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Effect of Geogrid on Behaviour of Black Cotton Soil using Plate Load Test for Initial Loading

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Abstract: *This study investigates the effectiveness of geosynthetic reinforcement, specifically biaxial geogrids, in improving the load-bearing behavior of black cotton soil using Plate Load Test (PLT). Black cotton soil is known for its high shrink-swell potential, low shear strength, and poor load-bearing capacity, making it unsuitable for structural foundations without stabilization. A series of geotechnical tests including moisture content, plastic index, compaction, and permeability were conducted to characterize the soil. Plate Load Tests were performed both with and without geogrid reinforcement to analyze settlement under varying loads. The results revealed that the inclusion of geogrid significantly reduced settlement from 18 mm to 5.4 mm under a 300 kN load, representing a 70% reduction and indicating enhanced stiffness and load distribution. The load-settlement curve for reinforced soil demonstrated improved resistance to deformation and higher bearing capacity. This research highlights geogrid reinforcement as a cost-effective, sustainable method for stabilizing expansive soils and improving subgrade performance in civil engineering applications*

Keywords: Geogrid, Black cotton soil, Plate Load Test, Soil stabilization, Bearing capacity

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