of ensuring Dame Judith Hackitt's crucial 'Golden Thread' is realised. Now, every party involved, from product manufacturers and specifiers to asset owners and managers will be legally accountable and liable for the decisions they make before, during, and post-build.

There's no doubt the Government is taking this process extremely seriously, with the LUHC Secretary's latest double-down on his Housebuilder's Pledge highlighting a no-compromise approach. Whilst focused on the residential market, the exercise should serve as an indicator of how policy will move to encompass all aspects of construction.

Significant progress has been made, but there's a way to go. In 2021, the Fire and Rescue Services dealt with over 185,000 fires in England alone. A significant proportion of these were in multiple occupancy buildings including apartment blocks, hotels, education facilities, and hospital units.

At the heart of the issue has been the building products specified. With fire safety now the hottest technical topic, many specifiers and developers are reevaluating every material selected from fabric to finish. Fundamentally, these choices will affect how safe the building will ultimately be, so prioritising non-combustible materials must be the essential goal.



Embodied resistance, inherently safe

Prevention is the best form of protection and building with fire-resistant materials is the best way to guarantee the spaces we occupy remain safe and resilient.

Concrete is a reliable, non-combustible material, maintaining its structural integrity and releasing no VOC's even in the most intense fires. With the highest A1 reaction to fire classification possible, it's the lowest risk option, saving lives and preventing property damage. Fundamentally, it's the most suitable material for fire-safe construction.

To prove this, MPA Precast carried out a full-scale fire test on precast concrete cladding panels, offering unarguable evidence of the efficacy of the materials to anyone who still doubts it.

Top Performer

The BS 8414-2:2020 test was conducted by an independent body, the Fire Protection Association (FPA). The aim of this official assessment was to monitor the behaviour of non-load-bearing external cladding, rainscreen, and external wall insulation when exposed to flames. The process was designed to simulate both an exterior fire and an interior fire which had vented through apertures in the façade.

The results were conclusive. When the timber test crib was lit, temperatures in excess of 600°C were recorded, however, despite this ferocity, the area behind the concrete maintained an ambient internal temperature. This not only demonstrated its ability to shield from flame but also extreme heat.

Structurally, although there was minor cosmetic damage, it remained sound, meaning minimal remediation would be required post-fire.



Unnecessary Risks

The test shows concrete's eminent suitability for fire-safe construction, requiring no additional protection to safeguard occupants.

On the other hand, timber, which is becoming popular as a cladding and structural material, is combustible. Fuelling a fire, it can increase the spread and worse, risk complete structural collapse. This has led to growing calls for specifiers to reevaluate timber designs in light of public safety concerns.

Timber's risks have been further recognised by the National Fire Chiefs Council, which has recently highlighted the many hazards associated with timber construction. The RISC authority has also flagged considerable insurance issues around the material, particularly in relation to the protection of property, as fire damage can lead to financial collapse, possession loss, and even mental trauma.

That's why we need to make building with officially-certified non-combustible materials like concrete the standard for fire-safe construction.

Concrete: The Safest Option

As Luke Smerdon-White, Technical Director, Thorp Precast Limited, concludes:

"Post Grenfell the construction industry has quite rightly faced increased examination as to the fire credentials of building components. Whilst concrete is not combustible, the initial uncertainty and scepticism included Precast concrete façade systems. Members of the MPA Architectural & Structural committee were individually making this case successfully, but sought as a collective, under the umbrella of the MPA, to undertake the most vigorous test available to the UK of the entire precast façade build-up.

The results of the BS 8414 test clearly demonstrate that precast concrete façades are extremely robust and provide outstanding resilience, enforcing the MPA message that concrete does not burn."

Ultimately the construction sector must design and build using the safest products available. Concrete's advantages are obvious and can help specifiers, developers and contractors alike achieve fire-safe outcomes which comply with regulations and protect occupants, owners, and insurers alike.



REUSE TO REDUCE

Elematic FaMe is the shuttering system you can use over and over again. With the right care, your FaMe system will be your daily partner in fast shuttering for over 10 years.

BOOK A TIME
to chat with one of our Shuttering experts by scanning this QR code.

DID YOU KNOW?

You can cut your monthly LVL usage by 50% with FaMe system.



Paul Görner, Sales Engineer
Badei Makhmour, Sales Engineer



Download
FAME SHUTTERING GUIDE

Please visit elematic.com for more information and follow us



Apprenticeships through Derby University

Trying to attract young people into the precast industry has always been a challenge as we had no clear development pathway for candidates to follow. The main areas we wanted to address throughout the apprenticeship were, Health & Safety, Quality Management and Production Management.

When we engaged with Derby University, we found them very receptive to the idea of creating a precast module that could fit into an existing Higher Level Apprenticeship programme. Going forward, we have created a range of excellent career opportunities in conjunction with Derby University to attract new talent into the sector that can earn as they learn, completing their university degree while obtaining valuable work-life experience, without excessive student loan debts.

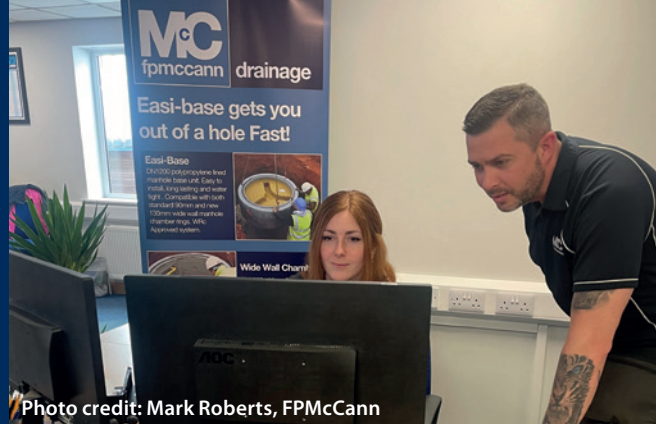


Photo credit: Mark Roberts, FPMcCann

Mark Roberts, Despatch / Yard Manager, FPMcCann, shares his motivations behind enrolling on the programme:

"I am currently in the first year of the programme and enjoying working through the core Workplace Health and Safety, Operational Management and Sustainability Modules. As a mature student and single father, time management is the biggest challenge I face, however the programme leader and lecturing team are always available to offer support and guidance. Although I am 27 years into my career, I am relatively new to the industry; so gaining a vocational qualification whilst in parallel gaining valuable experience from industry experts was important to me."

Safer handling of inbound and outbound material

Handling goods of any weight safely is an essential skill for any employee in almost any sector. In the construction industry in particular, lifting failures have the potential to cause serious damage to products, sites and - most importantly - people.

For businesses in the concrete and precast sector, staff are frequently interacting with extremely heavy loads, requiring robust processes to be in place that keep employees safe including when operating lifting accessories, equipment and cranes.

Explore Manufacturing has been investing in equipment and training to ensure everyone has the right skills, knowledge and risk controls in place to mitigate and manage the risk associated with the lifting of heavy concrete products.

Establishing lift plans for each unit, which are determined at the design stage, as well as carrying out lift briefings and ensuring regular communication between crane operators and slingers are all effective strategies to ensure goods are handled appropriately and safely. As well as keeping staff safe from harm, these processes can boost staff morale and are often a point of positive feedback from clients.



Photo credit: Explore Manufacturing Limited

Spotlight on sustainability

Precast Concrete and Masonry sustainability report: summary

Design and construction communities are working hard to reduce the environmental impact of buildings and structures.

The precast and masonry sectors were among the first to produce EPDs (Environmental Product Declarations) for the UK's production of blockers, pavers and many other precast products, and we continue to update our sector EPDs to ensure that the construction industry uses the most accurate and up-to-date data in Whole Life Carbon Assessments (WLCAs).

Our annual auditing and data collection scheme continues to allow the sector to report on key sustainability metrics and show the progress being made right across the membership.

Sustainable consumption and production systems

In 2021, 91.8% of members' production was covered by ISO 9001 and 90.1% of precast and masonry produced was covered by ISO 14001. Responsible Sourcing certification to BES 6001 rose to 88.5%, up from 71.1% in 2012.

Currently, around 27% of our members are covered by third-party EPDs; this is expected to rise to 70% when our sector EPDs are renewed and members can generate their own product EPDs. [See EPDs article on page 8]

Natural resources and circular economy

Factories' water consumption and waste generation increased

compared to previous years, but remained below 2012 levels, while the use of low carbon cementitious materials increased significantly in 2021.

The proportion of British-made rebar, mesh and strand has also increased, accounting for almost two-thirds of all reinforcement used by members.

Sustainable communities

Around 83% of respondents have formal Code of Business Ethics policies; 93% reported having an Equal Opportunities policy and around 93% have already introduced measures to ensure compliance with Anti-Bribery and Corruption legislation. Nine out of every 10 companies (90%) have an Anti-trafficking & Slavery statement.

Climate change & energy (including transport)

The precast and masonry sector's consumption of fossil fuels continues to drop, while precast factory energy consumption dropped to ~54.4 kWh/t in 2021, from ~62.7 kWh/t in 2012.

The share of renewable energy (not subject to Feed-In-Tariffs) has almost quadrupled since 2019. Around 44% of all electricity used by precast and masonry factories in 2021, almost 85,425 MWh, was from green renewable resources.

Factory carbon emissions stayed low in 2021, at around 10.03 kg CO₂/t. The overall reduction in factory carbon emissions from 2010 levels was around 50%.

www.mpaprecast.org/sustainability-report



Photo credit: Sterling Services Limited

Net Zero ambitions in action

1. A Net Zero carbon roadmap

The concrete & cement sector aims to become a carbon negative industry by 2050. The sector has been actively exploring short-term carbon targets and examining a wide range of short-term scenarios modelling how carbon reductions at factory, mix design and product geometry levels can reduce carbon emissions.

2. Equipping the industry with accurate & verifiable carbon footprints & assessments

Providing our members with access to One Click LCA has enabled more companies to develop EPDs and WLCAs (Whole Life Carbon Assessments). Precast manufacturers are already using the tool to experiment with their mixes and develop projections of their likely future carbon emissions with higher levels of accuracy.

3. Commitment to provide accurate carbon & environmental assessments

To tackle the rise in inaccurate carbon reporting, MPA Masonry recently argued successfully for an amendment to the IStructE's embodied carbon calculator and also completed a study exploring the true wastage rates of masonry blocks on site to help improve the methodology currently used in WLCAs. [See EPDs article below]

4. Rewarding success and sharing best practice

The Precast and Masonry Sustainability report also highlights the successes of our membership, this year including Techrete, which launched its "Net Zero emissions by 2030" strategy in 2021. Techrete has been investing in renewable energy solutions, such as solar arrays and geo-thermal heating, and introducing low carbon reinforcement and limits to cement in their mixes to reduce emissions associated with their cladding products.

MPA Precast and One Click LCA enable Brett Landscaping to publish EPDs

Environmental Product Declarations (EPDs) are becoming increasingly popular in the construction industry, and Brett Landscaping are at the forefront of this by publishing EPDs for their paving products. EPDs are third-party verified documents that provide transparent information on the environmental impact of a product throughout its lifecycle. The EPDs for Brett Landscaping's paving products are created in accordance with ISO 14025, ISO 21930 and EN 15804+A2 standards and cover all aspects of the product's environmental impact, including raw material extraction, manufacturing, transportation, and end-of-life disposal.

The key benefit of EPDs is that it enables businesses to be honest and provide customers with the information they need to make informed decisions about the environmental impact of the products they are purchasing. From this, customers can decide to work with a manufacturer who can demonstrate their dedication towards sustainability whilst also earning credits towards BREEAM and LEED certifications.

The process of creating an EPD involves a comprehensive life cycle assessment (LCA), which is carried out using the One Click LCA tool, that analyses the environmental impact of a product from cradle-to-grave. This assessment is then verified by the EPD Hub to ensure accuracy and transparency. Once verified, the EPD is published into the public domain.

In summary, EPDs produced by Brett Landscaping provide customers with the information they need to make informed decisions about the environmental impact of their paving products. By publishing EPDs, Brett Landscaping are demonstrating their commitment to sustainability and transparency while also identifying areas where they can improve their environmental performance.

No more wasted opportunities

On-site wastage has been a longstanding problem for the UK construction sector, not only affecting the bottom line but also making a significant contribution to a project's CO₂ emissions. With the global drive towards Net Zero, every effort is being made to reduce carbon, wherever possible, including the building materials selected and the way they are specified.

With a commitment to low carbon construction, MPA Masonry and the British Ready Mixed Concrete Association (BRMCA) were keen to understand wastage rates generated from the use of aerated blocks, concrete blocks, and ready-mixed concrete. Working with respected environmental consultant Reusefully Ltd, the organisations conducted qualitative and quantitative research amongst some of the UK's largest contractors, developers, suppliers, and waste data specialists to get to the heart of the issue.

Not only that, its team, headed up by Dr Katherine Adams and Gilli Hobbs analysed existing and historic data, to achieve the most accurate set of figures possible.

Long regarded as a missing link within the carbon reporting chain, both bodies wanted to prove that building with concrete consistently results in minimum amounts of waste and, importantly, work within circular economic principles.

According to David Manley, Head of Sustainability at Forterra:

"As a sector, we promote the whole life approach to measuring the impact of our product. This means we need to know what happens at each stage of the product or asset's life. The one area where we had the least amount of knowledge was the amount of waste being generated on-site during construction and ensuring we distinguished between temporary works and any actual waste.

The results were resoundingly positive, the team was able to identify that on-site wastage rates for blocks were a mere 3-5% and 1-2% for ready-mixed concrete. Research participants suggested that factors including good design, quality, procurement, and site management practices contributed to a lower percentage, highlighting that the way the material is handled on-site is a major factor in keeping waste to a minimum.

Importantly, this rate for blocks is significantly lower than the 20% wastage rate used for the product over the last five years in official carbon assessments, suggesting upfront carbon has been overestimated by at least 15%-17%. Furthermore, wastage rates for ready-mixed concrete are exceptionally low, especially as the supply chain has got more sophisticated, with customers ordering to need rather than expectation.

From here, the research recommends several steps to further reduce wastage. MPA Masonry and BRMCA are already exploring further research opportunities, specifically looking at how site wastage data collection can be improved, alongside other organisations active in this area, including GLA, BRE, and QualisFlow.

As David Manley concludes, "This research study has established what we believe to be a true reflection of site practice. We also hope that by asking our supply chain to review how much waste is being produced they will further value our products and look to identify opportunities to reduce any waste being generated and ensure it's recycled appropriately".



Masonry enables fabric first approach

Concrete at the heart of Future Homes

As we move towards incoming legislation that will change the way housing in the UK is built, MPA Masonry members find themselves well placed to continue to be the primary solution for quality house building at scale. The forthcoming Future Homes Standard along with other publications from the Future Homes Hub, such as the next edition of the embodied carbon report, are issues that concrete block and aircrete products look to work closely with the Future Homes Hub on.

One of the central technical requirements of the Future Homes Standard, the need to lower fabric u-values, has already been met by the masonry industry. Innovative schemes such as Project 80 (Midland Heart Housing), completed in modified traditional masonry builds, have delivered on this new and improved standard of housing. Ultimately, the move towards providing more energy efficient homes cannot come soon enough for a housing market that's feeling the pinch during a cost-of-living crisis.



The resilience of concrete products is a key factor in why they provide the answer when choosing a material for the fabric of homes. Many of the obvious inherent properties of masonry builds give you a more robust construction leading to peace of mind for the end users. It's a key added benefit to the prospective homeowner that delivers over and above achieving a set performance standard.

MPA Masonry members supply Project 80

H+H aircrete blocks and Besblock concrete blocks are currently being used on a landmark housing development, Project 80. Launched in 2022, The West Midlands-based scheme, which is being undertaken by Midland Hearts Housing Association will provide a blueprint for the UK's residential construction sector, with the aim of building 80 properties which meet or exceed the requirements of the Future Homes Standard.

Correct material specification is crucial to success, as every residence within the estate has to be designed according to a 'Fabric First' approach. This means that, no matter what heating solution is installed, the building itself needs to be as efficient as possible, meeting set targets stipulated within the new standards.

This criteria directly led to the selection of H+H aircrete blocks, as they are not only lightweight, easy to install and sustainably manufactured, they also meet the development's brief for a thermally efficient, air-tight structure. Concrete blocks have been chosen for cavity wall construction due to their inherent thermal performance qualities, which would help achieve ultra-low u-values.

When it came to the supplier, the developer was also keen to work with a local, Midlands-based business with plenty of regional experience. Shropshire based Besblock, which has been manufacturing high quality concrete blocks for over 50 years proved a natural choice, as

they were able to deliver the large quantity of product required, to tight timeframes with the minimum amount of logistics, keeping the supply chain short and carbon emissions low. Specifically, its Universal Star Performer block was chosen, as it has lower embedded CO₂ than traditional blocks through the use of reduced-carbon "sustainacem" and low impact natural aggregates. Cured by energy from a nearby waste wood facility, its composition also incorporates construction waste from West Midlands sites, promoting circularity.

In addition to the concrete and aircrete blocks' inherent attributes they are also able to enhance the performance of the energy saving technology within each property, including underfloor heating and air source heat pumps. This results in high performance houses which not only comply with the Future Homes Standard, but will stand the test of time and remain resilient to fluctuating climate conditions.

The Future Homes Standard will firstly tackle operational carbon through a focus on building fabric, work on embodied carbon is incoming; a long-standing challenge for the entire precast industry. Decarbonisation progress has taken a significant step forward in recent years, use of novel materials and trials of low-carbon alternatives are becoming more prevalent in the industry and long term we all look to drive embodied carbon out of our products.

Moreover, the drive to remove embodied carbon from masonry products should lead to class leading life cycle figures, especially given the intended lifespan of these homes over and above current modelled duration. It has been a long-standing desire from the precast industry to look at lifespans of domestic housing in excess of the 60 years currently quoted by RICS professional statement with masonry products being assured in excess of 100 years.

From carbon sequestering materials to quantum leap technologies such as growing concrete in a test tube, there has never been a more interesting time to see what is going on in the world of concrete technology.

The full-scale fire test carried out by MPA Precast and UK Concrete has recently highlighted the excellent fire resistance afforded to structures

that are built out of concrete. It's a key aspect of performance that is sometimes taken for granted, however, the robustness of concrete products exposed to fire cannot be overstated. Aside from non-combustibility, the fact that in fires no toxic fumes are given off is a performance benefit that should drive home the safety benefits to homeowners.

External factors such as climate change will have a further impact on how we expect the industry to perform. It is clear from IPCC reports as well as recent weather events, that global climate change will bring a significant uptick in extreme weather events and temperature variations to the UK. Two main challenges to the housing industry manifest in the form of overheating and flooding, both of which are real risk factors for the general public.

A vastly understated quality of heavyweight homes is resistance to overheating, especially given the record temperatures seen in the UK last summer. The important principles of thermal mass have been more fully incorporated into Part O of building regulations allowing a much more nuanced approach to targeting specific overheating problems. Dynamic thermal modelling of masonry construction under these regs will yield anything up to a 2.0°C reduction in peak temperatures, making overnight conditions more comfortable for occupiers.

The robustness and resilience of traditional masonry builds in flooding scenarios is a key benefit of concrete products as specifiers increasingly need to consider climate adaptation into their decisions. We have all seen reports of terrible losses of property where rivers burst their banks or extreme rain events bring flooding to previously unaffected areas. Even areas that received flood protection in the past are not immune from susceptibility, with older protection schemes now inadequate to tackle more extreme flooding scenarios.

Our industry, while providing flood management solutions also provides the resilience needed to allow repairs should a flooding event occur. Local tradespeople are well qualified to retrofit flood damage where traditional masonry fabric is used for building, with no need for structural elements to be replaced, making it a straightforward task to bring properties back into use as soon as possible.

All told, the masonry industry is well positioned to face new challenges, many of which are legislation based while others focus on the need to take greater responsibility for our role in meeting the climate change challenge head on. Given all that is going on within our industry, maybe the biggest challenge is changing perceptions around 'traditional' masonry building but the task is one we look forward to.



Casting the fabric of Britain

Ground-breaking precast infrastructure

More and more projects are utilising concrete in new and exciting ways. From the tunnels housing HS2's high-speed trains to the colossal Thames Tideway Tunnel, construction projects across the UK are exploring the potential for concrete to be a ground-breaking - and sustainable - building material.

Thames Tideway Tunnel

The Thames Tideway Tunnel will upgrade London's Victorian-era sewage, making it able to handle the demands of nearly 9 million people. The 7.2 meter diameter tunnel will stretch from Greenwich to Stratford with a break at Bermondsey.

The essential upgrade to the UK's infrastructure will also bring environmental benefits, collecting sewage before it enters the river and ensuring it is properly treated to protect London's flora and fauna.

Even for the project's construction, Tideway wanted to deliver the project with the lowest possible contribution to greenhouse gas emissions, aiming for an 8% reduction in embodied carbon (against a 2016 baseline) with a stretch target of 10%.

FP McCann supplied two precast concrete segmental shafts to form part of the "super sewer", both of which have been sunk at the tunnel's central London site at Heathwall Pumping Station.

The small site has posed a range of challenges to the contractors in charge of sinking the shafts, such as the proximity to the river and local residents. The smaller of the shafts at 11.4m ID was sunk to a

depth of 28 metres below ground, while the second shaft, which is larger at 17.5m ID and at 54m deep, links to the base of the small shaft by a 2.4m ID 42 metres long culvert tunnel.

Both shafts were sunk using the jacked caisson method to a depth of 16m followed by the underpinning method of construction to a depth of 33m and utilised Spray Concrete Lined (SCL) to a finished level 54m BGL. The smaller shaft was constructed using the same methodology.

Explaining the use of precast concrete for the shafts, Project Manager for Active Tunnelling Richard Wilson said: "The use of such universal precast concrete segmental shafts allows for an extremely efficient and structurally sound build process enabling two options, caisson and underpinning. Construction is simple and allows for ease of ground excavation."

"The smaller site footprint taken compared to other shaft construction options, helps to reduce the volume of material to be removed thereby minimising the environmental impact. From the installation of the first rings, both shaft builds continued uninterrupted".



Photo credit: Tideway



Farringdon's Crossrail station

Concrete is the star of the show at Farringdon's Crossrail station, with a cathedral-like concrete ceiling arching over three spaces showing just how impressive and versatile the material can be.

Known as the upper apse, the first spectacular ceiling above the station's Cowcross Street entrance forms an array of diamonds across the ceiling made up of criss-crossing concrete beams. Up to 12-meter long beams form a surprisingly smooth and elegant ceiling, supporting the sloping concrete panel soffit of a wide stairway with escalators carrying passengers to the Underground lines, including the newly-built Elizabeth Line.

As well as its striking aesthetic, the diamond pattern is also a nod to the nearby diamond dealers and jewellery stores in Hatton Garden; cleverly concealed lights even add a gem-like gleam to the ceiling.

Concrete was chosen for its low-maintenance nature, allowing for a high impact appearance that would last longer. "We wanted to avoid metal ceilings which require ongoing maintenance. Metal panels get opened and closed to access hidden services and begin to look tired after a while," explains Soji Abass, Crossrail's lead architect for the station.

Precast concrete also made the construction process easier and safer, according to project manager Duarte Seixas. "We looked at making this ceiling from in-situ concrete, but it would have been very hard to achieve the finish we wanted on an incline. It would also have been difficult to crane material and reinforcement through a heavy steel structure above. We looked at making just the beams from in-situ and putting precast panels above, but dismissed this for the same reason, so in the end we agreed that the whole ceiling should be precast."

102 precast concrete elements were installed using a temporary steel structure, which was removed after the permanent steel and concrete elements had been put in place. The precast supplier, Evans Concrete Products, used a large, to-scale mock-up to check this approach would work.

Once the beams and nodes were assembled, 63 precast slabs made up the diamond patterns by being placed on ledges along the sides of the beams. Even this seemingly minor element contains detail and forethought; the panels are sitting loose on their ledges, rather than being fixed in position, to allow the pressure of a potential explosion to dissipate through the building.

HS2 Green Tunnels

As part of the construction of HS2, the UK's high-speed rail network, Sateba Stanton Precast were awarded the contract to deliver three innovative, modular design green tunnels.

The first tunnel, stretching 1.5 miles at Chipping Warden, will be made up of 5,020 segments reinforced with steel; five different concrete precast segments will form the towering 'm'-shaped arch: one central pier, two side walls and two roof slabs.

To reduce disruption and improve efficiency, each of these segments will be crafted at Sateba Stanton Precasts' Ilkeston factory before being shipped to sites across Buckinghamshire and Northamptonshire, where they will be assembled.

Another green tunnel, at Greatworth, Northamptonshire, will similarly be manufactured in Derbyshire before being shipped to the HS2 site and assembled over the proposed railway line as it passes through the village, before being covered in earth and landscaped to blend into its surroundings.

The innovative design, which reduces the amount of concrete and steel by using this lighter-weight modular approach will significantly lower the overall carbon embedded in the structure. The tunnels will also have specially designed 'porous portals' at either end to reduce the noise of trains entering and exiting the tunnel and small portal buildings to house safety and electrical equipment. It also requires fewer people and less equipment on site, minimising disruption for local residents and increasing the safety of the site.



Photo credit: © HS2 LTD

Precast takes centre stage in new UK projects

Three exciting new developments across the UK are showcasing the versatility of concrete and precast panels. Extensive investment is taking place in East London's Stratford, with much attention being given to creative spaces in the area, while Everton FC's stadium is beginning to take shape – all with the innovative use of concrete.



Photo credit: Everton Football Club



Photo credit: FPMcCann Limited

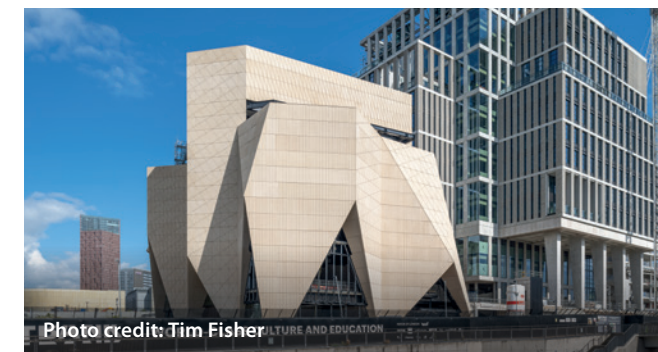


Photo credit: Tim Fisher

Everton FC Stadium

The construction of Everton's 52,888-seater stadium continues to progress, with the primary concrete structure in all four stands now complete.

Work will now focus on completing the stadium's upper bowl, which has started in the west stand with upper tier steelwork on top of the concrete structure progressing alongside the installation of terracing units and a retaining wall to the rear.

All of the precast concrete elements that have now been produced are ready to slot together to form what will be the floors, walls and supporting pillars of the stands. Each component has been created in a specialist factory and brought to site using a pioneering process known as Design for Manufacturing and Assembly (DfMA).

As the project nears completion, the cranes will begin to be dismantled and work will start on external excavations for two giant underground tanks designed to harvest rainwater for use across the stadium, such as in flushing toilets.

Effective use of Building Information Modelling (BIM) has enabled the project to be mapped and planned in minute detail, covering everything from the millimetre-accurate assembly of prefabricated concrete walls and the exact location of plug sockets to identifying potential clashes and risks in the construction sequence.

BBC Music Studios

FP McCann has secured the £50 million contract to supply an internal precast wall lining system and hollowcore flooring for the BBC's new music studios in East London.

The studios, part of Stratford's Queen Elizabeth Olympic Park, will replace the existing BBC studios in Maida Vale and become the new home of the BBC Symphony Orchestra, helping to establish the area as a key destination for music and the arts.

FP McCann is working alongside structural engineers and acoustic consultants to install precast concrete acoustic wall lining systems in combination with a hollowcore panel roof structure, providing outstanding acoustics for the studios as well as a sleek, urban aesthetic.

The reinforced precast concrete studio wall lining units are all 150mm thick with a Type C surface finish; they comprise of single solid panel sections together with units that have case in openings for doors and studio viewing windows.

The hollowcore flooring system will be made up of prestressed, steel-reinforced concrete planks ranging from 150mm to 400mm deep, with a total of 4,800m² of hollowcore flooring to be supplied in total.

V&A East

The V&A East expands the museum's presence into East London and forms part of 'East Bank', which comprises the V&A, BBC Music, UAL College of Fashion and Sadler's Wells, at the new Stratford Waterfront.

Inspired by the sleeves of a dress on a Vermeer painting in Dublin and also Spanish couturier, Balenciaga, Irish architects O'Donnell + Tuomey designed the façade to 'act as a 3-dimensional folding dress, lending the museum a distinctive form and striking identity.'

The unique nature of the V&A East for Techrete, as an architectural precast concrete specialist, is the complex geometry of the structure and façades. The inclined nature of the façade to different angles, planes, and bespoke corners, presented a challenging task in terms of the coordination of the 3D design, the mould-making and site preparation. A 3D 'digital twin' was created by Techrete's engineers to ensure clashes with other disciplines were minimized, and scheduling and sequencing was optimised.

To achieve the complex shapes within the two metre height modules, a 'kit of parts/stage casting' approach in our panel production was implemented and individual panels were cast in stages, some of which were made up of three parts. This approach enabled Techrete to produce multi-faceted panels, since most sides are formed against the mould surface. These surfaces subsequently received an acid etched treatment finish, ensuring the consistent appearance of the panel.

The features included within the panels such as peaks, troughs, recesses and scores, presented an added complexity to Techrete's mouldage, and the key to our success in this regard was twofold. Firstly, it was dependent upon the bespoke moulds which were produced by Techrete's expert in-house joiners and secondly, in the precision placement of the stage casts within the moulds, to achieve the very high level of accuracy required.

Some 474 panels, covering 5,878 square metres of the museum were fixed to the structure between September 2021 and April 2022. The inclined façades required Techrete to 'bend the law of gravity' and very specific installation sequences were followed to 'top score' in this large-scale game of Tetris.

CURING, MOULD RELEASE, ADMIXTURES, REPAIR



48 HOUR

SITE SUPPORT PROMISE

GROUTS

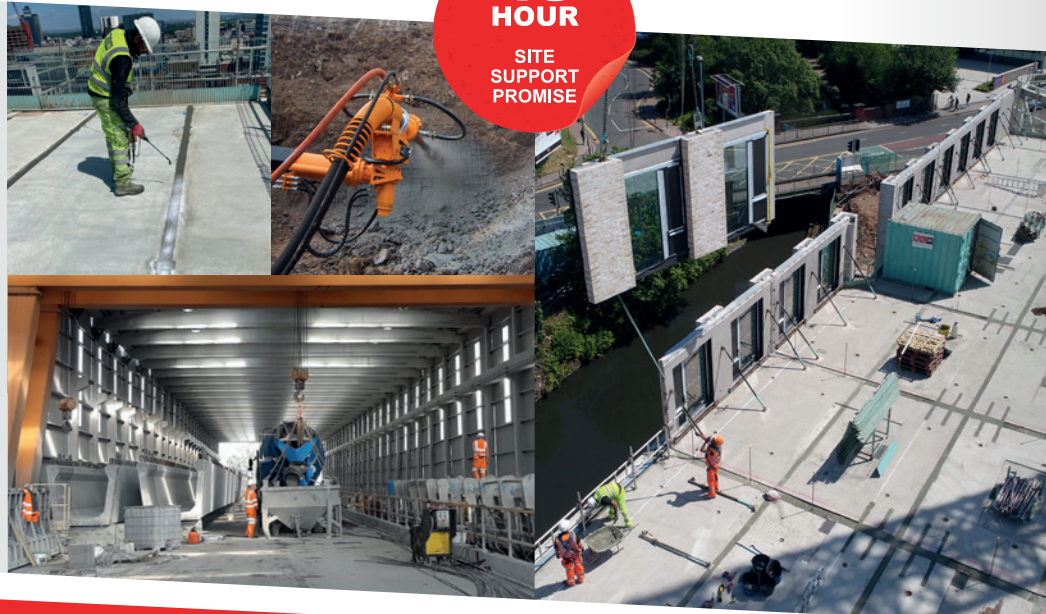
- > Bedding mortar
- > Conbextra BM, PM & GP

ADMIXTURES

- > Plasticisers
- > Super Plasticisers
- > Mould Release Oils

CONCRETE REPAIRS

- > Fairing coats and patch repairs



www.fosroc.com

T: 01827 262222 | E: enquiryuk@fosroc.com



Producer members

ABM Precast Solutions Limited	Forterra	Patersons of Greenoakhill Ltd
Aggregate Industries (UK) Limited	Forticrete Limited	Plasmor Limited
Anderton Concrete	F P McCann Limited	Precast Products Group
Banagher Precast Concrete Ltd	H+H UK Limited	Robeslee Concrete Company Limited
Besblock Limited	Hillhouse Quarry Group Ltd	S Morris Limited
Breedon GB Materials - Scotland	Ibstock Concrete Ltd	Skene Group Construction Services Ltd
Brett Landscaping & Building Products	Interfuse Limited	Specialist Precast Products
Broome Bros (Doncaster) Limited	Laird Bros (Forfar) Ltd	Stanton Precast Limited
CEMEX	Levenseat Ltd	Sterling Services Limited
Cornish Concrete Products Limited	Longley Concrete Ltd	Stowell Concrete
Craven Concrete	Mannok	Supreme Concrete Limited
Creagh Concrete Products Limited	Mansfield Sand Company (Brick Division)	Tarmac Building Products Ltd
Cross Concrete Flooring Ltd	Marshalls Civils and Drainage	Techrete Limited
Decomo UK Limited	Marshalls plc	Thakeham Tiles Limited
Delta Bloc UK Limited	Mona Precast (Anglesey) Limited	Thomas Armstrong Group
E & JW Glendinning Limited	Naylor Concrete Products Limited	Thorp Precast Limited
Elite Precast Concrete Limited	Newlay Concrete	TT Concrete Products Limited
Evans Concrete Products/ Shay Murtagh Group	O'Reilly Precast Ltd	WDL (Concrete Products) Ltd
Explore Manufacturing	PACADAR UK Ltd	

Associate members

Adfil Construction Fibres	GCP Applied Technologies Ltd	Precast Concrete Structures Limited
Adomast Manufacturing Ltd	Graceland Fixing Ltd	Precast Construction Technology Ltd
ArcelorMittal Sheffield Ltd	Halfen Limited	Precast/Prestressed Concrete Institute
B&B Attachments Ltd	Hanson Cement Limited	Precast Structural Solutions Ltd
BDS Marketing Research Ltd	Hickman & Love (Tipton) Ltd	Probst Handling Equipment
Besser Company	Inter-Minerals	Procter Johnson
Beton Machinery Sales	Invisible Connections	Progress Group
BRE	J & P Building Systems Limited	PUK Ltd
Breedon Cement Ltd	Kingston University	Resiblock Ltd
Builders Merchants Federation	KVM Industrimaskiner A/S	RFA-Tech Ltd
Cambrian Services Limited	Lanxess Ltd	Schöck Ltd
Canadian Precast Institute	Larsen Building Products	SDG
Caswick Ltd	Leading Edge Management	Sicoma S.V.R.
Cenin Limited	Leca Danmark A/S	SIKA Ltd
Chyso UK Ltd	Leeds Oil + Grease Co. Ltd (LOGCO)	Simply Precast Accessories Ltd
ClarkeConsult	Longrake Spar Co Ltd	SKAKO Concrete A/S
Command Alkon UK Ltd	Loughborough University	Spiroll Precast Services Ltd
Concrete Manufacturers Association - South Africa	Lytag Ltd	Stainless UK
ConcreteNZ	Mapei UK Ltd	Strusoft UK
Concrete Technology Ltd	Martek Industries Ltd	Tarmac Cement & Lime Limited
Conspare Ltd	Master Builders Solutions UK Ltd	Tarmac Trading Limited
Construction Fixing Systems Ltd	Max Frank Ltd	Trelleborg Pipe Seals
Construx	Megasteel Ltd	Trimble Solutions (UK) Ltd
Cordek Limited	Mentor Training Solutions Ltd	UK Certification authority for Reinforcing Steels (Cares)
CPI Worldwide	Miers Construction Products Ltd	University College London
Doncaster College	National Precast Concrete Association Australia	University of Brighton
Dundee College	National Precast Concrete Association USA	University of Dundee
Dywidag-Systems International	O.C.O. Technology Ltd	University of Nottingham
E3 Recruitment	Orlimex UK Ltd	University of Sheffield
Ecocem Ireland Ltd	Oscrete UK	University of Surrey
Ecoratio Ltd	Parex Ltd	University of Teesside
EKC Systems Ltd	PCE Limited	University of the West of England
Elematic Oyj	Peikko UK Ltd	University of the West of Scotland
ERICO Europe b.v.	Pemat UK	Wincanton
Euro Accessories Limited	PERI Ltd	Yara UK Ltd
Fosroc International Limited	Polarmatic Oy	

Made in the UK

CE and UKCA marked

BOLTED COLUMN CONNECTION

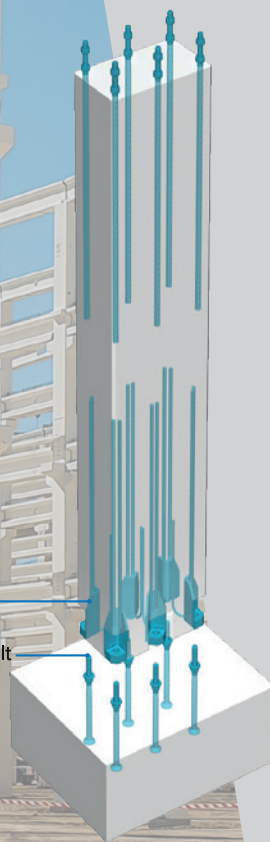
BENEFITS OF HPKM® COLUMN SHOE

- Easy design process
- Tested, reliable, and safe
- Fast erection process
- Prop-free column installation
- Completed connection as stiff as a cast-in-situ connection
- Approved by EOTA, granted ETA
- Local manufacturing in the UK

Visit us at Precast & Masonry Expo 23 on May 18th!

HPKM® Column Shoe

HPM® Rebar Anchor Bolt



peikko.co.uk

Published 2023 © Mineral Products Association (MPA)

MPA Precast and MPA Masonry are part of the Mineral Products Association, the trade association for the aggregates, asphalt, cement, concrete, dimension stone, lime, mortar, and silica sand industries.
www.mineralproducts.org

MPA Precast and MPA Masonry
The Old Rectory
Main Street
Glenfield
Leicestershire
LE3 8DG

Web www.mpaprecast.org
Twitter @mpa_precast
LinkedIn @mpaprecast

Web www.mpamasonry.org
Twitter @mpa_Masonry
LinkedIn @mpamasonry