RESEARCH PROBLEM STATEMENT

DATE: 09/15/2017  PROJECT AREA: Design

TITLE: Lowering Long-Term Costs of Arkansas’ Pavement Infrastructure

PROBLEM STATEMENT:

TRC1404 examined why some Interstate pavements prematurely deteriorated while others performed as designed. While there were multiple beneficial findings from the project, the project was performed up to fifteen years after the pavements were constructed. Therefore, all of the samples were collected long after the distresses began to form. This means a link between the original design and initial material performance could not be established. However, there are currently cores collected from the NEXT25 projects taken right after construction sitting in ArDOT’s lab. The NEXT25 projects began in June 2008 and are as recent as April 2014. This is a unique opportunity to evaluate these pavements before any distresses began. Not only can laboratory tests be conducted on the mixtures (dynamic modulus, IDT strength, creep compliance, SC(B) fracture) and extracted asphalt binder (complex modulus, phase angle, viscosity), but these test results can be input into Pavement-ME for predicting long-term performance of the pavement. This predicted performance can be compared directly to the actual performance occurring in the field. Over time, these predictions can continue to be validated versus actual pavement performance. By using the actual field performance from NEXT25, the field performance verification data can be used to obtain calibration factors of different distress models such as rutting and alligator cracking of Pavement-ME. In addition, this research would begin the foundation of a responsive and fully calibrated Pavement Management System.

OBJECTIVES:

There are three research objectives for this study: 1) perform all Level 1 tests on asphalt mixture and asphalt binder for NEXT25 sites with available cores, 2) compare actual field performance of NEXT25 jobs versus predicted field performance of Pavement-ME, and 3) if necessary, calibrate Pavement-ME using predicted and actual pavement performance for the NEXT25 jobs in order to increase precision of pavement design, thus saving economic resources for future projects.

FORM OF RESEARCH IMPLEMENTATION:

After lab testing and field validation, the final report to ArDOT will provide specific guidance on tracking long-term pavement performance to reduce the cost of maintaining the pavement network. In the implementation plan, specific recommendations will be made to modify the Roadway Design Plan Development Guidelines in order to better predict long-term pavement performance.

Estimated Project Duration: 24 months

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Standing Subcommittee Ranking: 3 / 5  Advisory Council Ranking: 25 / 44

Statement Combined with Statement Number(s)