

**“The initial trial melt of the Cement 2 Zero project is a critical part of the project, and a huge step towards creating a more efficient, environmentally friendly, and resource conscious manufacturing process contributing to the decarbonisation of the construction, cement and steel sectors.”**

Chris McDonald, chief executive officer at the Materials Processing Institute

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## Climate Action

### Cement 2 Zero Project

In 2023, it was announced that Tarmac was part of the innovative Cement 2 Zero project, aimed at developing the world's first zero-emissions cement on an industrial scale. The collaborative project, which has completed its first trial melts, is seeking to advance the decarbonisation of the construction, cement and steel sectors by ensuring the process can be scaled up from laboratory to pilot plant.

Partner organisations span the supply chain, with the Materials Processing Institute, University of Cambridge, CELSA Steel UK, Atkins, Balfour Beatty, Day Aggregates and Tarmac each taking on a vital role in research, development, scaling and testing.

The trial melt was carried out using the Materials Processing Institute's seven tonne Electric Arc Furnace (EAF) on its Teesside campus, which allowed team members to observe the process at a large scale. Once substantially trialled, developed and de-risked, a series of further industrial-scale trial melts would be held at CELSA's EAF in Cardiff.

The process was invented by Dr Cyrille Dunant at the University of Cambridge, who discovered that the chemical composition of used cement is virtually identical to that of the lime-flux used in conventional EAFs. Cement 2 Zero uses recycled cement as the flux in the electric steel recycling process, the by-product of which when cooled and ground produces Portland cement clinker that can be blended to make 'zero-emissions' cement.

The pilot-scale EAF experiments use the flux material containing end of life recycled cement processed by Day Aggregates and international mining and minerals group LKAB, using a variety of scrap steel inputs provided by CELSA.



The testing of melt procedures and slag cooling offers a greater understanding of creating an end-product that could be produced on an industrial scale, with Tarmac beginning the process of testing the new clinker to understand the grinding properties and assess key performance criteria of the new material.

Balfour Beatty and Atkins are defining testing protocols and detailing projects which will use the CEC material produced from these pilot-scale EAF trials once completed.

The Cement 2 Zero project secured £6.5m of Government funding from UK Research and Innovation (UKRI) as part of the Transforming Foundation Industries challenge.

Carles Rovira, CEO at CELSA UK, added: "CELSA UK is pleased to be working with the Materials Processing Institute and the University of Cambridge on the Cement 2 Zero project.

"We are committed to a Net Zero Pathway and embracing the principles of a circular economy through our CELSA Circular Steel Programme, therefore investing resources in this ground-breaking collaborative project is a great opportunity for all involved."