

Effect of Steel Fibers on M30 Fly Ash Concrete

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Abstract : Concrete's versatility and affordability make it a highly competitive building material capable of meeting diverse requirements. However, the increasing demands placed on structures and the need for enhanced durability and performance have driven the development of distinct cementitious materials and concrete composites. One significant aspect of this advancement is the utilization of waste materials from industries, such as fly ash, to improve concrete's properties. Fly ash, a byproduct of coal combustion can enhance concrete's strength and durability while reducing environmental impact. Additionally, steel fibers can enhance concrete's toughness and crack resistance, contributing to improved structural performance. The experimental study aims to optimize the proportion of ingredients in M30-grade concrete, incorporating fly ash and steel fibers. By varying fly ash content (10% to 30%) and steel fiber dosage (0% to 1.5%), the research seeks to determine the optimal combination for achieving the desired compressive strength. Two sets of experiments are conducted: one focusing on varying fly ash content while keeping steel fiber dosage constant, and the other focusing on varying steel fiber dosage while keeping other parameters fixed. Through systematic testing, molding, curing, and evaluation according to specified standards, the research aims to analyze the impact of fly ash and steel fibers on concrete's compressive strength. The findings have the potential to inform engineers about optimized concrete mix designs that balance performance, cost-effectiveness, and sustainability, advancing toward more resilient and environmentally friendly building practices.

Keywords : concrete, sustainability, durability, compressive strength

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