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STRENGTH CHARACTERISTICS OF SOIL BLENDED WITH FLY ASH AND RICE HUSK ASH-TWO WASTE MATERIALS

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Abstract

In many parts of the world, waste materials like fly ash and rice husk ash have created environmental issues related to land use for disposal, as well as air and water pollution. Fly ash and rice husk ash can be used in soil stabilization, which minimizes the large quantities generated. This study investigates the individual effect of fly ash (FA) and rice husk ash (RHA) on the strength properties of locally available soil and the potential use of these two waste materials as well. Soil-FA and soil-RHA mixes were prepared by partially replacing soil by weight at rates of 0%, 5%, 10%, 15%, and 20%. The California Bearing Ratio (CBR) and direct shear tests were conducted on compacted specimens of various mixes of soil containing FA or RHA in different proportions. The addition of 20% FA improves the CBR value of soil by 401% and 241% for unsoaked and soaked conditions, respectively. In the case of a soil-RHA mix containing 10% RHA, the CBR value of untreated soil is improved by 381% and 216% for unsoaked and soaked conditions, respectively. In the direct shear test, the addition of 20% FA to the soil increases the cohesion value from 0.102 kN/m² to 10.00 kN/m², while the addition of 10% RHA improves the cohesion of untreated soil to 10.03 kN/m². It is evident that the addition of fly ash and rice husk ash enhances soil strength; therefore, these waste materials can be beneficially used in geotechnical engineering applications.

Key words: California bearing ratio, fly ash, rice husk ash, shear strength

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