The Structural Integrity of Recycled Aggregate Concrete Produced with Fillers and Pozzolans

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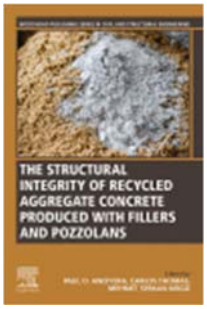

20 - Durability assessment of recycled aggregate in concrete production

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Abstract

This work assesses the durability of recycled aggregates (RAs) used in concrete production. In carrying out this assessment, a host of properties ranging from water permeability up to chemical resistance has been taken into account, considering work that has been carried out by researchers on the durability characteristics of RAs. The RAs under each topic are compared with the natural aggregates (NA). The need to

assess them is pivotal as it will help provide suitable standpoints for their utilization in construction works of greater magnitude and significance. Results showed that recycled aggregates concrete (RAC) has high water absorption due to its porosity compared to the conventional NA. A mortar fluidity of 135±2.5 mm also exhibited a better permeation performance in contradiction to the synergetic effects of water–binder ratio and the quality of the RA mortar where the result showed that the water sorptivity of the RAC and the quantity of the aggregates are directly related at a constant curing age. The creep of the concrete made from RA is 50% greater than equivalent control concretes made with the conventional aggregates. The RCAs were used as a complete replacement of natural aggregate (100%), and the shrinkage was determined to increase up to 33%. From this comparison, it is well established that RAs possess lesser strength than conventional aggregates. On the other hand, the performance of the RA can be greatly improved with materials like metakaolin, silica fumes, and fly ash, among others.

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