

Fresh and Mechanical Properties of Concrete Containing Crushed Brick Waste as Partial Fine Aggregate Replacement

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Abstract

Concrete is one of the oldest established construction materials, and it is employed in the design of many structures all over the globe. Because of strong demand, the material used in concrete production, particularly natural sand, is dwindling year after year. The ongoing extraction of these natural resources is harmful to the ecosystem. Simultaneously, crushed brick debris from building sites pollutes the environment. Crushed Brick Waste (CBW) was employed as a fine aggregate substitute for genuine production in this investigation. This study looks at the fresh qualities, mechanical characteristics, and durability of concrete (concrete including crushed brick debris as a partial fine aggregate substitution). In this experiment, five different combinations were employed. Concrete mixtures with 0%, 10%, 20%, 30%, and 40% CBW replacement amounts were cast and water cured till the testing age. To investigate the workability, compressive strength, and water absorption of concrete containing CBW, slump tests, compressive strength tests, and water absorption tests were performed. The results reveal that the application of CBW has an effect on the workability and strength of concrete. When the amount of crushed brick waste utilised as a partial fine aggregate replacement increase, the workability of the concrete decreases. In conclusion, using CBW as a partial fine aggregate replacement saves river sand and minimises the amount of CBW disposed away at the landfill.

Keywords: Fine aggregate; Crushed brick waste; Slump test; Compressive strength; Water absorption.