Summary of Final Report BC 354-64
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A COMPENDIUM OF GROUND MODIFICATION TECHNIQUES

PROBLEM STATEMENT

Because increased population growth has led to the need to use marginal sites for buildings and highways, and because many soils can be made into useful construction material when properly modified, ground modification has become a viable consideration for many infrastructure projects. Ground modification essentially is the enhancement of the existing soil engineering properties by alteration via compaction, admixtures, or inclusions. The technique selection depends upon soil-method compatibility, feasibility, and economics. Accordingly, there is a need to provide state-of-the-art guidance to engineers concerning ground modification techniques.

OBJECTIVES

The overall goal of the project was to provide comprehensive guidance to engineers concerning the viability and selection of the method-soil compatibility of various ground modification techniques. This objective was accomplished by the following:

- Examining recorded case histories, recommended techniques, current design theories and software, and specifications
- Categorizing modification method feasibility vs. soil type to provide an easy and quick discriminatory guide for method selection and applicability
- Evaluating design theories, methods, guidelines, and software, and illustration of theory using example problems.

FINDINGS AND CONCLUSIONS

This report summarizes the advantages and limitations of, the appropriate selection and recommendation of, and the design considerations for the following ground modification techniques:

1. Compaction
2. Deep Dynamic Compaction
3. Surcharging (preloading)
4. Stone Columns
5. Soil Stabilization
6. Grouting
7. Jet Grouting
8. Deep Soil Mixing
9. MSE Walls
10. Reinforced Slopes

11. Soil Nailing
12. Geogrids in Highways
13. Lightweight Fills

BENEFITS

This compendium of ground modification techniques will provide FDOT engineers and contractors with a state-of-the-art guidebook and reference tool for various ground modification solutions. For some techniques, the compendium provides guidance for the use of software for preliminary designs with regard to feasibility considerations. Many of these ground modification techniques are currently being used by FDOT. Consequently, this report will help the design engineer to better understand the theories involved with ground modification (e.g., concepts, assumptions, design limitations), and improved understanding should enhance confidence and acceptance of techniques by engineers. The ability to effectively compare various potential ground modification solutions to geotechnical problems will lead to more economic solutions with regard to construction involving marginal land sites.

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