

Recycled Aggregates from Construction and Demolition Waste in the Production of Concrete Blocks

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Abstract : The construction industry generates large amounts of waste, usually mixed, which can be composed of different origin materials, most of them catalogued as non-hazardous. The European Union targets for this waste for 2020 have been already achieved by the UK, but it is mainly developed in downcycling processes (backfilling) whereas upcycling (such as recycle in new concrete batches) still keeps at a low percentage. The aim of this paper is to explore further in the use of recycled aggregates from construction and demolition waste (CDW) in concrete mixes so as to improve upcycling. A review of most recent research and legislation applied in the UK is developed regarding the production of concrete blocks. As a case study, initial tests were developed with a CDW recycled aggregate sample from a CDW plant in Swansea. Composition by visual inspection and sieving tests of two samples were developed and compared to original aggregates. More than 70% was formed by soil waste from excavation, and the rest was a mix of waste from mortar, concrete, and ceramics with small traces of plaster, glass and organic matter. Two concrete mixes were made with 80% replacement of recycled aggregates and different water/cement ratio. Tests were carried out for slump, absorption, density and compression strength. The results were compared to a reference sample and showed a substantial reduction of quality in both mixes. Despite that, the discussion brings to identify different aspects to solve, such as heterogeneity or composition, and analyze them for the successful use of these recycled aggregates in the production of concrete blocks. The conclusions obtained can help increase upcycling processes ratio with mixed CDW as recycled aggregates in concrete mixes.

Keywords : aggregates, concrete, concrete block, construction and demolition waste, recycling

Conference Title : ICAECM 2017 : International Conference on Architectural Engineering and Construction Materials

Conference Location : Paris, France

Conference Dates : October 19-20, 2017