UTC Project Information

Project Title	Mechanistic Characterization of Thin Asphalt Overlays for Pavement Preservation using Finite Element Modelling Approach
University	University of Illinoi at Urbana-Champaign
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Funding Source(s) and Amounts Provided (by each agency or organization)	$102,005 USDOT $105,509 UIUC
Total Project Cost	$207,514
Agency ID or Contract Number	DTR13-G-UTC44
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Brief Description of Research Project	Thin asphalt overlays are commonly used as a preservation technique for rigid and flexible pavement because of their ability to improve riding quality, extend service life, and reduce noise levels. Many state highway agencies are currently using thin overlays routinely in local roads and highways as part of their planned preservation and maintenance operation. Despite the widespread use of thin overlays, there remain questions about their life expectancy and potential role in improving pavement's structural capacity and functional properties. The proposed research work aims at characterizing the performance of thin asphalt overlays using a mechanistic approach. However, the analysis of thin overlay poses significant challenges compared with the conventional techniques commonly used in the analysis of layered pavement systems. The overlays experience gradient of material properties because of aging and, possibly, moisture damage. In addition, the mixture's heterogeneity and microstructural characteristics render the application of some basic assumptions challenging; especially when the overlays are directly exposed to non-

	uniform and three-dimensional truck loads. Therefore, mechanistic-based performance deterioration models will be developed in this study, bridging the characteristics of the local (aggregate gradation, size, binder-aggregate, mastic-aggregate interactions, mastic, etc.) and global scales. The finite element model will be based on simple input parameters that should be available at the design and construction stage, but contain fundamental characteristics of the existing pavement, materials used, thickness, and environmental conditions.
Describe Implementation of Research Outcomes (or why not implemented)	N/A
Place Any Photos Here	
Impacts/Benefits of Implementation (actual, not anticipated)	This study is aimed at developing mechanics-based performance models for asphalt overlays. One of the direct benefits of developing mechanistic overlay models would be to incorporate the models into pavement preservation and maintenance programs. This allows agencies to make proper, educated decisions about their preservation frequencies and strategies. Such models can also help agencies and industry to enhance thin overlay performance through optimizing the mix constituents and design thickness. Costly and time-consuming field trials can then be limited or avoided.
Web Links • Reports • Project website	<www.chpp.egr.msu.edu>