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A Study of Partial Replacement of Cement with GGBS in Concrete and Aggregate with Plastic

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Abstract: *The sustainable development of the construction industry necessitates the exploration of alternative materials to reduce the environmental impact of concrete production. This paper investigates the feasibility and performance of employing Ground Granulated Blast Furnace Slag (GGBS) as a partial replacement for cement and integrating plastic waste as a partial replacement for aggregate in concrete. The objective is to evaluate the mechanical properties, durability, and environmental benefits associated with these alternative materials. Through a comprehensive experimental investigation encompassing mix design optimization and testing of fresh and hardened concrete properties, as well as durability assessments, the study reveals the potential of GGBS and plastic waste as sustainable alternatives in concrete production. This research contributes to the reduction of cement consumption and the effective management of plastic waste, addressing both ecological and economic concerns in the construction sector.*

Keywords: *Ground Granulated Blast Furnace Slag (GGBS), concrete, plastic waste, cement replacement, aggregate replacement, sustainable construction*.

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