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# Performance Appraisal of Coal ash Stabilized Rammed Earth

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## Abstract

Rammed earth construction is an ancient technique which when combined with modern methods could bring substantial improvement in the construction of buildings. This paper presents a study on the strength and durability aspects of coal ash stabilized rammed earth intensifying on the utilization of industrial waste for a sustainable method of construction. At first, compaction studies were done with different combinations of bottom ash (BA) and fly ash (FA) mixtures to obtain an optimum content for use as binder. The optimized amount of binder was then added to soil in varying proportions along with cement to determine the compaction behavior. From the compaction results, 30% of binder content was proposed for stabilization of the rammed earth and all the further studies were carried out by adding this amount of binder. Unconfined compressive strength of the stabilized soil was determined after 7, 14, 28, 45 and 60 days which showed significant improvement in comparison to the pure soil. Microstructural and mineralogical studies were done to affirm the strength test results and to determine the effect of binders on soil stabilization. Compression tests on stabilized rammed earth were also conducted using large cylinders and masonry prisms after 28 days of curing. Durability of the stabilized soil was assessed through spray erosion test which showed their effectiveness in resistance to erosion. Coal ash stabilized soil showed promising results for their utilization in rammed earth construction.

**Keywords:** rammed earth, coal ash, pozzolanic reaction, compressive strength, durability

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