Case Study: Canary Wharf Group
Reducing Embodied Carbon Emissions

Canary Wharf Group aim to raise awareness of the environmental impact from embodied carbon in construction and provides information on the initiatives taken to reduce carbon emissions through innovative methods and stakeholder collaboration.

THE CHALLENGE AND OPPORTUNITY

The embodied carbon emissions associated with construction can account for up to **11% of global carbon emissions**, and it is crucial to tackle this issue as part of efforts to achieve government net-zero emissions targets by 2050. Embodied carbon is defined by LETI and the UK Green Building Council as the carbon emissions of a building created by its materials: their extraction, transportation, construction, maintenance, replacement, and end of life treatment. With the built environment accounting for nearly **40% of global carbon emissions**, the UK construction industry has a vital role to play in reducing carbon emissions and minimising its environmental impact.

The importance of lowering embodied carbon emissions, such as in concrete and piling, has been recognised by Canary Wharf Group (CWG), the developer behind the iconic Canary Wharf estate in East London. This knowledge has encouraged innovative thinking when it comes to embodied carbon. As CWG have oversight and control over the design, procurement, and construction process of their developments, they have been able to engage stakeholders as early as possible which gives them the opportunity to explore options for lowering the embodied carbon.

1. REDUCING CARBON EMISSIONS FROM CONCRETE

The carbon emissions from cement production, a key ingredient of concrete, account for approximately **8% of global carbon emissions**.

During the tender and procurement stages of the concrete packages on Wood Wharf (CWG's new mixed-use development), CWG were able to challenge the contractors to use lower carbon concrete mixes in their bids.

This was made possible by being part of ConcreteZero, a leading coalition of concrete buyers and users to accelerate the demand for net-zero concrete, through various ways such as sharing key concrete databases and sending a powerful and consistent demand signal across the entire concrete value chain which inspires ley decision makers to demonstrate accountability. This played a significant role in changing attitudes to using low carbon concrete as it was led by data and not conjecture.

Outcomes and Learning

Through CWG's engagements with their supply chain, they were able to learn how the impacts of varying environmental conditions influenced the concrete mixes.

Every opportunity to use the highest cement replacement mixes suited to the ambient site temperature was planned rigorously against the weather forecast.

This approach moves away from the typical summer and winter concrete mixes and gives the concrete contractor's site team more flexibility to adapt.

Acknowledging that embodied carbon data is crucial to achieve low carbon concrete, CWG developed a low carbon concrete plan which sets out carbon targets and requirements to record and track embodied carbon values and is aligned with CWGs carbon targets.

- **To accelerate the change in the concrete industry, design and material standards will have to be updated to allow different and more sustainable alternative concrete blends to be specified and used.**
- **It is important to speed up the ambition of key industry players to respond to this demand through net zero commitments such as science-based targets (SBTs) and circularity initiatives.**
- **Policy makers play a crucial role if regulation and legislation are reviewed and changed so that it encourages and rewards the decarbonisation of the industry in general.**

2. REDUCING CARBON EMISSIONS DURING PILING CONCRETE

At One North Quay, CWG's first wet lab facility, the secant piling activities have been designed to consume over approximately 5,500m3 of concrete.

Actions

CWG liaised closely with Expanded Piling, the Piling Contractor, to look at different concrete options to reduce embodied carbon. Set meetings were held during the tender process which were focused on net zero and the CWG net zero carbon pathway commitments, and different cement replacement options were challenged to ensure the lowest embodied carbon concrete mixture, which was suitable for the job.

Outcomes and Learning

- **Early collaboration with the supply chain contractors and designers supported the CWG carbon net zero agenda.**
- **By challenging supply chain contractors and designers, this allowed CWG to look at increased GCGS in the concrete mixes. This allowed the Piling contractor to procure and use concrete with 85% GBBS replacement (ground granulated blast furnace slag) - which is a by-product of iron manufacturing.**

3. REDUCING CARBON EMISSIONS BY USING AN ELECTRIC PLANT

During the early tender phase for the piling works on the One North Quay project, CWG stipulated embodied carbon targets with the Piling Contractors and advocated innovation to reduce carbon emissions as far as possible during the piling works phase. Due to the early procurement conversations, the successful Piling Contractor, Expanded, were able to secure a battery powered drilling rig to be used on the project, the Liebherr Rig, which was the first of its kind used in the UK.

Due to the rig being electric, it had lower emissions which saved 773 litres of diesel from being used. In addition to the fuel savings, the rig was quieter in operation compared to a diesel fuel equivalent.

Outcomes and Learning

- **Early collaboration with the supply chain during the tender phases enabled the Piling Contractor to investigate and procure an innovative plant, such as the electric piling rig.**
- **By trialling a new piece of plant, this has not only allowed CWG to share data with the manufacturers, but this driven conversations across the whole supply chain, with manufacturers driving to offer plant to reduce carbon emissions.**
- **With 100% of CWG electricity from renewable sources, overall, the electric rig contributed to lower emissions throughout the piling phase of the project.**

CONCLUSION

It is clear that Canary Wharf Group have made significant efforts to reduce embodied carbon emissions in their construction projects. By engaging with their supply chain and challenging contractors to use low carbon concrete mixes, CWG has been able to reduce carbon emissions associated with cement production. By collaborating with the piling contractor, CWG was able to use concrete with 85% GBBS replacement, which is a by-product of iron manufacturing, and reduce emissions associated with piling. The use of an electric plant during the piling works phases also helped reduce emissions and noise pollution, saving nearly 800L of diesel being used.

While the results are impressive, there is still much to be done to achieve net-zero emissions by 2050. Canary Wharf Group's initiatives will hopefully inspire other construction companies to follow suit and continue to innovate, so that the industry can contribute to global efforts to reduce carbon emissions.

Read more about Canary Wharf Group's ambition to reach carbon net zero by 2030 **here**.