

Reactive Aggregate in Base Course: Implementation of Laboratory Results

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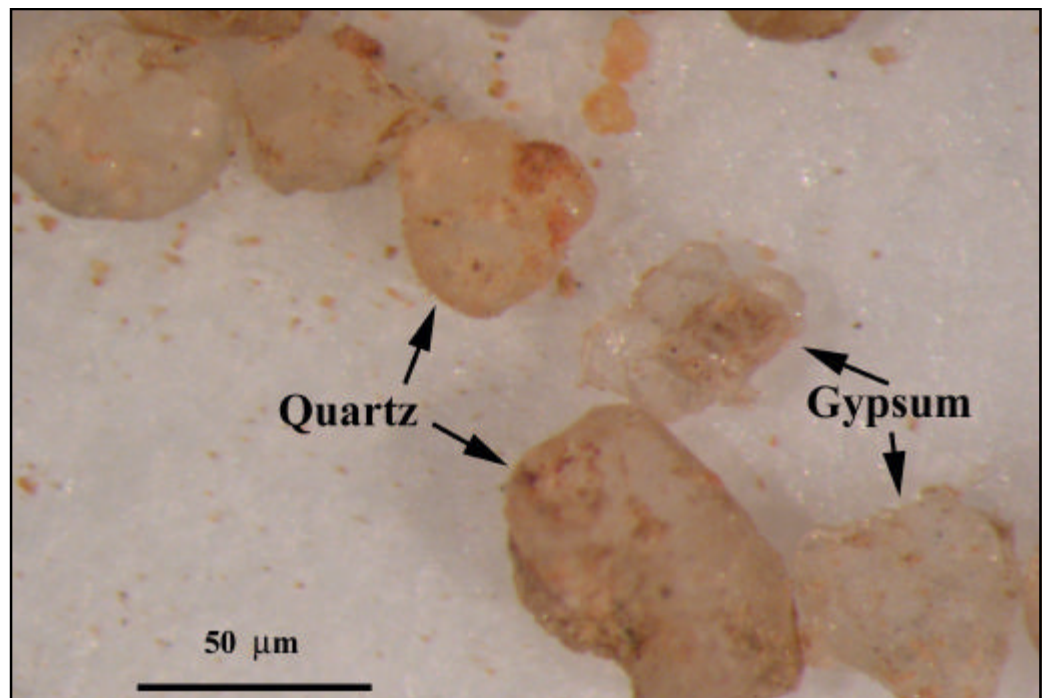
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Problem

Laboratory results from the recent LTRC-funded research project "Stabilization Techniques for Reactive Aggregate" suggest that expansion of stabilized sulfate-containing soil may be reduced when stabilized with blended cements containing granulated blast furnace slag (BFS). In laboratory tests, the expansion of the reactive aggregate was within the specifi-

cation tolerance of 0.1 percent when blended with certain mixtures of Type 1 portland cement (C) and BFS. The further addition of silica fume (SF) or amorphous silica to the C:BFS mixture resulted in even less expansion.

Results of this laboratory study must now be implemented in the field. Four test sections will be built, each with one of the follow-



Soil from a Winn Rock-treated site containing gypsum crystals

ing cement mixtures: Type 1 portland cement (C), 1:1 C:BFS mixture, 3:1 C:BFS mixture, and 3:1 C:BFS mixture with five percent SF.

Objective

The objective of this research project is to validate laboratory results that indicate reduced expansion of stabilized sulfate-containing soil occurs when granulated BFS is included in the cement blends used for stabilization.

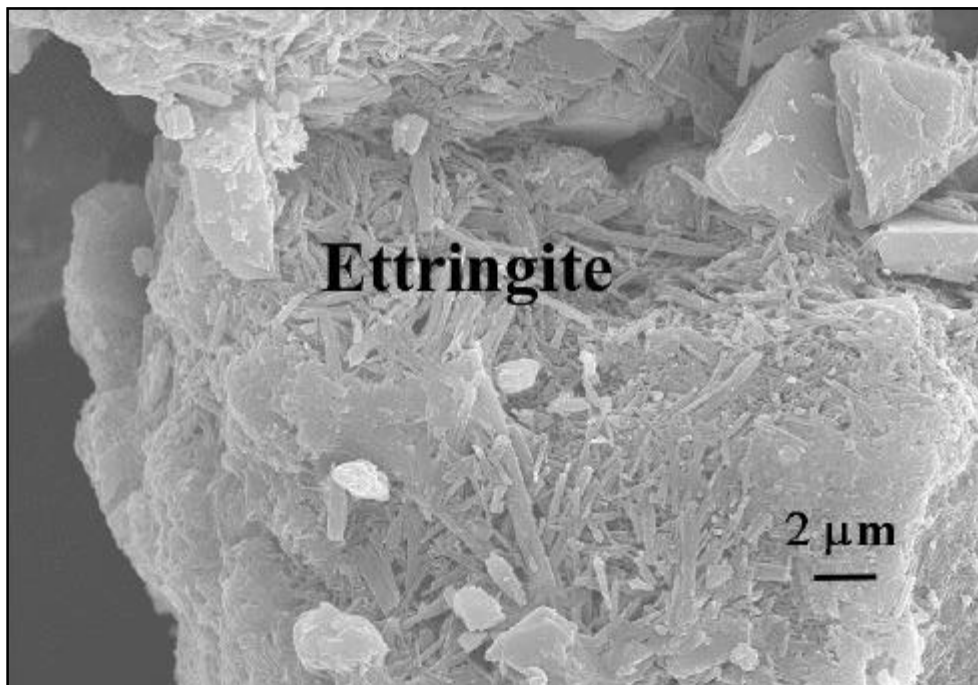
Description

Prior to stabilization with the aforementioned cement mixtures, suspect expansive soils must undergo detailed mineralogical and microstructural characterization analyses. If a soil is deemed suitable for this field study, subsequent phases of the project will involve stabilization of test sections and evaluation of the effectiveness of the various cement mixtures used for stabilization.

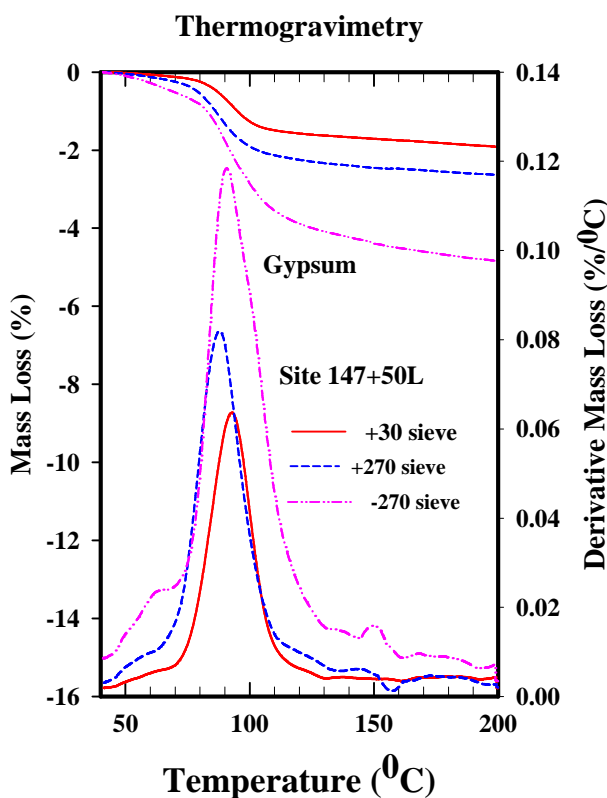
Test sections will be photographed in detail before and after stabilization. Expansion will be monitored by DOTD personnel.

Implementation Potential

Identification of soils that are vulnerable to expansion can result in better utilization of construction and maintenance resources.



Scanning electron photomicrograph of a soil particle with ettringite



Thermogravimetric curves of different soil fractions
The amount of gypsum increases with the finer fractions.