

# Stabilization of Black Cotton Soil using Kota Stone Dust

O. R. Devkar, S. R. Gade, U. J. Jagade, A. N. Ingale, Prof. A. A. Jagtap

Diploma in Civil Engineering

Zeal Polytechnic, Pune, India

**Abstract:** Black cotton soil, known for its high shrink-swell capacity and poor engineering properties, poses significant challenges in construction and infrastructure development. Stabilization of such expansive soils is crucial to enhance their load-bearing capacity and minimize volumetric changes. This study investigates the effectiveness of using Kota stone waste, a by-product from the stone cutting industry, as a stabilizing agent for black cotton soil. Various proportions of Kota stone powder (ranging from 5% to 25% by weight) were mixed with the soil and tested for changes in Atterberg limits, compaction characteristics, unconfined compressive strength (UCS), and California Bearing Ratio (CBR). The results indicate a significant improvement in the strength and stability of the soil with an optimal dosage of Kota stone powder. The use of Kota stone not only improves geotechnical properties but also promotes sustainable construction practices by utilizing industrial waste. This research demonstrates a cost-effective and eco-friendly approach to soil stabilization, particularly relevant for road and foundation works in black cotton soil regions.

**Keywords:** Black Cotton Soil, Soil Stabilization, Kota Stone Waste, Expansive Soils, Geotechnical Engineering, Industrial Waste Utilization, Sustainable Construction, Soil Improvement, California Bearing Ratio (CBR)

