EcoBinder project: Demonstration on site and laboratory durability study.

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The ECO-Binder project aims to implement R & D activities related to developing Belite-Ye'elimite-Ferrite (BYF) based low-CO_2 binders. Specifically, the goal is to develop an optimized prefabricated insulated building panel with 30% lower carbon footprint, 20% better insulating performance and 15% lower cost than current solutions. The reduction of the CO_2 footprint relies on the use of BYF cement for the concrete envelope instead of Ordinary Portland cement.

Three BYF cements have been tested; cement prototypes provided by Heidelberg Cement, LafargeHolcim and Vicat, who are project partners. This made it possible to explore more broadly the range of BYF compositions. For the panel fabrication, the concrete mix-designs were calibrated by the Danish Technological Institute (C32/40 type targeted). The concretes were then made in real conditions in a precast concrete plant of Nuova Tesi near Mantova, in Italy. The demonstration was a success, and the pre-caster appreciated the rapid acquisition of strength with the BYF cements. In addition to this demonstration, BRE manufactured concrete specimens of different strength grades (C20/25, C32/40 and C40/50) for durability assessment. Some of the tests were performed at BRE, but also by other project partners (DTI, Vicat, HeidelbergCement and LafargeHolcim). The BRE results to date show the stability of mechanical strength, the absence of swelling in the water and drying shrinkage which is low. Other aspects of performance such as chloride diffusion resistance and carbonation rate are discussed.

Abstract for submission to: 38th Cement and Concrete Science, Coventry, September 2018.
http://www.iom3.org/

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