RESEARCH
PROJECT CAPSULE
December 2017
[18-2P]
TECHNOLOGY TRANSFER PROGRAM

Mitigating Joint Reflective Cracks using Stone Interlayers: Case Study on Louisiana Highway 5, Desoto Parish

JUST THE FACTS:

Start Date:
October 17, 2017

Duration:
72 months

End Date:
October 16, 2023

Funding:
SPR: TT-Fed/TT-Reg

Principal Investigator:
Kevin Gaspard, P.E.
Louisiana Transportation Research Center

Administrative Contact:
Tyson Rupnow, Ph.D., P.E.
Associate Director, Research
225-767-9124

Technical Contact:
Zhongjie "Doc" Zhang, Ph.D., P.E.
Pavement & Geotech
Research Administrator
225-767-9162

Louisiana Transportation
Research Center
4101 Gourrier Ave
Baton Rouge, LA 70808

Sponsored jointly by the Louisiana Department of Transportation and Development and Louisiana State University

POINTS OF INTEREST:

Problem Addressed / Objective of Research / Methodology Used Implementation Potential

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PROBLEM

When Portland cement concrete (PCC) pavement reaches an intolerable level of service, it is commonly overlaid with asphaltic concrete (AC) and is referred to as a composite pavement. Even though AC overlays are designed to resist failure mechanisms such as fatigue cracking and rutting, underlying cracks in the PCC pavement, particularly at joints, often reflect through the AC overlay.

Reflective cracking in a composite pavement is caused when discontinuities (cracks or joints) in underlying layers propagate to the surface due to traffic loading and thermal stress, allowing water infiltration through the cracks and subsequent failure of the overlay and deterioration of the base and subgrade layers.

Reflective cracking in AC overlays represents a serious challenge associated with pavement rehabilitation. The Louisiana Department of Transportation and Development (DOTD) has experimented with various treatments and techniques to control reflective cracking since the 1970s. One crack-control treatment involves placement of a stone interlayer over the PCC pavement prior to the AC overlay.

OBJECTIVE

The purpose of this project is to monitor the effectiveness of stone interlayers in composite pavements, determine the depth of stone required to prevent reflective cracking at the PCC joints, and measure the movement of the PCC joints under traffic loading.

METHODOLOGY

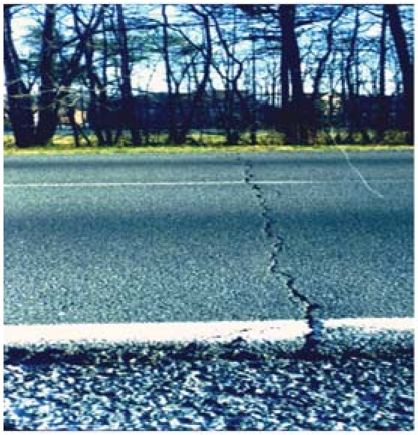
Initially, the research team will conduct a comprehensive literature review regarding the use of stone interlayers in composite pavements. Previous and ongoing research will also be summarized. A statewide email survey will be conducted to identify locations where stone interlayers have been used in composite pavements. These locations will be placed in a geographic information system.

Once the stone interlayer locations have been identified, the DOTD pavement management system database will be mined to obtain the distress history of the pavement at these locations. Four test sections will be constructed on LA 5 in DeSoto Parish. One of the test sections will be the control section and will have a 6-in. thick stone interlayer. The thickness of stone interlayer for the other sections will be 8-, 10-, and 12-in.

Accelerometers will be placed on one joint in each test section so that joint displacements may be measured under traffic loads. Performance, costs, and any constructability problems will be documented in an interim report after one year of service and a final report after five years of service.

IMPLEMENTATION POTENTIAL

Assessing the test sections in this study will provide insight regarding the thickness of stone interlayers required for eliminating longitudinal and transverse reflective cracking in composite pavement as well as insight into the movement of transverse joints during traffic loading. Findings from this study may be used to recommend improved pavement design and preservation procedures.



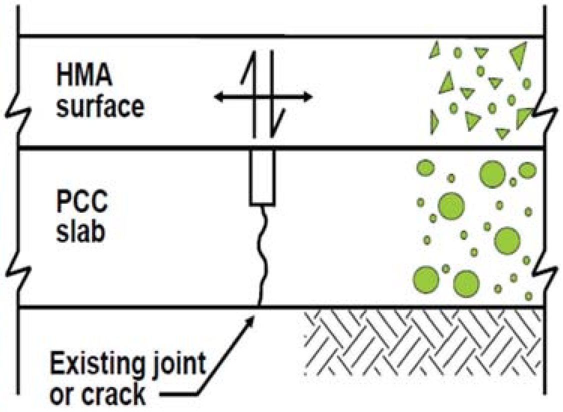


Figure 1
Reflective cracking