

ABSTRACT

Deep soil mixing, which is generally used for stabilizing soft soils, is a technology that creates strong columns in the ground by mixing of a binder material with the in-situ soil. Although this method has been used in practice in the United States since the early 1970's, the design and construction procedures associated with the technology are still being developed. The variables in design are numerous, including the characteristics of the binding agent, the nature of the untreated soil, the mixing procedure, and the curing conditions. An important factor in design is determining which variables influence the strength gain of the treated soil. In the laboratory, most of these parameters can be controlled. If these parameters are not controlled, wide variations in test results can occur, with important impacts on design.

This report clarifies the terminology, procedures, and reporting methods associated with laboratory testing of soil-cement specimens applicable to the wet method of deep mixing. The research included a literature review of the material properties and laboratory procedures for deep mixed soil-cement materials, from which a comprehensive list of terminology relating to mixture proportions for deep mixing methods was compiled. A laboratory procedure for design phase testing of deep mixed soil-cement mixtures that reflects the current state of practice was developed, and the suitability of the procedure was assessed by applying it to five soils and developing a method for presenting test results. From these results, a correlation was established between the unconfined compressive strength and the as-cured total-water-to-cement-ratio.

The scope of this research is limited to relatively easy-to-mix soils, such as sands with varying degrees of silt and low plasticity clay.