

Experimental Investigation of Sustainable Concrete Production using Blast Furnace as A Cement Substitute- A art of Review

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Abstract: *The pursuit of sustainable construction practices has led to a growing interest in alternative materials that can reduce the environmental impact of traditional concrete production. This experimental study focuses on the utilization of blast furnace slag as a substitute for cement in concrete, aiming to assess its mechanical properties, environmental impact, and overall sustainability. The primary objectives of this research are threefold. Firstly, the study seeks to evaluate the mechanical properties of concrete by varying the content of blast furnace slag in the mix, with a specific emphasis on strength, durability, and structural performance. This involves conducting a comprehensive analysis of the concrete's compressive strength, flexural strength, and other relevant mechanical characteristics. Secondly, a life cycle assessment (LCA) will be employed to analyze the environmental impact of the concrete mixtures. This assessment will compare carbon dioxide (CO₂) emissions, energy consumption, and overall sustainability of the concrete produced with varying percentages of blast furnace slag. The LCA will provide valuable insights into the environmental implications of using slag as a cement substitute, aiding in the identification of eco-friendlier concrete production practices. Lastly, the research aims to assess the environmental impact of blast furnace slag itself when employed as a cement substitute. This involves examining the production, transportation, and incorporation of blast furnace slag into the concrete mix, providing a holistic view of its sustainability across the entire life cycle. The experimental approach involves the meticulous design of concrete mixes with different percentages of cement replaced by blast furnace slag. The varying mix designs will be tested for mechanical properties, and the data obtained will be used to draw correlations between slag content and concrete performance. In summary, this research endeavors to contribute to the body of knowledge surrounding sustainable concrete production by exploring the mechanical, environmental, and sustainability aspects of utilizing blast furnace slag as a cement substitute. The findings of this study are anticipated to provide valuable insights for the construction industry to adopt more environmentally friendly practices while maintaining or enhancing concrete performance.*

Keywords: sustainable construction practices

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