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ENVIRONMENT AND SOCIETY

GREENING CONCRETE WITH SUSTAINABLE RAW MATERIALS

Concrete products manufactured from secondary raw materials could help the building sector improve its environmental performance and cut waste.

The new concrete products developed through the EU-funded SUS-CON (SUStainable, innovative and energy-efficient CONcrete, based on the integration of all-waste materials) project have been designed to meet the competitive and cost-efficient needs of the construction industry while at the same time reducing the sector's impact on the environment.

'We have developed completely new concepts and technologies in order to integrate secondary raw materials in the production of concrete,' explains project coordinator Alessandro Largo from CETMA in Italy. 'This will lead to the manufacture of more sustainable and energy-efficient concrete for both ready-mixed and pre-cast applications.'

The project is also promoting awareness of the benefits of new greener products in order to overcome both technical and non-technical barriers in an industry as traditional as construction.

For the moment, the main exploitable results concern several novel types of aggregates and binders made completely from secondary raw materials (such as plastic waste, electrical and electronic equipment waste, polyurethane foam and municipal solid waste). Other results include the combination of these novel products in an energy-efficient lightweight concrete made entirely of secondary materials along with a decision

support tool to help manage and share EU waste stream data.

'The lightweight, eco-friendly, cost-efficient and all-waste concrete products we've developed are applicable for both ready-mixed products (floor screed and floor screed underlay) and pre-cast applications (blocks and panels),' says Largo. 'These pre-cast and ready-mixed prototypes have been produced by various European construction companies within the project, and their compatibility with existing production processes has been demonstrated in real-life trials.'

The SUS-CON concrete solutions were then installed in real buildings located at three different European sites (Spain, Turkey and Romania). Improvements in the energy efficiency of buildings constructed with SUS-CON concrete were monitored. The prototypes were also evaluated in terms of their mechanical, thermal and acoustic insulation properties and fire resistance.

An exploitation plan has now been developed in order to drive forward concepts that are deemed to have commercial potential. 'This plan contains a full list of exploitable results, a description of each result, an explanation and a short exploitation plan,' explains Largo. 'In order to bring these products closer to the market, we will first develop promising systems at the pilot scale.'

Ultimately, the project's results will contribute towards reducing the embodied energy and CO₂ footprint of concrete through the replacement of traditional binders with novel binders made from secondary materials. The new concrete concepts developed by combining these new novel aggregates and binders will offer improved thermal insulation properties, and enable architects and builders to incorporate higher performance standards in both design and construction.

'The construction industry is one of the largest consumers of energy and raw materials and one of the highest contributors to the emission of greenhouse gases,' says Largo. 'In order to become more sustainable, the sector needs to limit its environmental impact and in particular must reduce the use of both raw materials and energy. We believe that developing new novel technologies that integrate secondary materials in the production cycle of lightweight concrete is an all-inclusive solution that can improve both sustainability and cost efficiency.'

SUS-CON

- ★ Coordinated by CETMA in Italy.
- ★ Funded under FP7-NMP.
- ★ <http://cordis.europa.eu/result/rcn/173491>
- ★ Project website: <http://www.sus-con.eu/>
- ★ <http://bit.ly/1Nkux1x>