



MARSH

Sustainable building projects:
Lower carbon concrete is gaining strength



If the global cement industry was a country, it would create the **third largest** carbon dioxide emissions in the world, behind only China and the US. Discover how leading UK construction firms are mitigating the risks of lower carbon concretes, to power them towards their net zero targets.

How a four-storey, five-tonne whale sculpture put UK lower carbon concretes in the spotlight

Concrete. It's the world's most widely used building material, dating back thousands of years, to ancient Greece. Now, a more sustainable, lower carbon concrete (LCC) iteration has hit the national UK headlines — and in a spectacular way.

In the bustling business district of Canary Wharf, east London, a four-storey tall blue whale breaches the water of the Wood Wharf wet dock, towering above workers and visitors. The imposing sculpture, titled Whale on the Wharf, is a tribute to sustainability, and was created from five tonnes of plastic ocean waste. In keeping with its size, weight, and sustainable nature, an extra-strong base was needed to support both the sculpture and the circular economy message it embodies.

Developer Canary Wharf Group (CWG), which commissioned the sculpture, worked with construction material specialists, Holcim UK, to develop a novel concrete mix for counter-weight foundations to keep the sculpture and its frame in place. Holcim's experts didn't have to look further than their morning brew to dramatically promote the use of LCCs and use the spectacular Whale on the Wharf sculpture to emphasise the importance of the circular economy. A key element of this novel concrete mix is nothing other than coffee.

LCCs come in a variety of mixes, some now in mainstream use, and some that are novel.



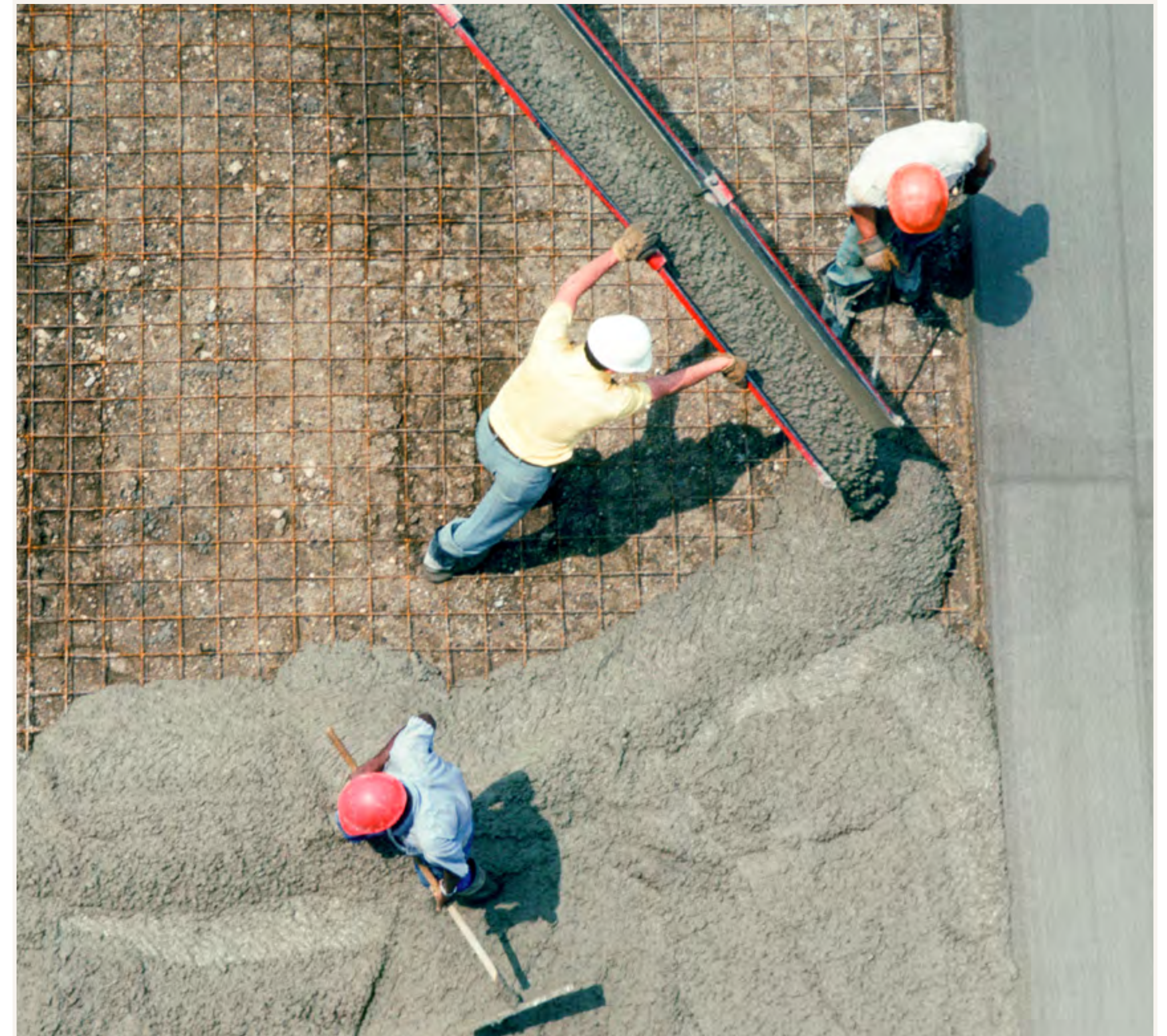
The importance of decarbonisation

The UK government, along with several construction companies, recognises the importance of the decarbonisation of cement manufacture, and have granted permission for the construction of the UK's first carbon capture cement plant, Padeswood cement works, in north Wales.

While the process of carbon capture and storage forms an important part of the LCCs conversation, this article is focused on different cement/concrete mixes and explores the increasing popularity of LCCs, both mainstream and novel mixes, and raises the awareness of risk, and how to work with insurers.

Find out more: Concrete terminology

Lower carbon concretes and novel concrete mixes are sometimes referred to in the media and the construction industry by umbrella terms such as 'eco-concrete' or 'green concrete'. Neither of these terms apply specifically to a particular type of concrete, or novel concrete mix. Please refer to the Low Carbon Concretes Routemap, described in more detail below, for alignment of the terminology used in the sector.



LCCs in the mainstream: London Docklands developer, Canary Wharf Group, shares its concrete journey

LCCs are sparking the interest of all construction stakeholders, including investors, owners, developers, contractors, and tenants. CWG is a driving force behind the urban regeneration of London's Docklands, which saw the area transformed into a global financial and business hub. The unveiling of the whale sculpture was a public acknowledgement of the increasing popularity of LCCs to the UK construction industry.

CWG partnered with construction material specialists, Holcim UK, to develop a LCC for the robust, counterweight base needed to support the five-tonne Whale on the Wharf sculpture.



From coffee pot to concrete mixer

One of Holcim's novel cement mixes contains biochar, a carbon-rich, charcoal-like substance produced by heating organic material (biomass) in a low-oxygen environment. In keeping with the local environment, Holcim used biochar made from a blend of coppiced woods and spent coffee grounds from Canary Wharf's cafes and restaurants.

Five loads (32m³) were mixed and batched at Holcim UK's Battersea Readymix plant before delivery to site. A specialist civil engineering diving company, DiveCo Marine, then pumped the concrete into place under the water's surface.

Why are lower carbon concretes important?

LCCs are an alternative to traditional concrete. They have a wide variety of mix options, typically focused on cement replacements. They have relatively lower carbon compared to 100% cement concretes due to containing less cement. They reduce carbon emissions significantly during production, and can perform as well as, and sometimes even better than, traditional concrete in terms of durability and strength, depending on mix design.

Some lower-carbon mixes might have slower early strength development but can be designed to achieve comparable or superior long-term performance. LCCs can be used as like-for-like substitutes for many applications, by several means, including incorporating alternative materials, adjusting production processes, and injecting carbon dioxide into the concrete mix, enhancing strength while reducing emissions.



LCCs have moved into mainstream use

In many project types, green concrete has become a mainstream material for construction companies, so much so that many barely mention it in publicity materials.

Several UK projects have used LCCs, sometimes with novel mixes, including the M25 motorway; Network Rail's Chatham station project, a trial at Heathrow Airport, and a HS2 site in northwest London. The Wembley Park development in London and a Northumbrian Water site have also been involved in testing and using the LCC technology.

Top five tips for making LCCs more insurable

Engage early: Regardless of the project type, early engagement with your construction insurance broker is crucial — when using novel materials or concrete mixes, it is even more urgent.

1

Consider operational insurance at the design stage: Real estate insurers are keen to learn as much as they can about novel materials, in order to offer the most effective coverage.

2

Choose your experts carefully: The more familiar your contractor and their risk managers and risk engineers are with less traditional methods and materials, the greater the comfort for your insurer.

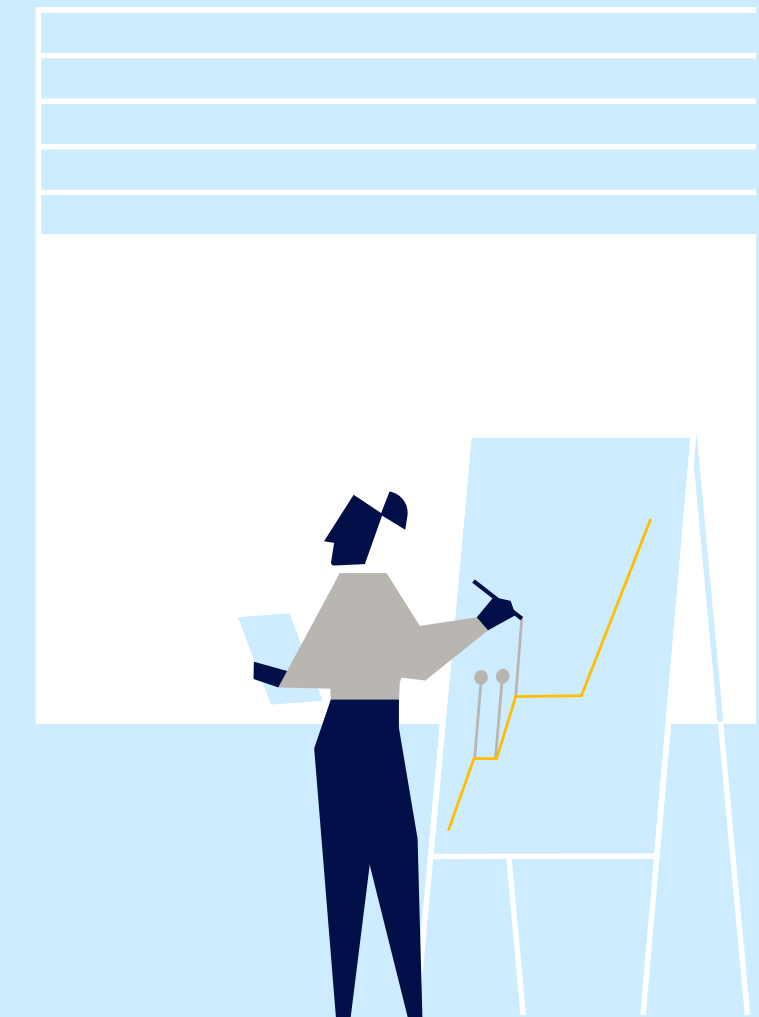
3

Take advantage of academic research: Ambitious construction companies are partnering with universities such as Cambridge and Queen's, Belfast, to provide crucial data to insurers.

4

Deploy [BSI Flex 350](#): The more information you can share with brokers and insurers, the better. Described in more detail below, Flex 350 is a performance-based approach to a benchmark for concretes not currently within standard, and offers a guide for low carbon alternatives.

5



How to work with construction and real estate insurers to mitigate risks related to LCCs



Insurers are eager to learn more and gain comfort around LCCs, and to work with clients so they can reach their net zero targets and obtain appropriate, reliable insurance cover. Your broker should be eager to work with you and your potential insurers to find solutions.

For example, Marsh is working with stakeholders to improve knowledge of, and comfort with, novel mixes. Information sharing activities have included inviting insurers to a concrete pour during a test, which had positive feedback from insurers.

Early engagement with insurers is crucial. In Marsh's recent [The Rise of Mass Timber](#) podcast series, an insurer advised construction companies to engage with real estate insurers at the design stage when considering using mass timber, before the budgets had been set. The same advice could be just as pertinent to companies wishing to use LCCs.

Thorough risk assessments and documentation processes are crucial. Risk mitigation includes rigorous testing and adherence to best practices.

Conscious of the need for performance data by many stakeholders, including insurers, producers of LCCs are working with academic partners, to help capture data and analyse the performance of different concrete mixes.

Test novel mixes in a low-risk environment

A crucial step towards obtaining performance data, and mainstreaming use of novel LCCs outside of standards, is to adopt the materials in low risk and/or temporary structures, to test and prove that the materials can be used at larger scale.

It can't be emphasised enough how much the insurance market value early engagement and clear information on the use of LCCs. This information is vital, both in terms of helping insurers understand risk profiles, and also from a property damage perspective in terms of fire safety, and avoidance of defects.

Expanding the use of LCCs in Canary Wharf

CWG are committed to adopting LCCs. The company views them as an important step in helping them achieve their net zero targets. And looking at the makeup of the CWG estate, where there are significant high-rise structures, the use of concrete is substantial as the estate grows and, in some circumstances, repurposes. Moving forward, more concrete will be needed, creating opportunities to adopt lower carbon solutions.

CWG fully appreciate the need to include their insurers in their journey, and are leading the way to demonstrate best-practice engagement.



The importance of testing and data gathering

As well as the Whale on the Wharf sculpture, CWG are utilising four concrete mixes — three LCC and one traditional as a control mix — in the construction of a temporary theatre in Canary Wharf. Specific and separate test slabs were incorporated within the undercroft of the theatre structure, constructed on a live site with spans exceeding six metres.

In order to monitor the slabs, check carbon performance, and collect data, fibre optics and temperature, gauges have been strategically embedded in the concrete, so CWG can evaluate how the four mixes perform. They are also load testing the slabs under long-term conditions to

monitor and record its structural performance and durability. The company are using the BSI's BS Flex 350, used by the Environment Agency, and described below, to navigate the performance route.

CWG are keen to work with academics to not only to help with their development of LCCs, but also to produce data for the good of the industry.



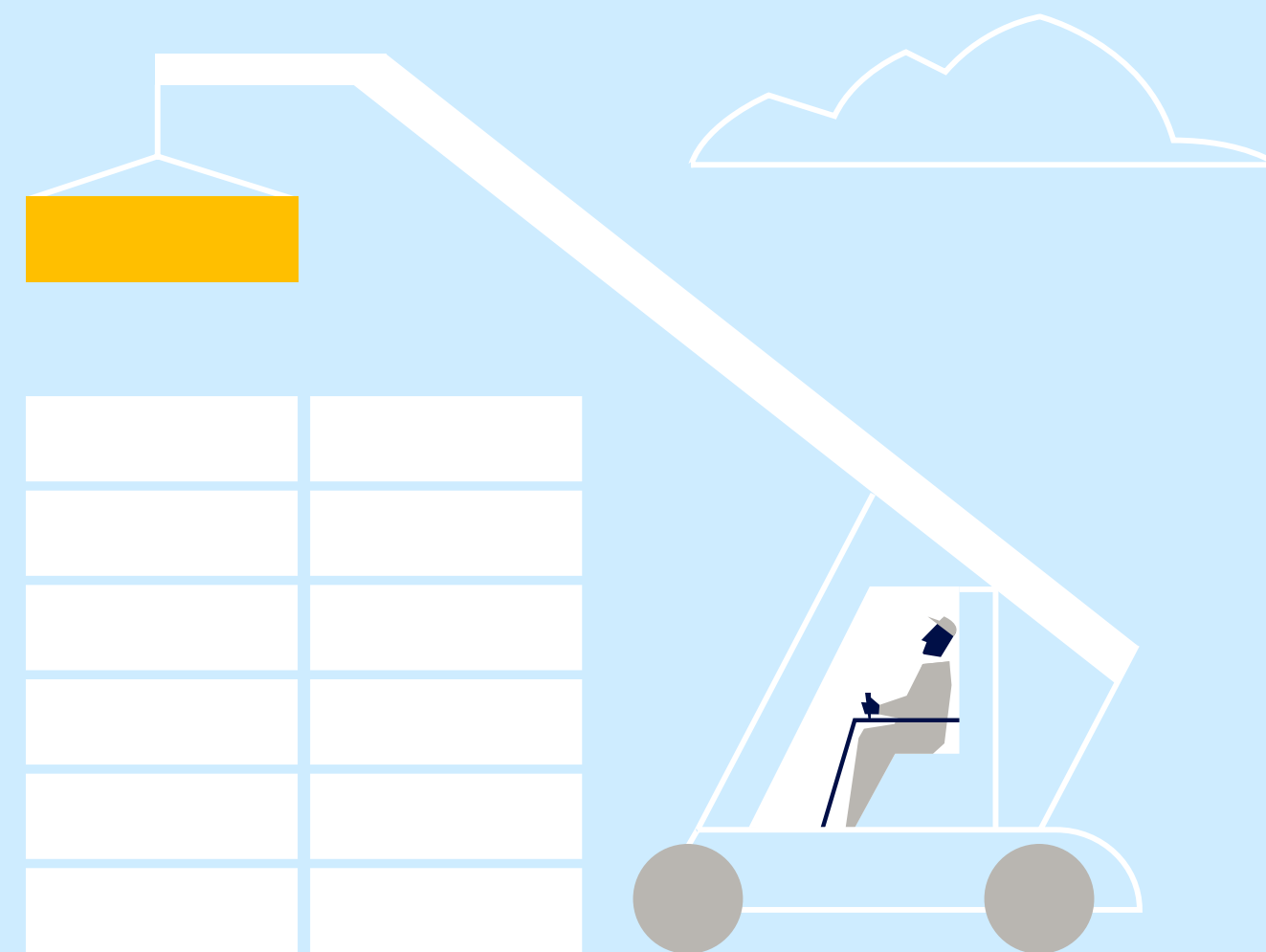
Getting comfortable with LCCs: How the Environment Agency supports all construction stakeholders, including owners and developers

It's not just CWG promoting LCCs. Marsh specialists continue to expand their knowledge of the materials, and have held insightful conversations with the Environment Agency (EA). The EA have collaborated on innovation/risk workshops and shared their insights and experience of the use of the materials, and identified initiatives that they hope will promote good use and improve the knowledge of the construction sector.

The UK government is keen to promote the use of LCCs. The EA along with other infrastructure clients are taking this seriously. In addition, there is an [Infrastructure Client Group](#) initiative focused on accelerating the decarbonisation of concrete.

How to build your knowledge

Aware of the sometimes-patchy levels of knowledge surrounding LCCs and their use, the EA has also teamed up with the Supply Chain Sustainability School (SCSS) to create [training e-modules](#) that are free to access, following free registration with the SCSS. This content is based on the Institution of Civil Engineers' [Lower Carbon Concrete Route Map](#), authored by the [UK Low Carbon Concrete Group](#).



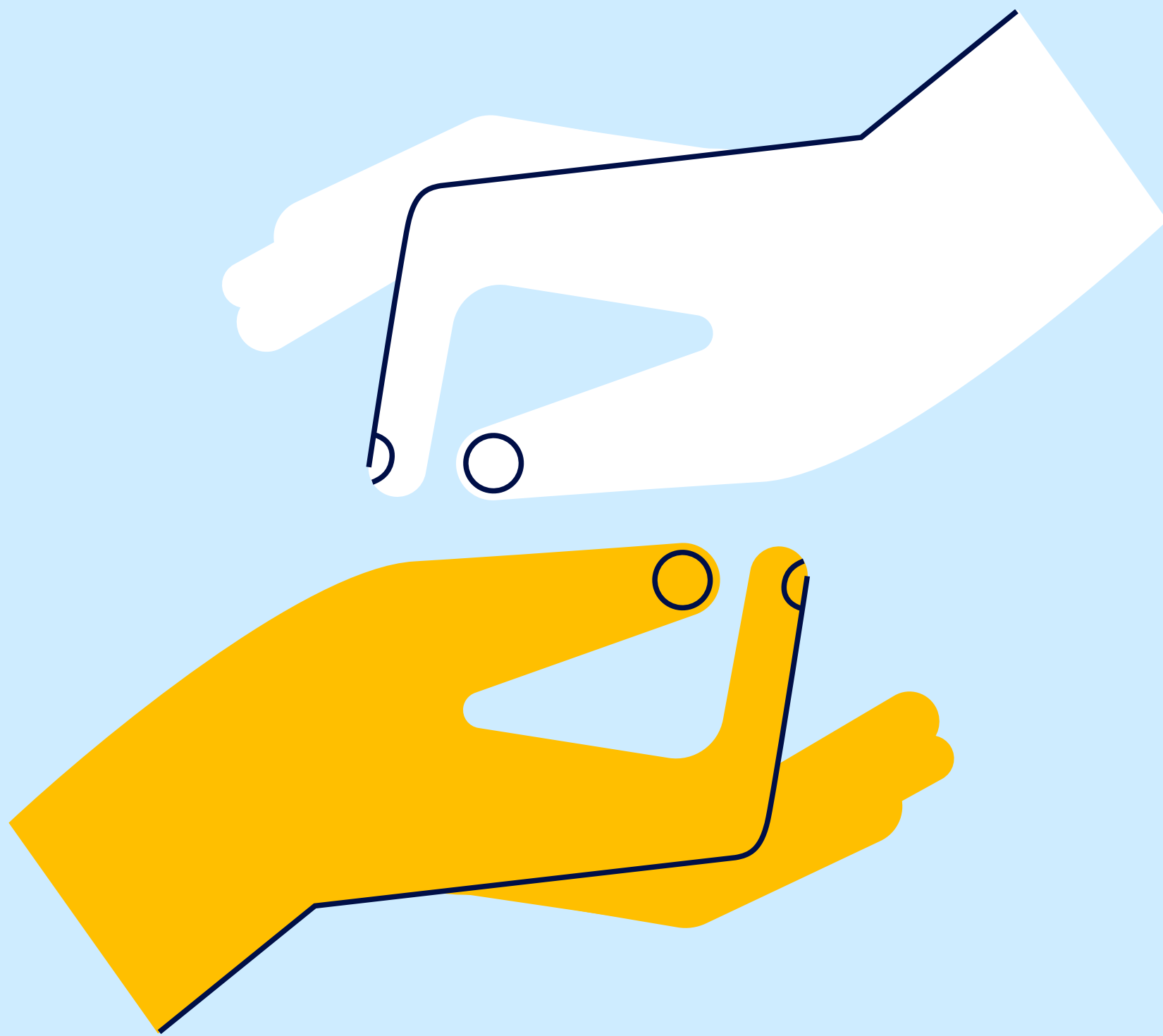
How construction companies are benefitting from the circular economy

Going green is boosting profits. UK construction companies are discovering significant cost savings by adopting circular economy methods and principles.

So much more than a box-ticking exercise, circular economy principles can reduce expenses, put companies ahead of the competition, and attract top young ESG-conscious talent, especially important in an industry suffering from endemic staff shortages.

Discover more about how to make the circular economy work for your company in our paper, [Embracing sustainability: The benefits of adopting circular economy principles for UK construction companies](#).

How your construction insurance broker can help



As with any sustainable material, the attitude of insurers towards LCCs, is evolving as knowledge and experience increases.

With their expertise in both construction and the insurance market, coupled with industry relationships, construction insurance brokers should be able to share valuable context, and share the most up to date advice for UK construction companies wishing to use sustainable materials, including LCCs.

Your insurance broker should be able to advise you about how best to position the use of sustainable materials so that you receive the best-value construction insurance with the most viable coverage.





About Marsh

Marsh Risk is a business of Marsh (NYSE: MRSB), a global leader in risk, reinsurance and capital, people and investments, and management consulting, advising clients in 130 countries. With annual revenue of over \$24 billion and more than 90,000 colleagues, Marsh helps build the confidence to thrive through the power of perspective. For more information about Marsh Risk, visit marsh.com, or follow us on [LinkedIn](#) and [X](#).

Important notices

This is a marketing communication. The information contained herein is based on sources we believe reliable and should be understood to be general risk management and insurance information only. The information is not intended to be taken as advice with respect to any individual situation and cannot be relied upon as such.

Statements concerning legal, tax or accounting matters should be understood to be general observations based solely on our experience as insurance brokers and risk consultants and should not be relied upon as legal, tax or accounting advice, which we are not authorised to provide.

Marsh Ltd is authorised and regulated by the Financial Conduct Authority for General Insurance Distribution and Credit Broking (Firm Reference No. 307511). Registered in England and Wales Number: 1507274, Registered office: 1 Tower Place West, Tower Place, London EC3R 5BU. All rights reserved.