A Review of Advances in Peat Soil Stabilisation Technology: Exploring the Potential of Palm Oil Fuel Ash Geopolymer as a Soil Stabiliser Material

ABSTRACT

This study aims to highlight the latest developments in the field of peat soil stabilisation technology via chemical stabilisation. The review examines the use of traditional stabilisers such as OPC and various non-traditional stabiliser materials, i.e., Palm Oil Fuel Ash (POFA)-OPC blends, chemical solutions, and geopolymer materials, to enhance the Unconfined Compressive Strength (UCS) characteristics of peat soils based on the ASTM D 4609 requirements. OPC, POFA-OPC blends, and alkaline solutions mostly produced stabilised soil samples that fell short of the ASTM requirements. Existing studies on the use of waste-derived geopolymers to treat peat soils are limited, while the use of POFA geopolymer materials has mostly focused on the improvement of clayey and silty soils. The results of soil stabilisation with geopolymer were very encouraging, as the strength gains were in line with the ASTM soil strength requirements. As a result of this review, it can be concluded that POFA geopolymer is a viable soil stabiliser material with the addition of Ground Granulated Blast Furnace Slag, and that the use of POFA-GGBFS geopolymer to enhance the strength properties of peat soils should be investigated.