Arkansas State Highway and Transportation Department
Transportation Research Committee

RESEARCH PROBLEM STATEMENT

DATE: 08/27/2010

PROJECT AREA: Pavements

TITLE: Reflective Cracking Susceptibility of Arkansas Hot Mix Asphalt Mixtures

PROBLEM STATEMENT:

In order to extend the life of pavement structures across Arkansas, a thin Hot Mix Asphalt (HMA) overlay is an economical alternative to full reconstruction. However, existing pavements often have flaws in the surface, frequently in the form of cracks or joints. These flaws create stress concentrations in the overlays, which turn into cracks and propagate to the surface of the new overlay. These cracks are called reflective cracks. Current standardized HMA performance tests, such as the indirect tension test, the thermal cracking test, or the flexural beam test, are not able to fully capture the mechanisms behind reflective cracking. However, fracture tests, such as the Disk-Shaped Compact Tension, Semi-Circular Bend, Single-Edge Notch Beam, and Arcan test utilize notches, which simulate flaws in the overlay. With a servo-hydraulic loading frame and a climate control chamber, all four of these fracture tests can be run on a single loading frame by only changing out simple fixtures. Developing a laboratory test to identify cracking potential is critical to ensure HMA mixtures provide acceptable performance over their design life.

OBJECTIVES:

There are three objectives to this research. First, by using universal and easily adaptable base equipment, HMA mixtures using various aggregate sources and asphalt cement types from around Arkansas will be ranked to determine which are most resistant to reflective cracking. Second, the laboratory performance of these HMA mixtures will be correlated to field performance in order to establish guidelines for future mixtures. Third, the strongest performing fracture test for Arkansas' HMA mixtures will be chosen for recommendation of future implementation.

Form of Research Implementation:

There are two anticipated forms of research implementation. First, a single fracture test will be recommended as a supplementary specification in Arkansas for HMA resistance to reflective cracking. Second, guidelines will be provided on running fracture tests using universal servo-hydraulic testing machines.

Total Estimated Cost and Project Duration: **$** 134,000 **and** 24 **months.**

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ADVISORY COUNCIL RANKING	TRC RANKING	Statement Combined with Statement Number(s)
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