

Reshaping society

As the most widely-used man-made material in the world, concrete plays a key part in reshaping both the look and structure of the built environment. However, technological advances need to strike a balance with environmental requirements and the need for sustainable development.

■ by **Richard Kershaw**, *Cemex UK, UK*

Today's pioneers in concrete technology are responsible for reshaping society, the economy and the environment. Ready-mix concrete is the most widely-used man-made product on the planet, providing the current fabric of our built environment and the basis for our future renewable energy infrastructure. As such, we are compelled to work hard to mitigate climate change by reducing CO₂ emissions in our production processes and in the entire lifecycle of our products.

When it comes to balancing technological advancement and innovation with environmental needs and concerns, it is a finely-tuned operation and one that is not taken lightly at Cemex. Climate action is by far the biggest challenge of our time, demanding new ways for industry to work together to develop and embed new and ambitious technologies with urgency.

For many years, in the UK and globally, the concrete and cement industry has been committed to continuous improvement and innovation. On a European level, we are encouraged by CEMBUREAU's latest update outlining the sector's climate ambition within the cement and concrete value chain, which it says has moved from 'ambition to deployment' over the last four years. Clearly it is this appetite for improvement we share as an industry that is driving the continued acceleration and transition towards net zero.

Our 'Future in Action'

For Cemex, advancement in concrete technology means putting carbon reduction and collective action at the heart of all key decision making processes. Our global 'Future in Action' decarbonisation and sustainability programme sets the pace and is working hard to achieve sustainable excellence through climate action, circularity and natural resource management, with the primary objective

of becoming a net-zero CO₂ company by 2050.

In May 2022 Cemex announced the inauguration of a new UK Climafuel facility at its Rugby cement plant. Using Climafuel at the Rugby cement plant has contributed to 75 per

cent alternative fuels usage across the company's European-wide operations. Whilst at the Cemex Tilbury cement plant on the River Thames, the company has just unveiled its first vehicle powered by hydrogenated vegetable oil (HVO). As a diesel-like biofuel, HVO is one of the leading alternative renewable fuels available to the construction industry, producing up to 90 per cent less CO₂ emissions than traditional diesel fuel. Considered a transitional fuel, it is helping to lower CO₂ emissions while the industry moves towards more longer-term solutions such as electric or hydrogen power. On a global scale Cemex Ventures, the corporate venture capital and open innovation unit, continues to invest in Carbon Clean to tackle industrial decarbonisation through advanced carbon capture technologies and solutions. Just a few examples of investment into breakthrough technology to achieve carbon neutrality.

By developing strategic partnerships with industries and companies at the forefront of carbon capture, utilisation and storage (CCUS), as well as other innovative solutions such as concentrated solar thermal power to drive clinker production and CO₂ mineralisation, among others, Cemex is currently working with over



Cemex's Rugby cement plant in the UK inaugurated a new Climafuel installation, supporting the use of alternative fuels

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50 partners to develop industrial-scale solutions to reach net-zero CO₂ emissions. With more than 1000 innovation ideas in the pipeline, the company has more than 220 active projects in its innovation portfolio.

Cemex is making substantial progress globally with its decarbonisation commitments. In 2023, as the first company in the industry to provide validated environmental impact disclosure for 100 per cent of its cement products, it also successfully reduced Scope 1 and 2 specific CO₂ emissions by 13 and 12 per cent, respectively, since 2020. This progress has been achieved at a pace that would have taken 15 years to accomplish previously. In 30 per cent of Cemex sites that are located in water-stressed areas, it has now also implemented water optimisation plans. Alternative fuel usage increased to 37 per cent, the highest level in Cemex's history and the clinker factor fell to 72 per cent, a record for the company's cement operations.

In 2023 Cemex also launched its Regenera waste management business worldwide as part of the expansion of Cemex's profitable Urbanisation Solutions portfolio. The Regenera business specialises in providing circularity

solutions to extend the life cycle of products and materials by reusing them in value-added products. Leveraging Cemex's global expertise and infrastructure to use waste and industrial by-products as sustainable substitutes for fossil fuels and natural raw materials in its production processes, the company can now offer a wide range of tailored services including reception management, recycling and co-processing of waste. Globally to date, Regenera has helped to repurpose close to 28Mt of waste and by-products.

End-to-end digital solutions

With new and emerging technologies gathering momentum across the value chain, we are also witnessing major leaps forward in digitisation, machine learning (ML) and artificial intelligence (AI). The adoption of AI and ML are without a doubt poised to revolutionise the construction sector from an innovation and technological perspective, with applications ranging from design and planning to project management and maintenance. And whilst adoption rates might be slow compared to other sectors where they are being deployed, we are seeing highly favourable results.

Digital transformation is a top priority at Cemex, as the company continually looks for digital solutions to innovate and drive more efficient, sustainable and safer construction projects and practices. In the UK, Cemex's digital solutions portfolio was launched with the arrival of Cemex Go – the industry's first end-to-end digital platform, designed to support a faster, smarter customer experience by providing transparency on jobs, including status, order tracking, invoicing and more.

Cemex's end-to-end suite of added value digital tools also now supports an innovative BIM platform, plus Cemex i-Con software which has been specially created to drive greater efficiencies on-site to make smarter, more informed decisions during the time-intensive, and often complex, process of concrete strength development. The new software provides contractors with real time insights using Bluetooth and maturity tracking for the removal of formwork, applying loads and pouring concrete. It works across all Cemex concrete mixes and includes BIM Plug-in software.

Cemex's global Digital Forward initiative recently announced the development of the first generative AI tool of its kind in the building materials industry, which looks to

transform salesforce relationships by providing real-time customer support. The new tool, deployed through Microsoft Teams, uses Microsoft's artificial intelligence, combined with Cemex product information and construction expertise.

Easily accessible from any internet-enabled device, it ensures replicability across Cemex's global operations, forming part of the company's digital innovation efforts to support commercial, supply chain, manufacturing and back-office processes.

Lower-carbon concrete technology

Cemex's most significant breakthrough in concrete technology has to be the pioneering introduction of Vertua® lower-carbon concrete and cement. As the first to market in 2020, Vertua is now a US\$7.2bn global brand and part of an extensive family of products that includes lower-carbon cements, concrete, aggregates, admixtures and mortar products.

The brand covers five more sustainability attributes: lower-carbon emissions, increasing energy efficiency, saving water, incorporating recycled materials and optimising design. Continuously expanding to include a pipeline of new, updated and re-categorised products, the product portfolio includes a range of additional benefits such as increased durability, reduced heat of hydration, as well as aesthetic finishes.

In France 80m³ of Vertua Lower Carbon Concrete, was mixed with earth, sand, gravel, lower carbon binder and water and recently supplied for the construction of the Pierre Fabre Foundation's new prestigious facilities in southwestern France. The innovative formulation allowed for the replacement of approximately 60 per cent of the gravel and sand with on-site earth. Sourcing soil directly from on-site earthworks also minimised the CO₂ emissions associated with material transportation.

Whilst on the Place de la Concorde in Paris, Mexican architect Carlos Barba,

Cemex Vertua concrete has been used to create luminescent concrete benches in France – ahead of the 2024 Olympic Games



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founder of AR + TE ARchitecture and TErritoire, has used Vertua concrete to create luminescent concrete benches with shimmering aesthetic surface finishes. Combining aesthetics with highly levels of durability, the use of lower carbon concrete technology here has provided an illuminating visual night-time tourist attraction, ahead of the 2024 Paris Olympics.

The recent amendment of BS 8500 in December 2023 has further broadened the availability of lower-carbon concrete mixes. In the UK Cemex manufactures a wide range of high-quality British cements using locally-quarried materials and additions. As lower-carbon concrete technology leaders, the company has recently reduced the embodied CO₂ across our ReadyBlock® concrete block range by an average of 44 per cent. In accordance with The Future Homes Standard, when all new homes must produce 75-80 per cent less carbon emissions by 2025, Cemex's medium lightweight blocks have already achieved a CO₂ reduction of 77 per cent. This enables Cemex to offer the lowest-carbon blocks on the UK market. (The calculation compares the current embodied CO₂ across Cemex's concrete product range vs 2021 embodied carbon data).

At the forefront of the circular economy in the construction value chain, Cemex pioneers in the field of concrete technology to increase the use of waste and residues as alternative raw materials and fuels across its operations. Providing cement, ready-mix concrete, aggregates and urbanisation solutions in growing markets around the world, we are powered by a multinational workforce which is focussed on delivering a superior customer experience, enabled by digital technologies. ■

2024



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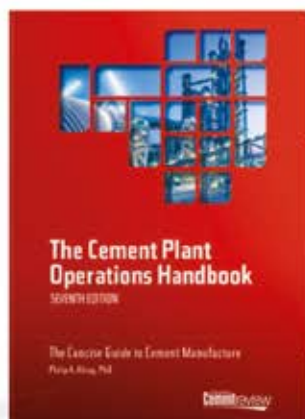
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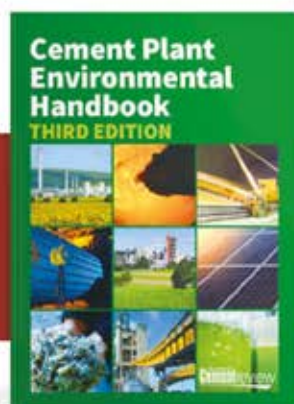
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