SPR-3517 2012

Project Implementation: Classification of Organic Soils and Classification of Marls— Training of INDOT Personnel

Introduction

This is an implementation project for the research completed as part of two projects: SPR-3005, Classification of Organic Soils, and SPR-3227, Classification of Marl Soils. The methods developed for the classification of both soils have been incorporated in Indiana Department of Transportation (INDOT) standard specifications 903.05 and 903.06, respectively. Both projects included recommendations for implementation that reflected input from the project administrator and study advisory committee. A specific recommendation from both projects was that INDOT soil technicians be trained to perform the required tests and to classify soils based on the revised classification systems. This project was initiated to carry out the implementation of those recommendations.

The project scope includes developing training materials, training pertinent INDOT personnel, integrating the revised classification system into INDOT's standards, and establishing a resource database for future training of INDOT personnel.

Findings

- The presence of organics in soils can create problems in geotechnical practice by increasing the soil's compressibility and creep potential, decreasing its maximum dry density and strength, and potentially interfering with the soil's stabilization or modification with cement, lime, and cement or lime byproducts.

- Such problems are recognized in current INDOT specifications, which have strict limits on the percentage of organic matter allowed for certain applications. Thus, identification of organic soils and quantification of the percentage of organic matter is critical in many engineering projects. The method that was previously employed by INDOT to determine organic content tends to over- estimate the percentage of organic matter. This is problematic because misclassification of organic soils can lead to significant costs that could be avoided.

- Marls typically have low dry density, very high moisture content, and low shear strength. As a result, they are considered problem soils and their correct identification and classification is critical in geotechnical engineering practice.

- Because of the generally unsatisfactory geotechnical properties of marls, INDOT specifications restrict the amount of calcium and magnesium carbonate that can be present in soils for a number of applications, similarly to how they restrict the presence of organic matter. The methodologies that are available for determining the calcium carbonate content are either very complex (e.g., the chemical determination of $CaCO_3$), or not sufficiently sensitive (e.g., the effervescent action of hydrochloric acid on the carbonate). As with organic soils, misclassification of marl soils can be costly.

- As a result, classification systems were developed to classify organics soils (SPR-3005) and marls (SPR-3227) more accurately and in a relatively easy manner.

- This project: (1) administers training to INDOT personnel and interested representatives from the geotechnical consulting/construction community, and (2) develops training materials to be used by INDOT to train additional personnel.

Implementation

This project was implemented based on four specific tasks:

1. Collection of sample soils for testing and classification.

2. Development of training material, namely: a PowerPoint presentation with concise instructional handouts; sup-

porting classification examples for a variety of soils; and a manual summarizing the classification system for both soils with supporting examples.

3. Delivery of training sessions to INDOT personnel, as well as representatives from select geotechnical consulting firms and contractors.

4. Production of a training video.

Recommended Citation

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