

ABSTRACT

A Study On The Use Of Construction Wall Waste As A Mixture For Artificial Coarse Aggregate

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This study aims to evaluate the potential use of construction wall waste, specifically red bricks and lightweight concrete blocks (hebel), as a substitute material in the production of artificial coarse aggregates for geopolymer mortar. The primary issue addressed is the excessive exploitation of natural coarse aggregates and the potential environmental pollution caused by unmanaged construction waste. In this research, artificial aggregates were produced using the pelletization method with a mixture of fly ash and wall waste in varying compositions of 20%, 40%, 60%, 80%, and 100%. The mixture was then activated with an alkaline solution (NaOH and Na₂SiO₃) and cured at 70°C and 90°C for 2 hours. The test results indicate that the optimum compressive strength was achieved at 20% waste composition with a curing temperature of 70°C, reaching 24.20 MPa at 28 days. Meanwhile, abrasion test values also showed the best performance within the 20–40% composition range. An increase in waste content above 60% led to a significant decline in compressive strength and abrasion resistance, presumably due to the low chemical reactivity of the waste and the increased porosity of the aggregates. This research contributes to the development of environmentally friendly construction materials and supports the principles of sustainable development by reducing dependence on natural materials.

Keywords : geopolymer mortar, artificial aggregate, construction waste, red brick, lightweight concrete, compressive strength.

Literature : 11

Year of Publication : 2025