

**Arkansas State Highway and Transportation Department
Transportation Research Committee**

RESEARCH PROBLEM STATEMENT

DATE: 09/10/2016	PROJECT AREA: Pavements
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TITLE: Evaluation and Prevention of Longitudinal Cracks in Asphalt Pavements

PROBLEM STATEMENT:
 Formation of longitudinal cracks parallel to the pavement's centerline, along the longitudinal joints, or laydown direction in asphalt pavements is one of the most common premature pavement distresses around the country including Arkansas. These cracks can be a type of fatigue cracking or top-down cracking, which allows moisture infiltration, roughness, and may be associated with raveling and poor adhesion or stripping and cause structural failures. Among others, poor joint construction or location with the least dense area (high air voids) appears to be the main reason of such premature longitudinal crack related failure. Highway agencies including AHTD spend millions of dollars to preserve and maintain these roadways. Both crack sealing and filling have been used by many agencies as cost effective techniques in preventive maintenance. A properly executed pavement crack maintenance activity is able to extend the pavement life from 6 months to 4 years. These forms of maintenance activities do not necessarily provide additional structural strength to the pavement, rather these filler or sealer materials prevent water and other incompressible materials such as sand, dirt and debris to enter the pavement structure. Depending on the length and width of these cracks, different materials and methodologies should be used to treat these cracks or take preventive measures before the initiation of cracks. Thus, further studies are necessary to determine the most effective and economic materials and methodologies for crack-sealing and crack-filling for asphalt pavements in Arkansas. The proposed study will consider a roadway or multiple roadway sections, collect core samples, conduct laboratory tests, and quantify field performance to find out the most suitable treatment methods and compatible materials. Further, this study will perform sensitivity analyses of longitudinal cracks using the MEPDG software to understand the influence of material properties and design parameters. The outcomes of this project are expected to will help AHTD to reduce future pavement maintenance costs as well as to improve pavement conditions in the state of Arkansas.

- OBJECTIVES:**
1. Find the best practices in for preventing and maintaining longitudinal cracks in HMA
 2. Evaluate different longitudinal crack treatment techniques
 3. Perform sensitivity analyses of longitudinal cracks using the MEPDG software
 4. Find the most economic longitudinal crack treatment for conditions prevailing in Arkansas

- FORM OF RESEARCH IMPLEMENTATION:**
1. Report containing best practices on longitudinal crack treatments and the best treatment option for conditions prevailing in Arkansas.
 2. Recommendations for possible modification of "410.07 Spreading and Finishing" & "418.06 Construction Methods (Workmanship)," pertinent to longitudinal joints.

REVIEWER: Bryan Signorelli **Estimated Project Duration:** 24 mo.
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