

Partial Replacement of Cement by Bentonite

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Abstract: Industry uses bentonite for a variety of purposes. Understanding the composition and structure of bentonite as well as the properties it produces, reveals certain industrial applications. These properties are primarily used when the material is suspended in a liquid, most commonly water, or as a dried powder or granule. The majority of industrial application rely on swelling properties of bentonite to form viscous water suspensions. The partial replacement of cement by bentonite in concrete mixtures presents a promising avenue for enhancing the sustainability and performance of construction materials. This project provides a comprehensive overview of the research, experimentation, and potential applications of utilizing bentonite as a sustainable alternative to traditional cement in concrete production. The study evaluates the mechanical properties, workability, durability, and environmental sustainability of bentonite-based concrete through a review of existing literature, experimental investigations, and field trials. The findings suggest that partial substitution of cement with bentonite can lead to improvements in rheological properties, durability, and environmental impact, while maintaining or even enhancing the structural integrity and performance of concrete structures. Challenges and limitations, including those related to mechanical strength, long-term performance, and market acceptance, are discussed, along with recommendations for future research and development.

Keywords: Bentonite, Concrete, Construction

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