

The Effect of Soil Fractal Dimension on the Performance of Cement Stabilized Soil

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Abstract - In roadway construction, the cost of soil-cement stabilization per unit area is significantly influenced by the binder content, hence the need to optimise cement usage. This research work will characterize the influence of soil fractal geometry on properties of cement-stabilized soil, and strive to determine a correlation between mechanical properties of cement-stabilized soil and the mass fractal dimension D_m indicated by particle size distribution (PSD) of aggregate mixtures. Since strength development in cemented soil relies not only on cement content but also on soil PSD, this study will investigate the possibility of reducing cement content by changing the PSD of soil, without compromising on strength, reduced permeability and compressibility.

A series of soil aggregate mixes will be prepared in the laboratory. The mass fractal dimension D_m of each mix will be determined from sieve analysis data prior to stabilization with cement. Stabilized soil samples will be tested for strength, permeability and compressibility.

Keywords—Fractal dimension, Particle size distribution, Cement stabilization, cement content.

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