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# Recycling of End of Life Concrete Based on C2CA Method

**Authors :** Somayeh Lotfi, Manuel Eggimann, Eckhard Wagner, Radosław Mróz, Jan Deja

**Abstract :** One of the main environmental challenges in the construction industry is a strong social force to decrease the bulk transport of the building materials in urban environments. Considering this fact, applying more in-situ recycling technologies for Construction and Demolition Waste (CDW) is an urgent need. The European C2CA project develops a novel concrete recycling technology that can be performed purely mechanically and in situ. The technology consists of a combination of smart demolition, gentle grinding of the crushed concrete in an autogenous mill, and a novel dry classification technology called ADR to remove the fines. The feasibility of this recycling process was examined in demonstration projects involving in total 20,000 tons of End of Life (EOL) concrete from two office towers in Groningen, The Netherlands. This paper concentrates on the second demonstration project of C2CA, where EOL concrete was recycled on an industrial site. After recycling, the properties of the produced Recycled Aggregate (RA) were investigated, and results are presented. An experimental study was carried out on mechanical and durability properties of produced Recycled Aggregate Concrete (RAC) compared to those of the Natural Aggregate Concrete (NAC). The aim was to understand the importance of RA substitution, w/c ratio and type of cement to the properties of RAC. In this regard, two series of reference concrete with strength classes of C25/30 and C45/55 were produced using natural coarse aggregates (rounded and crushed) and natural sand. The RAC series were created by replacing parts of the natural aggregate, resulting in series of concrete with 0%, 20%, 50% and 100% of RA. Results show that the concrete mix design and type of cement have a decisive effect on the properties of RAC. On the other hand, the substitution of RA even at a high percentage replacement level has a minor and manageable impact on the performance of RAC. This result is a good indication towards the feasibility of using RA in structural concrete by modifying the mix design and using a proper type of cement.

**Keywords :** C2CA, ADR, concrete recycling, recycled aggregate, durability
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