CERIS : Civil Engineering Research and Innovation for Sustainability

RECYCL3D – Recycled aggregates for 3D printed concrete structures

Summary

Construction & Demolition Waste (CDW) represents one of the most relevant materials flows globally and ambitious goals for its management were set by the EU. Nonetheless, market uptake of recycling and recovery products from CDW is still lacking. In particular, the fine recycled aggregates (fRA) are still the most under-used component without a clear entry point into the circular economy model. The recovery/recycling of CDW can be improved by developing its use in higher-grade applications through innovation and emerging technologies. In this context, the Recycl3D (Recycled aggregates for 3D printed concrete structures) project aims at maximizing the recovery of fRA derived from CDW and valorising it as an essential constituent in the fabrication of new concrete elements through innovative 3D printing technologies. Therefore, Recycl3D tackles the challenges of sustainability (circular economy) and innovation (additive manufacturing) of current relevance for the construction industry. The actions within Recycl3D will facilitate the entry of fRA from CDW into the circular economy value chain and at the same time increase the material efficiency and lead to higher added value. Then, the mechanical, durability and service life of 3D-RAC elements (considering also their recoverability and recyclability) could be consistently predicted and, consequently, the barriers for future market uptake can be addressed by designing and optimising 3D-RAC structural prototypes and testing them in relevant environments. These outcomes will directly impact both the scientific and industrial communities at both the global/European and the national/regional levels. The project consists of Applied/Industrial Research activities in the fields of sustainable construction materials & structures and additive manufacturing performed by a carefully tailored Consortium that ensures multidisciplinary and complementary expertise needed to significantly advance current knowledge.

Figure 1. Printing of prototype

Figure 2. Prototype testing

Project Reference

ERA-MIN3/0001/2021

Leading Institution

UNISA – University of Salerno (Italy)

Partners

c5Lab – Sustainable Construction Materials Association (Portugal), UPC – Universitat Politècnica de Catalunya (Spain), LNEC – National Laboratory for Civil Engineering (Portugal), ZUT – West Pomeranian University of Technology in Szczecin (Poland), BETOTEST POLSKA Sp. z o.o. (Poland), UFRJ – Federal University of Rio de Janeiro (Brazil), ASU – Arizona State University (USA)

CERIS Principal Investigator

João Pacheco
(joaonpacheco@tecnico.ulisboa.pt)

CERIS Research Team

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Funding

ERA-MIN 3 Cofund 2021

Period

2022-2025

Total

772 939.00 €

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Project Website

recycl3d.eu