

Experimental Investigation of The Influence of Cement on Soil-Municipal Solid Waste Incineration Fly ash Mix Properties

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Abstract : The aim of this study is to assess the viability of utilizing Municipal Solid Waste Incineration Fly Ash (MSWIFA) with Ordinary Portland cement as soil reinforcement materials for geotechnical engineering applications. A detailed experimental program is carried out, followed by analysis of results. Soil samples were prepared by adding Cement to MSWIFA-soil mix at different percentages. Then, a series of laboratory tests were performed, namely: Sieve analysis, Atterberg limits tests, Unconfined compression test, and Proctor tests. A parametric study is conducted to investigate the effect of adding the cement at different percentages on the unconfined compression strength, maximum dry density, and optimum moisture content of clayey soil-MSWIFA. The variation of contents of admixtures were 10%, 20%, and 30% for MSWIFA by dry total weight of soil and 10%, 15%, and 20% for Portland cement by dry total weight of the mix. The test results reveal that adding MSWIFA to the soil up to 20% increased the MDD of the mixture and decreased the OMC, then an opposite trend for results were found when the percentage of MSWIFA exceeds 20%. This is due to the low specific gravity of MSWIFA and to the greater water absorption of MSWIFA. The laboratory tests also indicate that the UCS values were found to be increased for all the mixtures with curing periods of 7, 14, and 28 days. It is also observed that the cement increased the strength of the finished product of the mix of soil and MSWIFA.

Keywords : clayey soil, cement, MSWIFA, unconfined compression strength

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