REDUCING CO_2 EMISSIONS THROUGH THE USE OF CALCIUM SULFOALUMINATE-BASED CEMENTS

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PARTNERS
Lafarge France; Lafarge UK; Lafarge Roofing; Marshalls; CRH plc; Rugby Cement and Castle Cement.

COST AND DURATION
The Carbon Trust contribution towards this project is £108,499.
The project started in October 2004 and is due for completion in November 2006.

PROJECT REFERENCE NUMBER
2004-3-896

Concrete made using 'low carbon' cement

OBJECTIVES

This project aims to facilitate significant reductions in UK and global CO_2 emissions arising from cement manufacture. It will assess and demonstrate the suitability for use of appropriate formulations of novel low carbon cements based on calcium sulfoaluminate and dicalcium silicate. The results will be used to influence decision makers in the cement industry to accelerate the development of these cements.

SUMMARY

Portland cement is the principal binding material in almost all of the concrete used in ordinary construction. However, global Portland cement manufacture produces at least 1.4 billion tonnes of CO_2 per annum. Recent studies carried out at BRE and elsewhere indicate that substantial reductions in CO_2 emissions from cement manufacture could potentially be achieved through the use of novel low carbon cements based on calcium sulfoaluminate and dicalcium silicate. While some types of calcium sulfoaluminate-based cement are available commercially, these are not currently suited to general concrete applications. However, by varying their composition they have the potential to be developed as low carbon cements that are suitable for use on a large scale provided appropriate raw materials are available.

Current estimates suggest that global CO_2 emissions could ultimately be cut by up to 300 million tonnes per annum if Portland cement were substantially replaced by these novel materials. By accelerating the development of these cements this project could lead directly to a significant reduction in global CO_2 emissions.

The involvement of major industrial partners in the project demonstrates that the cement industry is becoming increasingly interested in the inherently low CO_2 emissions arising from the manufacture of these cements. However, further assessment (and demonstration) of the feasibility and potential of these cements is needed and this project includes their testing for a range of engineering properties and assessing their durability in a range of environments.

In conclusion, this project is seeking to identify the optimum compositions for the cements to minimise environmental impact and manufacturing costs whilst retaining the properties essential for use in engineering applications.

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