Microcracking Of Cement Stabilized Layers

Develop guidelines for mitigation measures to prevent shrinkage cracking in cement-treated layers with a primary focus on microcracking.

WHAT IS THE NEED?

The California Department of Transportation (Caltrans) employs a variety of strategies and materials in maintaining and rehabilitating the state highway system’s pavements, a necessary approach given the varying characteristics of the pavements in use and their diverse properties.

Microcracking is a promising technique for limiting or preventing shrinkage cracking in cement-treated layers. However, insufficient research has been conducted to fully understand the mechanism, to develop procedures for microcracking, and to identify suitable criteria for mechanistic-empirical design procedures and performance models of pavement structures.

Caltrans’ specifications currently require microcracking on full-depth reclaimed cement-treated layers. However, no detailed information is provided in the specification on how to determine whether microcracking was successfully achieved.

WHAT ARE WE DOING?

Caltrans, in partnership with the University of California Pavement Research Center (UCPRC), updated literature review to document recent work to determine if findings from other studies confirm or contradict the UCPRC research findings to date. Alternative crack mitigation strategies will also be investigated.
UCPRC built a 1.25 mile long test road on the University of California, Davis campus with varying thickness, cement contents, and roller treatments (e.g. time of rolling, vibration/no vibration, weights). The research team will continue monitoring the test track and other existing and new field experiments. Monitoring will include biannual falling weight deflectometer (FWD) testing and a visual assessment.

Materials and specimens sampled from the test road and other field projects will be tested in the laboratory to determine key mechanistic properties and compare laboratory test results with results measured in the field with the stiffness gauge and FWD. The researchers will prepare revised guidelines for crack mitigation in cement-treated layers based on testing data and findings.

**WHAT IS OUR GOAL?**

The goal of this project is to develop guidelines for mitigation measures to limit shrinkage cracking in cement-treated layers with a primary focus on microcracking.

**WHAT IS THE BENEFIT?**

Proposed guideline for microcracking of cement stabilized layers can guide design engineers, contractors, and project specification writers on how to decide on the optimal microcracking procedure. The guideline will lead to improved use of cement-only stabilization and determine its appropriate use based on the road condition.

**WHAT IS THE PROGRESS TO DATE?**

As of August 2020, the research team has made the following progress:

- Completed test road monitoring according to the workplan
- Continued monitoring the test track and pilot projects on Caltrans and county roads
- Continued laboratory testing
- Began preparation of the interim report on test road monitoring
- Began preparation of the final report