



# Chemical Stabilization of Pavement Subgrade

## **Problem Description**

Roadway alignments are typically dictated by constraints other than the existing conditions. For reason, the design of the roadbed and pavement section must accommodate the conditions at each site even when poor, low strength soils are present in the subgrade. TDOT's current practice in these situations has been to either remove low quality materials or design a thicker pavement section, both at substantial cost to the state and its residents. Chemical stabilization is often a cost-effective alternative to either of these approaches and should be considered on more TDOT projects. TDOT's usage and experience with stabilization has declined with time. In order to reverse this trend, TDOT needs to gain knowledge and experience with all aspects of the chemical stabilization process from exploratory and laboratory testing through design to construction.

## **Research Objectives**

- Determining what subsurface exploration, laboratory testing, and soil properties and classification of in-situ soils are required in order to recommend a specific chemical treatment.
- Developing laboratory testing procedure(s), laboratory mix design(s), and testing program(s) of laboratory-prepared, chemically-treated soil samples for evaluation of suitability.
- Determining relevant test methods and measurements required for pavement design strength improvements and correlation to pavement design parameters.
- Establishing necessary field-testing procedures employed in the construction phase to ensure proper implementation and acceptance metrics for the chemically stabilized subgrade.
- Discerning relevant pavement design properties, and the required improvements provided by chemical stabilization.
- Classifying any limitations to subgrade chemical stabilization.
- Delineating costs to use subgrade chemical stabilization per cubic yard.

## **Potential Implementation and Expected Benefits**

Increased knowledge of chemical stabilization procedures, especially those used in other states, will allow TDOT to assess the suitability of chemical stabilization for more of its projects. The experience gained will provide TDOT with a baseline for implementing high quality laboratory testing for chemical stabilization on future projects. Chemical Stabilization Fact Sheets will provide TDOT with a practical reference tool for the selection and implementation of chemical stabilization. The Field Testing manual will provide a comprehensive reference that TDOT can use to implement chemical stabilization on future projects. The revised Standard Specifications will allow chemical stabilization to be implemented more effectively in TDOT plans and workflow, and in accordance with the state of practice. TDOT and the residents of Tennessee will save money as chemical stabilization is appropriately applied to unstable or poor pavement subgrades throughout the state.

### **PROJECT NUMBER:**

RES2023-13

### **PRINCIPAL INVESTIGATOR:**

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### **TDOT LEAD STAFF:**

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### **PROJECT SCHEDULE:**

August 2022 to July 2024