

Utilizing Pulverized Glass as a Partial Replacement for Fine Aggregates in Cement Mortar

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Abstract: Mortar plays a pivotal role in the construction industry, underscoring the significance of comprehending its quality and the intricate interplay of its mixture in shaping performance outcomes. The utilization of waste glass as an innovative alternative to conventional fine aggregates in mortar mixtures is instrumental in enhancing structural safety. In light of this, the present study is dedicated to investigating the efficacy of waste glass incorporation in bolstering both compressive and flexural strength. This inquiry delves into the intrinsic qualities and strength attributes of concrete mortars, scrutinizing the influence of pulverized waste glass content. The range of powdered waste glass inclusions encompasses 0%, 10%, 15%, 20%, 25%, 30%, 50%, and 60% by weight in relation to the sand component of the mortar mixture. The experimental design involves the fabrication of a total of 72 mortar cubes, where 48 specimens are earmarked for conducting assessments of compressive and flexural strength. Compressive and flexural strength evaluations are conducted on the mortar samples after 7, 14, and 28 days of both moist and water curing protocols. The outcomes of these tests unveil the effectiveness of incorporating powdered waste glass as an aggregate within mortar mixtures, particularly at the 25% replacement mark. Intriguingly, the investigation highlights that concrete mortars imbued with 25% waste glass content exhibit superior strength in comparison to the other examined samples. Additionally, the study underscores that the strength outcomes for replacements of 25% and 10% successfully meet the prescribed strength requirements for cement mortar outlined in accordance with ASTM standards.

Keywords: compressive strength, flexural strength, cement mortar, pulverized glass, replacement

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