

A NOVEL APPROACH FOR MAXIMISING USAGE OF HIGH ALUMINA CEMENT AND SILLIMANITE IN REACTIVE POWDER CONCRETE

Journal: Journal of Environmental Protection and Ecology 26(2) (2025) Pages: 689 - 699

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Abstract

This study investigates the impact of incorporating sillimanite on the strength and durability characteristics of air-cured reactive powder concrete (RPC). The inclusion of sillimanite positively affected the strength properties of RPC by filling micro gaps, attributed to its fine particle size. Sillimanite was chosen as a replacement material for quartz sand, with varying percentages ranging from 0 to 60{\%} in 10{\%} increments. Additionally, the combined effect of high alumina cement (HAC) with sillimanite substitution was evaluated through compressive, flexural, ultrasound pulse velocity, water absorption, electrical resistivity, and rapid chloride penetration tests. The findings indicate that RPC with 30{\%} sillimanite substitution in HAC demonstrates optimal performance, with a slight decline observed beyond this proportion due to the extremely fine nature of higher sillimanite content. The enhanced filling capability and pozzolanic action contribute significantly to increased resistance to water absorption. This research concludes that sillimanite can effectively serve as an alternative to fine aggregate, as air-cured RPC exhibits notable property improvements.

▼ Keywords

RPC; air curing; compressive strength; durability; fine aggregate; sillimanite; strength

▼ Cite this article

PRANAP, KS, JEEVITHA, S., VANISOUNDARYA, G., SELVAPRIYA, V., RUBY, GS, & VADIVEL, M. (2025). A NOVEL APPROACH FOR MAXIMIZING USAGE OF HIGH ALUMINA CEMENT AND SILLIMANITE IN REACTIVE POWDER CONCRETE. In *Journal of Environmental Protection and Ecology* (Vol. 26, Issue 2, pp. 689–699).

EndNote

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