

Improvement of the Mechanical Behavior of an Environmental Concrete Based on Demolished

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Abstract : The universal need to conserve resources, protect the environment and use energy efficiently must necessarily be felt in the field of concrete technology. The recycling of construction and demolition waste as a source of aggregates for the production of concrete has attracted growing interest from the construction industry. In Algeria, the depletion of natural deposits of aggregates and the difficulties in setting up new quarries; makes it necessary to seek new sources of supply, to meet the need for aggregates for the major projects launched by the Algerian government in the last decades. In this context, this work is a part of the approach to provide answers to concerns about the lack of aggregates for concrete. It also aims to develop the inert fraction of demolition materials and mainly concrete construction demolition waste(C&D) as a source of aggregates for the manufacture of new hydraulic concretes based on recycled aggregates. This experimental study presents the results of physical and mechanical characterizations of natural and recycled aggregates, as well as their influence on the properties of fresh and hardened concrete. The characterization of the materials used has shown that the recycled aggregates have heterogeneity, a high water absorption capacity, and a medium quality hardness. However, the limits prescribed by the standards in force do not disqualify these materials of use for application as recycled aggregate concrete type (RAC). The results obtained from the present study show that acceptable mechanical, compressive, and flexural strengths of RACs are obtained using Superplasticizer SP 45 and 5% replacement of cement with silica fume based on recycled aggregates, compared to those of natural concretes. These mechanical performances demonstrate a characteristic resistance at 28 days in compression within the limits of 30 to 40 MPa without any particular suitable technology .to be adapted in the case.

Keywords : recycled aggregates, concrete(RAC), superplasticizer, silica fume, compressive strength

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