

The Feasibility of Using Milled Glass Wastes in Concrete to Resist Freezing-Thawing Action

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Abstract—The using of waste materials in the construction industry can reduce the dependence on the natural aggregates which are going at the end to deplete. The glass waste is generated in a huge amount which can make one of its disposals in concrete industry effective not only as a green solution but also as an advantage to enhance the performance of mechanical properties and durability of concrete. This article reports the performance of concrete specimens containing different percentages of milled glass waste as a partial replacement of cement (Powder), when they are subject to cycles of freezing and thawing. The tests were conducted on 75-mm cubes and 75 x 75 x 300-mm prisms. Compressive strength based on laboratory testing and non-destructive ultrasonic pulse velocity test were performed during the action of freezing-thawing cycles (F/T). The results revealed that the incorporation of glass waste in concrete mixtures is not only feasible but also showed generally better strength and durability performance than control concrete mixture. It may be said that the recycling of waste glass in concrete mixes is not only a disposal way, but also it can be an exploitation in concrete industry.

Keywords—Durability, glass waste, freeze-thaw cycles, nondestructive test.