

Experimental insights of using waste marble fines to modify the geotechnical properties of a lateritic soil

Abstract

Marble spoil waste is an environmental nuisance. The effects of adding waste marble fines (WMF) on the plasticity, strength and permeability of a lateritic clay have been investigated for its potential use as a soil modifier or stabilizer of road pavement layer materials or earth-building materials. The chemical compositions of the WMF and soil were determined using X-ray fluorescence and atomic absorption spectrometry, respectively. The specific gravity, Atterberg limits, compaction, strength and permeability characteristics of the soil were determined for varying proportions of the soil-WMF blends. The properties of the natural soil – classified as clay of low plasticity (CL) and A-7-6(7), according to unified soil classification and AASHTO classification systems, respectively – were improved after the addition of 10% WMF such that it behaves like a silt of low plasticity. Therefore, WMF is recommended as a low-cost soil modifier or stabilizer for lateritic soil and well-suited for road construction applications.

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