RESEARCH PROJECT CAPSULE [16-6P]

April 2016

TECHNOLOGY TRANSFER PROGRAM

Quality Management of Cracking Distress Survey in Flexible Pavements using LTRC Digital Highway Data Vehicle

JUST THE FACTS:

Start Date:
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Duration:
24 months

End Date:
March 31, 2018

Funding:
SPR: TT-Fed/TT-Reg

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Sponsored jointly by the Louisiana Department of Transportation and Development and Louisiana State University

POINTS OF INTEREST:

Problem Addressed / Objective of Research / Methodology Used Implementation Potential

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PROBLEM

The Louisiana Transportation Research Center (LTRC) has a Digital Highway Data Collection System that can collect high-resolution pavement images at highway speeds without interrupting traffic. The supporting software of the system, the Automated Distress Analyzer (ADA), was designed to conduct an automated distress analysis and generate a surface distress report. However, the precision of the ADA has not yet been validated.

The Louisiana Department of Transportation and Development's (DOTD's) current contracted application for pavement management distress analysis, through which its pavement management system (PMS) data is collected, has not been validated either.

Since the M-E Pavement Design Guide (MEPDG) that is currently implemented in Louisiana was locally calibrated based on the PMS database, it is important to assess the reliability of the PMS data. The cracking survey results from LTRC's Digital Highway Data Collection System and from the current DOTD-contracted application need to be validated, and a MEPDG-compliant procedure for the cracking analysis of flexible pavements needs to be developed.

OBJECTIVE

The primary objectives of this research are to compare and validate cracking survey results on selected flexible pavements obtained from the LTRC data collection system and from the Louisiana current contracted application; to investigate the feasibility of converting the existing PMS cracking data to comply with the MEPDG definition of cracking; and to recommend a cracking analysis procedure for flexible pavements using LTRC's Digital Highway Data Collection System.

METHODOLOGY

Common protocols for the evaluation of cracking distress in Louisiana's flexible pavements include the MEPDG protocol, the DOTD protocol, the Long Term Pavement Performance (LTPP) protocol, and the AASHTO protocol. Each protocol varies from the others. The research team will first review past studies regarding evaluation of cracking distress in flexible pavements; commonalities and differences among the studies will be assessed and reported.

With assistance from DOTD personnel, a set of flexible pavement test sections will be selected for this study, representing many variables (e.g., severities, geographic location, functional classification, traffic level, and base type). Pavement images from the outside travel lane of each test section will be collected using LTRC's digital highway data vehicle.

The ADA software will be used to provide an automated assessment of pavement distress, and a semi-automated assessment will be performed by comparing the resultant cracking map with the corresponding digital images. Digital images of the pavement surface will be checked manually for distress identification. Graphic comparison and statistical analysis will be conducted to evaluate correlation among the methods. The PMS data for these test sections will also be retrieved and assessed.

The relationship between the LTRC vehicle measurements and the PMS data will be investigated. Correction functions may be developed so that the PMS data can be used for future MEPDG calibration.

IMPLEMENTATION POTENTIAL

The accuracy of the distress data greatly affects the quality of the PMS and its pavement maintenance recommendations. Based on the evaluated precision of the ADA software, it is anticipated that LTRC will be able to collect flexible pavement cracking data that complies with the MEPDG protocol. Additionally, any conversion functions that are developed may be used to make existing PMS data MEPDG-compliant.

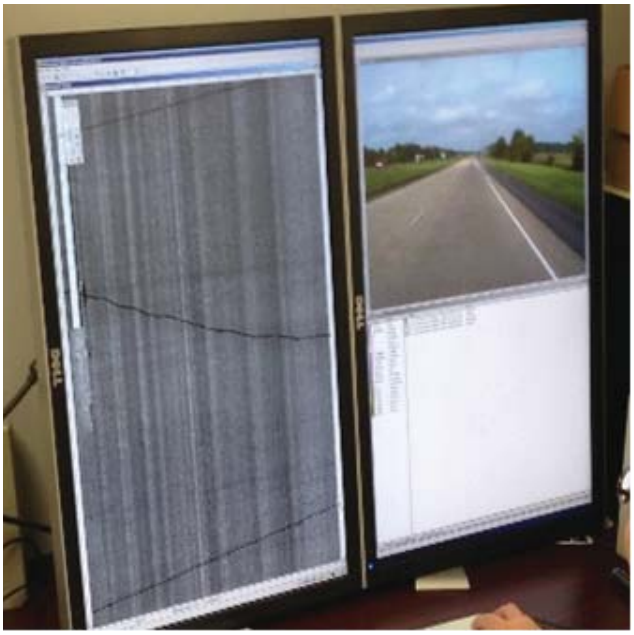

Figure 1
LTRC's Digital Highway Data Collection System