



# RESEARCH PROJECT CAPSULE [14-4PF]

November 2013

TECHNOLOGY TRANSFER PROGRAM

## Mitigation Strategies for Reflective Cracking in Pavements

### JUST THE FACTS:

**Start Date:**  
October 15, 2013

**Duration:**  
12 months

**End Date:**  
October 14, 2014

**Funding:**  
SPR: Pooled Fund: TT-Fed

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Department of Transportation and  
Development and Louisiana State  
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### POINTS OF INTEREST:

Problem Addressed / Objective of  
Research / Methodology Used  
Implementation Potential

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The Southeast Transportation Consortium (STC) is a collaborative research program consortium within RAC Region II through the Transportation Pooled Fund (TPF) Program. The STC is intended to encourage coordination among member states, as well as provide resources and management of collaborative studies. The consortium intends to address high priority transportation research topics of common interest to the southeastern and adjoining states. Louisiana serves as the lead agency in the STC.



### PROBLEM

Reflection cracks are caused by discontinuities (cracks or joints) in underlying layers, which propagate through hot-mix asphalt (HMA) overlay due to continuous movement at the crack prompted by thermal expansion and traffic loading. If the new overlay is bonded to the distressed layer, cracks in the existing pavement almost always propagate to the surface within one to five years; however, as early as a few months have been reported. Seasonal temperature variations may also affect the reflection cracking process, especially when dealing with rehabilitated rigid pavements.

Different methods, including the use of an intermediate layer, have been suggested for enhancing pavement resistance to reflective cracking. Experimental investigations in the early 1980s showed that interlayer systems might be used to delay or to prevent the reflection of cracks through a new overlay placed over an old cracked pavement. Later, Button and Lytton (1987) postulated that the use of interlayer systems to mitigate reflective cracking can be achieved by using two different mechanisms, reinforcing HMA with a stiff interlayer to provide a better distribution of the applied load over a larger area and to compensate for the lack of tensile strength of the HMA and dissipating strain energy in the vicinity of cracks through the use of a soft layer.

Elseifi and Bandaru (2011) evaluated the performance and cost-effectiveness of various treatment methods used to prevent and delay reflective cracking in composite pavements based on existing pavement sections built with these treatments in Louisiana. Results showed that saw and seal and chip seal as a crack relief interlayer are showing positive and cost-effective contributions to the pavement structure. Stress absorbing membrane interlayer and high strain asphalt crack relief interlayer (STRATA®) showed mixed results in terms of performance.

## OBJECTIVE

The primary objective of this research is to conduct an in-depth literature review of research projects on reflective cracking and a survey of the practices of the southeastern states with regard to the types of cracking mitigation strategy used, selection criteria for the different strategies and constructed systems, benefit/cost analysis performed, and guidelines for selecting appropriate strategies and constructing the chosen treatment system. This review will serve as a baseline for future research projects on this topic as identified by the results of the synthesis.

## METHODOLOGY

The research team will start the project by collecting and reviewing pertinent literature that describes current reflection cracking control treatment methodologies that are used or are currently being evaluated nationwide to delay or prevent reflection cracks. The literature search will include, but shall not be limited to, standard methods such as TRID, COPENDEX, NTIS, RiP, as well as consulting with state and national experts in the field. In addition, the research team will conduct a comprehensive survey to gather information from highway agencies located in the southeastern region, (i.e., Louisiana, Arkansas, Mississippi, Alabama, Georgia, Tennessee, North Carolina, Kentucky, Virginia, and West Virginia) and nationwide as related to current practices and experiences with the control of reflective cracking. The survey will also gather information from highway agencies as related to cost-effectiveness of crack control treatment methods, performance of these products and technologies, constructability, reflective cracking control policies, and other factors noticed during their evaluation. This is an important step to identify relevant factors that should be considered in the selection of reflective cracking control treatment.

## IMPLEMENTATION POTENTIAL

The results of this research can be used to enhance overlay performance against reflective cracking in the southeastern region and will impact asphalt contractors, DOT's transportation and environmental civil engineers, and society as a whole. The knowledge generated from this research project will be disseminated and transferred to the industry using progress and final reports, access to all research documentation and results, and presentations at related conferences.