Use of recycled materials

Summary

The project WP10c - Use of recycled materials studies the industrial production of cementitious materials (mortar and concrete) with incorporation of recycled aggregates. The main goal of the project is to capacitate industrial facilities for the use of recycled materials and the project is ongoing in two Portuguese regions - the Lisbon Metropolitan Area and the Centro Region, each with experimental work carried out in a laboratory and with pilot industrial units that will be used in demonstrative examples - the units are a quarry, a construction and demolition waste plant, a ready-mixed plant, and a mortar factory.

The main motivation for the use of recycled aggregates in construction products is the promotion of the circular economy and the sustainability of the construction sector; therefore, the project includes comparative life cycle assessments on the production of natural and recycled aggregates, mortar and concrete. These life cycle assessments cover both sustainability impacts and costs. They are intended to guide the project towards the most sustainable and economically-feasible options for the use of recycled aggregates in mortar and concrete.

The project falls within a particularly relevant context: circular economy models and decarbonization are being increasingly promoted by the European Union and the cement, aggregates, mortar, and concrete industries are no exception. The use of recycled aggregates not only conforms with the circular economy, but also typically allows the reduction of the carbon footprint of concrete. However, and notwithstanding the state-of-the-art on cementitious products with recycled aggregates being well established and demonstrating their technical feasibility:

- Most research on the topic has not taken into account industrial aspects.
- Industrial agents are lacking the necessary know-how for the use of recycled materials.

The main goal of the project is the industrial demonstration of the use of ready-mixed recycled aggregate concrete, which necessarily results in industry-oriented research and in providing know-how to industrial agents for the increased market uptake of recovered construction and demolition waste as recycled materials for cementitious products.

Figure 1. Fresh state tests of recycled aggregate concrete.

Figure 2. Laboratory testing of recycled aggregates.

Figure 3. Ready mixed concrete plant.

Project Reference

c5Lab WP10/C

Leading Institution

IST-ID – Associação do Instituto Superior Técnico para a Investigação e Desenvolvimento (Portugal)

Partners

c5Lab – Sustainable Construction Materials Association, CIMPOR – Cimentos de Portugal, SGPS, S.A. (Portugal), Secil (Portugal), LNEC – National Laboratory for Civil Engineering (Portugal), Itecons – Institute for Research and Technological Development in Construction, Energy, Environment and Sustainability (Portugal)

CERIS Principal Investigator

Jorge de Brito
(jorge.brito@tecnico.ulisboa.pt)

CERIS Research Team

José Dinis Silvestre, João Nuno Pacheco, Inês Flores-Colen

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335 429.00€

CERIS

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Project Website

c5lab.pt/projects.html