

Use of coarse recycled aggregates from concrete block pavement rejects: Mechanical Performance

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ABSTRACT

The large volume of construction and demolition waste (CDW) generated by construction activities in Brazil has caused environmental, social, and economic impacts due to the natural resources exploitation and illegal disposal. This paper presents the results of a laboratory investigation in conventional concrete and concrete made with coarse recycled CDW aggregates. To carry out the experimental research, the recycled aggregate most compatible with the natural aggregates common in the Northeastern Region of Brazil was used, that is, the 19-mm gravel. The recycled aggregates came from the demolition of concrete blocks pavement. To calculate the experimental mix, it was used the IBRACON method, which establishes values of simple compressive strength close to 32 MPa and a slump of 10 ± 2 cm. Three recipes were prepared with three substitutions of natural aggregate by recycled aggregate, by weight: 0% (reference), 50% and 100%, having water-cement ratios of 0.5, 0.6, and 0.7. It was nine concrete families using CP II Z-32 cement and natural aggregate. The results showed a small reduction in the parameters evaluated in general, such as rebound index, ultrasonic pulse velocity, modulus of elasticity, axial compression strength, and diametral tensile compression strength due to the use of CDW in the concrete. However, the simple compressive strength for concrete with ratio $w/c = 0.7$ increased by 10% over that of the reference concrete, which demonstrates the high quality of the recycled material used.

Keywords: Construction and Demolition Waste; Coarse recycled aggregate; Recycled concrete; Mechanical properties.