World Academy of Science, Engineering and Technology
International Journal of Civil and Architectural Engineering
Vol:17, No:01, 2023

Enhancement of Recycled Concrete Aggregates Properties by Mechanical Treatment and Verification in Concrete Mixes with Replacement up to 100%

Authors : Iveta Nováková, Martin-Andrè S. Husby, Boy-Arne Buyle

Abstract : The building industry has one of the most significant contributions to global warming due to the production of building materials, transportation, building activities, and demolition of structures when they reach the end of their life. Implementation of circular material flow and circular economy can significantly reduce greenhouse gasses and simultaneously reduce the need for natural resources. The use of recycled concrete aggregates (RCA) is one of the possibilities for reducing the depletion of raw materials for concrete production. Concrete is the most used building material worldwide, and aggregates constitute 70% of its volume. RCA can replace a certain amount of natural aggregates (NA), and concrete will still perform as required. The aim of this scientific paper is to evaluate RCA properties with and without mechanical treatment. Analysis of RCA itself will be followed by compressive strength of concrete containing various amounts of treated and non-treated RCA. Results showed improvement in compressive strength of the mix with mechanically treated RCA compared to standard RCA, and even the strength of concrete with mechanically treated RCA in dose 50% of coarse aggregates was higher than the reference mix by 4%. Based on obtained results, it can be concluded that integration of RCA in industrial concrete production is feasible, at a replacement ratio of 50% for mechanically treated RCA and 30% if untreated RCA is used, without affecting the compressive strength negatively.

Keywords : recycled concrete aggregates, mechanical treatment, aggregate properties, compression strength
Conference Title : ICCCCT 2023 : International Conference on Cement, Concrete and Construction Technology
Conference Location : Bali, Indonesia
Conference Dates : January 09-10, 2023