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Partial Replacement of Cement by Egg Shell Powder

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Abstract: *The construction industry heavily relies on cement, which is not only costly and resource-intensive but also contributes significantly to CO_2 emissions. Producing one tonne of Ordinary Portland Cement (OPC) consumes around 1.1 tonnes of raw materials and emits a similar amount of CO_2, raising environmental concerns. To address this, our project investigates the partial replacement of cement with 5%, 10%, 15% and 20%eggshell powder—a locally available waste material rich in calcium carbonate ($CaCO_3$).Eggshells, often discarded in large quantities in India, show potential as a sustainable cement alternative due to their chemical composition. In this study, M20 grade concrete (1:1.5:2) was prepared with 10% eggshell powder replacing cement. The mechanical properties such as compressive, split tensile, and flexural strength were tested at 7, 14, and 28 days and compared with conventional concrete. The aim is to produce eco-friendly, cost-effective concrete while reducing cement usage and environmental impact*

Keywords: Exhaustion, Workability, Compressive Strength, declined, sustainable management, effective

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