

Geotechnical assessment of palm oil fuel ash (POFA) mixed with granite residual soil for hydraulic barrier purposes

ABSTRACT

This paper assesses the geotechnical properties of granite residual soil treated with palm oil fuel ash (POFA), a waste from the palm oil factory for the purposes of hydraulic barrier in landfills. Granite residual soil treated with up to 40% palm oil fuel ash (by dry weight of the soil) was compacted using standard proctor compactive effort at the optimum moisture content. Index properties, hydraulic conductivity (k), volumetric shrinkage strain (VSS) and unconfined compressive strength (UCS) tests were carried out. Results showed that the index properties of samples met the minimum requirement for it to be used as a liner. The maximum dry density and optimum moisture content decreased and increased respectively. The influence of POFA treatment on the geotechnical properties generally showed an improvement with up to 15% POFA which gave the acceptable results with regards to its usability as a hydraulic barrier material in landfill.

Keyword: Granite residual soil; Hydraulic conductivity; Palm oil fuel ash; Unconfined compressive strength; Volumetric shrinkage