Florida Department of Transportation Research

Evaluation of Pavement ME Design Software for Flexible Pavements

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Project Number
BEA88

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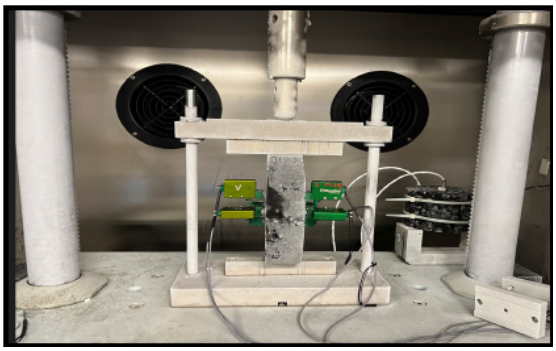
Current Situation

For decades, transportation agencies around the world have used the American Association of State Highway Transportation Officials (AASHTO) 1993 Method (the 93 Method) to design pavements. The method was developed from road tests conducted in the Midwest United States in the late 1950s and early 1960s. Since then, pavement materials, uses, and technologies have outpaced the 93 Method, exposing its limitations.



A creep compliance test was performed using the IPC Universal Testing Machine 30 with specimens of 6 inches in diameter by 1.5 inches thick.

The Florida Department of Transportation (FDOT) is considering changing from the traditional 93 Method to the mechanistic-empirical (ME) design method—for which AASHTO produced the ME Pavement Design Guide (MEPDG)—for flexible pavements in Florida.

Before adopting the method, FDOT must thoroughly research the performance and accuracy of the ME design software, AASHTOWare Version 2.6 (PMED Version 2.6), which supports the designing of flexible pavements.

Research Objectives

The objectives of this research were to 1) provide the first step for the implementation of ME design for flexible pavements in Florida by comparing the 93 Method to the ME Design Method, 2) predict distresses to observed distresses of the PMED Version 2.6, and 3) provide recommendations for Florida-specific input parameters for the PMED Version 2.6.

Project Activities

The Texas A&M Transportation Institute research team performed a PMED sensitivity analysis using global inputs to determine which failure models were most relevant to Florida. To do this, they developed a matrix to show the input parameter versus the hierarchical level with the sensitivity value defined.

Then the research team evaluated pavement distresses using Florida-specific parameters, focusing on the top-down cracking model—the most common type of distress on flexible pavements in Florida.

Last, the research team developed a work plan that covered the locally-based steps for the PMED calibrations for Florida.

Project Conclusions and Benefits

This research evaluated various distress models, provided recommendations on specific program input parameters, and provided a plan to accomplish local calibration. This research identified issues with some of the models (especially the thermal cracking model) within PMED Version 2.6 that still need to be addressed before FDOT moves forward with next steps of implementing ME design for flexible pavements.

For more information, please see fdot.gov/research.