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Effect of Marble Dust on Strength and Durability of Alker

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ABSTRACT

Earthen construction made from sand, clay, and water can be shaped into bricks using form and dried in the sun. Earthen structures are extremely durable if considering the skilled production and design principles. Strength and durability of earthen material can be improved if needed. Some kind of fibrous, inorganic or organic material can be added. Sticks, straw, dung, rice husks, asphalt emulsion, Portland cement, and lime are the materials that are used for the earth stabilization. In this study waste marble dust which is the by-product of marble industry were used for stabilization of earthen. Gypsum and lime stabilized soil called Alker will be the subject of the study. This paper presents the results of a laboratory study undertaken to investigate the effect of marble dusts on strength and durability of Alker. Marble dust was added to Alker up to 40%, by dry weight of the soil, at an increment of 10%. UCS test were conducted after and water absorption test as durability test were conducted on these samples after 7 and 28 days. It is known that the conventional earthen construction needs specific kind of soil with high clay content. Grain size distribution and consistency limits for the soil sample and unit weights, compressive strength and water absorption values for the stabilized samples were determined to analyze the effect of marble dust. It is observed that 20% marble dust addition improves the Alkers' physical and mechanical properties. Also marble dust added samples satisfy the minimum standard requirements to be used as earthen material.

Keywords: Alker, earthen construction, marble dust, soil stabilization.