

عنوان مقاله:

Evaluation of Water Absorption Performance on Mechanical Strength and Durability of Concrete Containing Granules of Recycled Polyethylene

محل انتشار:

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خلاصه مقاله:

With the increasing use of alternative materials in concrete construction, the need for a comprehensive study of the performance of such materials in concrete is inevitable. One of the biggest environmental challenges around metropolitan areas is how to recycle and remove plastic waste from the environmental cycle. The recycling cycle of these materials is very long and costly. Long service life is considered synonymous with durability. Because durability under one set of conditions does not necessarily mean durability under another set of conditions, it is common to refer to the environment when defining durability. In this research, the performance of water absorption on mechanical strength and durability of concrete containing recycled polyethylene granules has been investigated. The replacement rate of recycled polyethylene granules is 5, 10, 15, 20, 25%. Recycled granules have replaced sand (FA) and aggregate (FC). By adding 10% granules to replace sand and aggregate, concrete slump became smoother than the control sample. Also, the specific gravity of concrete has decreased compared to the control sample. The results of concrete mechanical strength and durability of concrete with the addition of 10% granule replacement granule (FC) have better results than sand replacement (FA). The results obtained in a period of 90 days show that by adding the optimal amount of aggregate (FC) granules, the compressive strength compared to the control sample has increased by 5.8%. Tensile strength has increased by 6.7% compared to the control sample. The water absorption rate decreased by 9.6% compared to the control sample, the water infiltration rate decreased by 17.3% compared to the control sample, and the resistance rate in the melting and frost test increased by 8.1%.

کلمات کلیدی:

Water Absorption, Durability, Mechanical Strength, Granules, Recycled Polyethylene

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