Committed to reaching net zero carbon by 2050

Concrete

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Heidelberg Materials

Contents

Introduction

Heidelberg Materials UK produces a range of heavy building materials including cement, aggregates, ready-mixed concrete and asphalt: all essential materials to build our future.

We take our responsibility to reaching net zero carbon by 2050 very seriously and are committed to fulfilling our role in meeting the UK government's ambitions. Our parent company, Heidelberg Materials Group, has signed SBTi's Business Ambition for 1.5°C and joined the UN's Race to Zero campaign.

In addition, we have launched three new 2030 targets we are working towards:

- Reducing carbon emissions to less than 400kg of CO_2 per tonne of cementitious material.
- Generating 50% of our revenue from sustainable products.
- Ensuring that 50% of our concrete is circular.

Our route to decarbonisation has been ongoing for many years and we have made significant headway, including reducing our CO_2 emissions in the UK by more than 50% since 1990.

We have a roadmap in place, which includes several important areas that will help us achieve net zero. These include:

- Improvements in plant efficiency and processes across our operations.
- Increased use of alternative raw materials and alternative fuels.
- Several industry-leading carbon reduction projects, including the potential for carbon capture and storage (CCS) at our Padeswood cement works in Mold, as part of the HyNet North West project, and demonstrating the use of a net zero fuel mix using hydrogen at our Ribblesdale cement works in Lancashire.

The Heidelberg Materials Group is transforming its business to build a more sustainable future and its strategy and sustainability commitments are shaped by the United Nations Sustainable Development Goals.

Working sustainably is at the heart of everything we do and our 2030 commitments are built around four pillars:

1. **Net zero:** driving our decarbonisation/producing lower-carbon products
2. **Safe and inclusive:** placing the health and wellbeing of our employees, communities and suppliers at the core of our operations
3. **Circular and resilient:** supporting circularity to reduce/reuse materials and natural resources
4. **Nature positive:** contributing through our biodiversity programmes/sustainable water management

Concrete

Ready-mixed concrete is the most widely used building material in the world and is essential to society and a cornerstone of our built environment.

Ready-mixed concrete is flexible, versatile, durable and strong, allowing designers and suppliers to work together to specify a solution that is individually optimised for each project and its exact requirements.

Modern society would not be possible without concrete. It is used in a wide variety of applications including housing, commercial buildings, road building and essential infrastructure projects such as bridges, tunnels and airports as well as energy and water plants.

The UK has a dense network of ready-mixed concrete plants that supply all projects – small and large. In total the UK ready-mixed producers supply over 15 million m^3 per year.

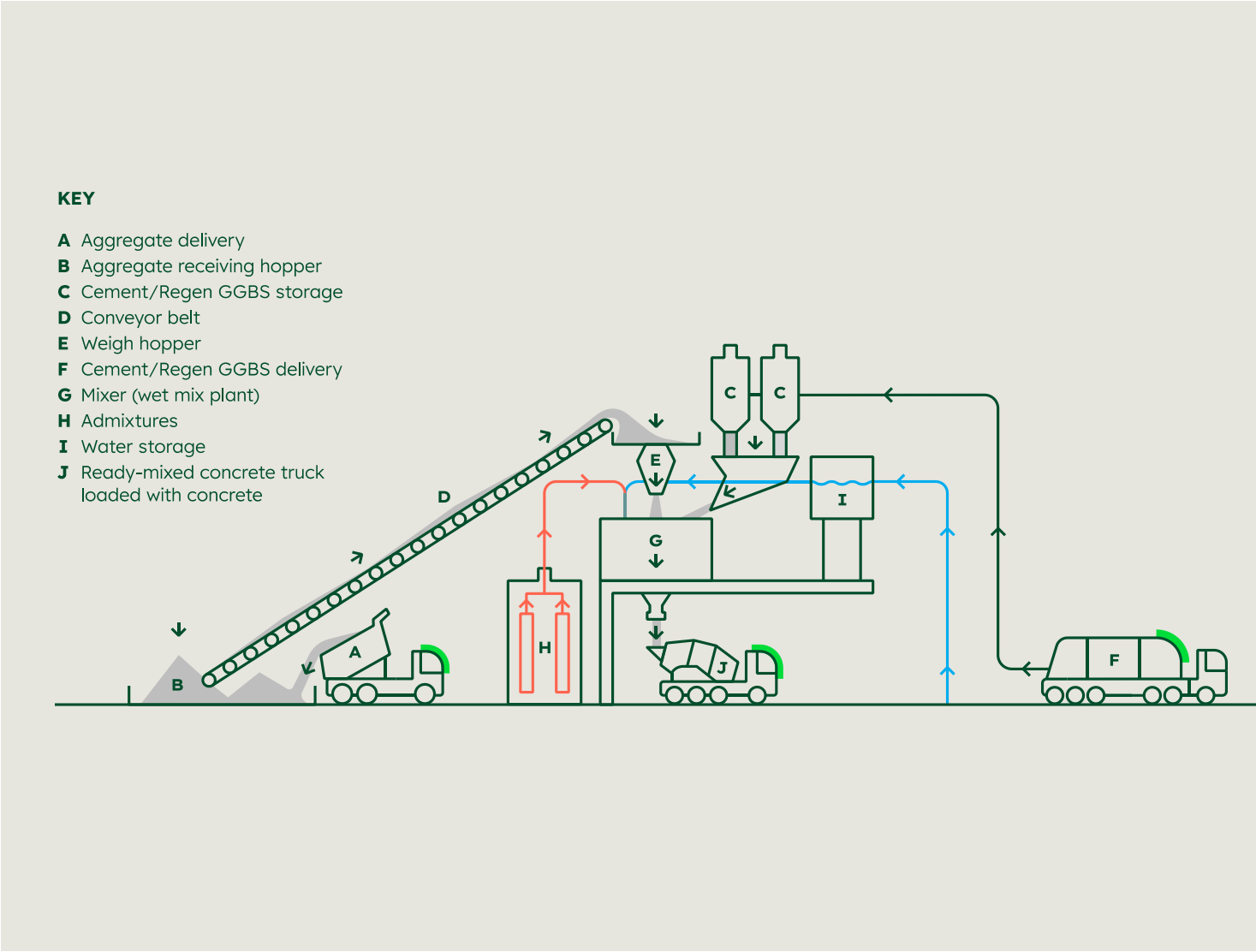
Over the lifecycle of concrete, carbonation will take place, resulting in the material absorbing about a third of the CO_2 emitted during production of the cement contained within the concrete. This significantly reduces the whole-life CO_2 footprint of both the cement and the concrete for which it is used.

The concrete production process has three main sources of CO_2 emissions:

- **Scope 1:** Production emissions, own transport emissions.
- **Scope 2:** Emissions from electricity consumption.
- **Scope 3:** Emissions from purchased goods and services.

The typical production process of concrete involves:

- Aggregates (coarse and fine) and cement/cementitious material delivered by road, rail or sea and stored in the aggregate bays and cement/cementitious silos at the concrete plant.
- The raw materials transferred to the mixer to produce the concrete.
- The material is loaded into ready-mixed concrete mixer trucks and delivered to the customer.



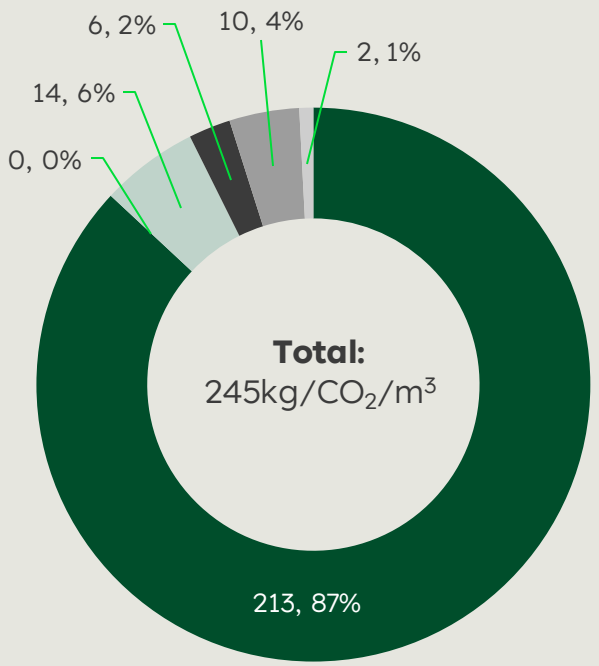
The scope 1 and 2 emissions at a concrete plant are minor as the main source is generally only the mobile plant that is required to move the aggregates from their bays to the loading bins.

The main scope 3 CO_2 emission sources are the indirect emissions from the cement that is required to produce concrete.

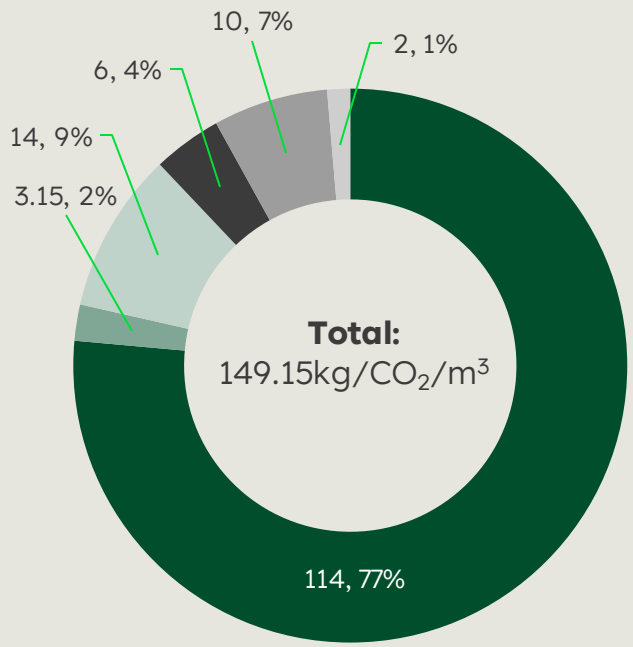
The production of cement is CO_2 intensive for two reasons. Firstly, CO_2 is produced as a by-product of processing the limestone for the production of clinker and, secondly, the fuels used in the heating of raw materials in the cement kiln.

As a result, around 90% of the embodied CO_2 emissions in concrete arise from the cement. The remainder are from aggregates, concrete plant operations and transportation.

C28/35 CEM I Concrete
in CO_2/m^3



C28/35 EcoCrete Concrete
in CO_2/m^3



- CEM I
- GGBS
- Raw material haulage
- Aggregates
- Chemical admixtures
- Operations

We have a number of levers that will help reduce the CO_2 emissions associated with the production of concrete. They are:

Investment in plant efficiency and processes

Optimising our plant set up, including state of the art production assets, increasing digitalisation and sharing best practice to further improve energy management, carbon reduction and reduce wastage.

Mobile plant/operations

We are working on finding alternative fuels for our mobile plant fleet. The use of biofuels such as hydrotreated vegetable oil (HVO) has the potential to reduce CO_2 emissions in the short term before hydrogen and/or sufficient electric storage technology becomes widely available.

Electricity

Sourcing electricity from low carbon sources and/or renewables can substantially reduce emissions. We purchase electricity rated as a zero-carbon product, thereby almost eliminating our scope 2 CO_2 emissions.

Technical innovation

By leveraging our concrete technical expertise and working with our customers, regulatory bodies and other stakeholders we can drive down CO_2 and increase low carbon concrete usage, by:

- Working with customers to develop performance specified low CO_2 concretes.
- Implementing mix optimisation to reduce overall cement consumption per m^3.
- Exploiting cementitious technologies to reduce cement use to reduce CO_2 per m^3.
- Working with emerging admixture technologies.
- Exploring novel low carbon and carbon negative cementitious and aggregate technologies.

We have a number of levers that will help reduce the CO_2 emissions associated with the production of concrete. They are:

Cement

Cement is responsible for the majority of carbon emissions in concrete and we have already made significant progress in our journey to reduce this by upgrading and modernising our production assets.

- Increasing the use of alternative fuels in our kilns to replace fossil fuels such as coal and increasing the amount of biomass fuels which are zero CO_2 rated.
- Using cement replacement materials such as ground granulated blast furnace slag (GGBS).

More action is required to achieve net zero cement – and concrete – and we:

- Have successfully completed a net zero fuel mix trial at our Ribblesdale cement plant that demonstrated that a hydrogen and biofuel fuel mix can be successfully used to operate a cement kiln.
- Plan to install a carbon capture and storage unit at our Padeswood cement plant that will have the capacity to capture 800,000 tonnes of CO_2 per year. If successful, it will enable us to produce zero carbon cement.
- Are developing new cement types such as CEM II which has a lower clinker content resulting in lower CO_2 emissions.

We have a number of levers that will help reduce the CO_2 emissions associated with the production of concrete. They are:

Aggregates

We have developed a detailed aggregates carbon roadmap that demonstrates how we intend to achieve net zero carbon by 2050. Key actions that we are taking include:

- Upgrading production assets.
- Decarbonising on-site emissions sources by using electricity as an energy source as well as biofuels and hydrogen.
- Increasing the use of recycled aggregates and decarbonising our transport emissions by increasing our share of aggregates that are delivered by rail or water.

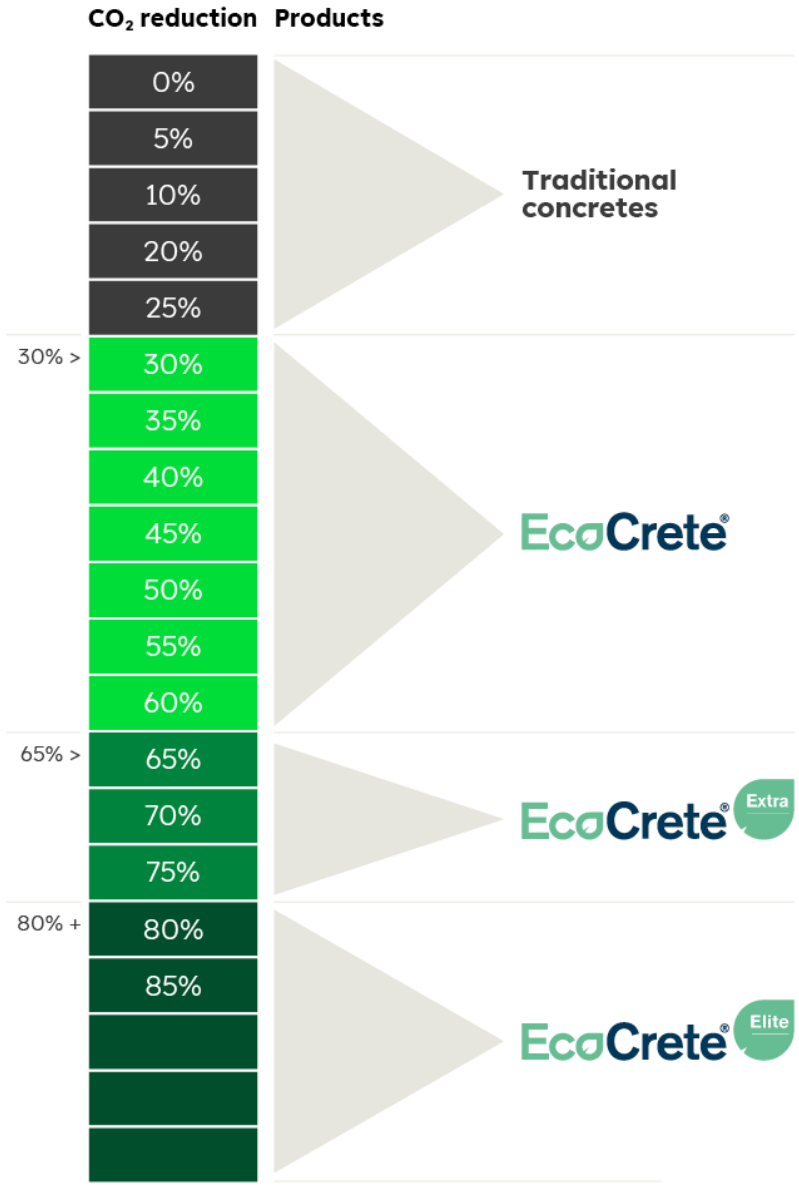
We offer a range of services to help our customers achieve their CO_2 emission reduction goals.

Heidelberg Materials UK has a first-class record of working with clients to develop bespoke low carbon solutions tailored to their specific project.

We have developed our EcoCrete range to make access to lower carbon concrete easier. EcoCrete, EcoCrete Extra and EcoCrete Elite are available nationally and offer significant CO_2 reductions over conventional concrete mixes.

The input values we use to calculate the CO_2 emissions of a concrete mix are externally verified and we can use this data to support our customers with a $kgCO_2/m^3$ indication for each mix. Where required, an indicative EPD* can be generated using lifecycle assessment tools aligned with the product category rules for Type III construction products to EN 15804. These detail the CO_2 emissions for a concrete mix and provide further detail of where the CO_2 emissions occur along the value chain.

* Indicative EPDs are not externally verified



Case study: **Sea wall defences, Dawlish, Devon**

In 2014 the sea wall at Dawlish collapsed and with it the main rail line that connects the south west of England. We worked with the contractor to design, develop and deliver innovative EcoCrete concrete mixes including a high-specification underwater concrete to re-build the sea wall.

By working with the designers and drawing on our technical expertise, we proposed using Heidelberg Material UK's EcoCrete as an alternative to the original specification. As a result, carbon emissions were reduced from 203kg per cubic metre to 77kg, saving over 1,500 tonnes of CO_2.

A number of laboratory trials were conducted to ensure that the product performance met the design criteria ahead of both plant and site trials to ensure the concrete performance could be replicated in a live environment. The Dawlish project proved that sustainable concrete mixes can be developed and applied in projects that are technically challenging.

Our actions today and what Heidelberg Materials UK has planned

2020s:

- Introduction of Heidelberg Materials UK EcoCrete low carbon concrete range – including cement free options.
- Replacement of CEM I mixes with lower carbon alternatives.
- 80% of concrete produced will meet ICE embodied carbon rating A or higher.
- Increase raw material delivery by rail and water.
- Increase use of reclaimer systems for circular management of returned concrete and site waste.
- Optimise aggregate supply footprint to minimise vehicle movement.
- Increase use of recycled aggregates.
- Introduce the use of carbon negative – CO_2 treated aggregate/cementitious materials.
- Majority of purchased electricity from zero carbon sources.
- Procurement of Euro 6-7 mobile plant and delivery vehicles as standard: biofuels, green electricity or hydrogen alternatives used as available.
- Majority of new batching plants to be fitted with solar panels.
- Retro fit older plants where practical.
- Scope 3 emissions measured and action plans in place to reduce emissions.

2030s:

- Ultra low/zero carbon cements introduced.
- Increase the use of carbon negative – CO_2 treated aggregate/cementitious materials.
- 100% of concrete produced will meet ICE embodied carbon rating A or higher.
- Majority of mobile plant and delivery trucks run on biofuels, green electricity or hydrogen.
- Majority of concrete sales incorporate recycled materials.
- Scope 3 emissions have been significantly reduced.

2040s:

- 100% zero carbon cement for all concrete operations.
- All mobile plants and delivery trucks carbon neutral.
- All scope 3 emissions carbon neutral.
- Concrete business achieves net zero.

Committed to reaching

net zero carbon

by 2050

2020 2030 2040

Sustainability and especially carbon reduction is of key importance to us. That's why we are working very hard with our customers and suppliers to reduce the carbon footprint of our concrete with the goal to achieve net zero by 2050 or earlier.

Gordon Napier
Concrete Managing Director

Heidelberg Materials UK is at the forefront of developing innovative solutions that reduce the carbon footprint of our concrete product range while maintaining the highest quality standards.

Daniel Clayton
Concrete Technical Director

Get in touch

Visit our website for more information and to find out how we can help you with your own carbon reduction aims.

heidelbergmaterials.co.uk

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