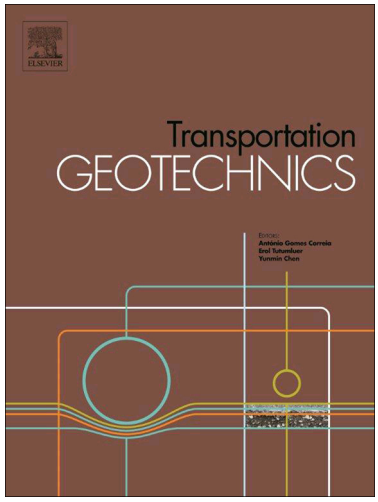

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Seyedesmaeil Mousavi

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Shear Strength Behavior in the Interface of Contaminated Soil with Bio-diesel Oil and Geosynthetics

SEYEDESMAEIL MOUSAVI[1]

College of Engineering, Islamic Azad University, Khodabandeh Branch, Zanjan, Iran

Abstract

This article aims to present the shear strength of soil-geosynthetic interface through laboratory tests. Shear strength of a soil-geosynthetic interface is defined as the primary parameter of slope stability in cases where the potential slip surface runs along a geosynthetic. Besides, palm biodiesel contamination can affect the geotechnical properties of foundation soils. In this study, interface interaction between soil and various geosynthetics, namely A, B, and C was investigated in term of shear strength parameters. The type of palm oil used for contaminating is B20 palm biodiesel ranging from 3% to 10% by the weight of dry sand. The objective of this research is to assess the shear strength parameters at the soil-geosynthetic interface. For this purpose, test specimens of both clean and contaminated sample with different gesynthetics were tested under direct shear test in order to evaluate their shear strength. Results were analyzed based on the behavior of three different geosynthetics as reinforcements and contaminated mining sand. The results of direct shear tests indicate that shear strength varies considerably along the soil-geosynthetic interface. It was found that the shear strength of reinforced sand with geosynthetic C was increased by almost 1.3 times as compared to that of the unreinforced test specimen. A notable discovery is that the reinforced sand with geosynthetic C could improve the shear strength of the soil sample to protect the slopes, particularly shallow foundations on mining sand. However, further laboratory and field investigations are recommended.

Keywords: Interface, Geosynthetic, Direct shear, Sand, Palm oil biodiesel

Highlights

►Addition of B20 oil causes an abrupt reduction in shear strength. ►The soil specimen reinforced with gesynthetic C indicates the highest interface shear strength. ►Difference in geosynthetic texture, geometry and stiffness affect the shear strength parameters at the interface.

[1] Corresponding: Tel: +98-919-650-6440, Email address: mousavi@khiau.ac.ir; mousavi.utn@gmail.com