

NCHRP *Research Problem Statement***I. PROBLEM NUMBER**

2015-D-05

II. PROBLEM TITLE

Defining Comparable Pavement Cracking Data

III. STATEMENT OF THE RESEARCH PROBLEM

Many state and local agencies collect downward pavement imagery using highway speed data collection vehicles with subsequent processing of these images using proprietary semi-automated crack detection/classification software to identify pavement cracking for use in asset management. Additionally, other agencies use visual collection methods to document cracking distresses. This data is currently used for two primary purposes: 1) State reporting of pavement cracking condition to fuel performance reporting, budgeting, and project selection, and 2) reporting of cracking data to the Federal Highway Administration (FHWA) through the Highway Performance Monitoring System (HPMS). There are a multitude of state and local methods for defining, classifying, and reporting cracking data derived from these "automated" methods. Additionally the HPMS stores resulting cracking data for use in modeling the performance of pavements on the National Highway System. The HPMS requires states to 1) estimate percent area with fatigue type cracking for all severity levels for Asphalt Concrete (AC) pavements in the wheel paths, and the percent of slabs with cracking in Portland Cement Concrete pavements; and 2) estimate the relative length in feet per mile of transverse cracking for AC pavements and reflection transverse cracking for composite pavements where AC is the top surface layer. There are significant differences between the methods each agency uses to sample, detect, measure and report cracking type, quantity, location and severity which cause the results to be incomparable between states, even when similar data collection technology is used. When reporting for HPMS, most states have to employ separate procedures (different than their production state crack detection processes) to produce this data set. The Federal Highway Administration is under increasing pressure to define performance goals for the National Highway System. Therefore, standardization of pavement cracking data must take place before a performance goal relative to pavement cracking can be implemented. The nature of pavements is not too diverse to develop common terms to describe distress types. The first phase of this project is to define common cracking measurement terms to be standardized. Regardless of the collection method, states manage, analyze, and report cracking data electronically, thus providing support for the development of a standard file format. The second phase of this project is to conduct a software needs assessment to aid in the procurement of a production cracking evaluation software. As part of the Needs Assessment, input must be received from end users including State and Local pavement management practitioners, researchers, and FHWA. The engineering software should be designed to 1) detect and rate cracking data from commonly collected downward imagery in standard terms, allowing for high speed automated or manual rating, 2) input visual cracking data, and 3) report using a standard file format. The proposed research will be used to standardize the collection and reporting of cracking data. The standard terms will be the basis for federal performance measures, and will establish focus and common language to compare cracking performance of pavements in different agencies. The Needs Assessment will be used to procure software to be used by agencies which collect and report cracking data and will be made available to the public.

IV. LITERATURE SEARCH SUMMARY

Two potential publications were identified in the TRID database but neither address this problem statement: "Application of MEPDG and HPMS Cracking Protocols with the Automated Distress Analyzer," Accession No: 01366552 "Pavement Surface Condition Standards: Rutting and Cracking," Accession No: 01139085

V. RESEARCH OBJECTIVE

The research objective is to develop the framework necessary for software to be developed which will identify and report pavement cracking in comparable terms across diverse pavement networks. Tasks will include: 1) Literature Review to identify the state of the practice across state agencies. 2) Software Review to identify features used by pavement evaluation practitioners. 3) Survey to incorporate the state of the practice when determining a. The cracking terms and measures presently used, and those desired to be used by state pavement asset managers. b. The cracking terms and measures desired by FHWA for future use. c. The software features desired by pavement management practitioners. d. The software features desired by FHWA. 4) Develop a Needs Assessment Document describing the common cracking measures to be used, features and algorithms to be incorporated into alpha and beta versions of cracking detection, rating and reporting software. The development of repeatable performance measures is an essential foundation for establishing a performance driven asset management plan, as required in MAP-21. Pavement cracking is a core component of measuring the performance of pavement, and measuring the improvement gained through most pavement preservation activities (which often do not improve IRI). The resulting research will build the foundation for creating and maintaining cracking evaluation software to be used by pavement asset managers, pavement engineers, and the Federal Highway Administration, and will create resulting common comparative metrics; similar to the way ProVAL has been used aid in consistently reporting the International Roughness Index. Pavement cracking deserves similar attention, particularly with recent emphases on performance driven asset management and cost effective preservation treatments which primarily improve cracking.

VI. ESTIMATE OF PROBLEM FUNDING AND RESEARCH PERIOD

Recommended Funding: \$300,000

Research Period: 16 months

VII. PERSON(S) DEVELOPING THE PROBLEM

Nathan Moore
Assistant Division Chief for Pavement Management
Maryland State Highway Administration
7450 Traffic Drive
Hanover, MD 21076
nmoore@sha.state.md.us
443-572-5073

VIII. PROBLEM MONITOR

Nathan Moore
Assistant Division Chief for Pavement Management
Maryland State Highway Administration
7450 Traffic Drive
Hanover, MD 21076
nmoore@sha.state.md.us
443-572-5073

IX. DATE AND SUBMITTED BY

2013-09-16 16:06:49

Nathan Moore
Assistant Division Chief for Pavement Management
Maryland State Highway Administration
7450 Traffic Drive
Hanover, MD 21076
nmoore@sha.state.md.us
443-572-5073