

Project Description:

The Kansas Department of Transportation (KDOT) and the New York State Department of Transportation (NYSDOT) have been using Chapter 5 of the 1993 AASHTO Design Guide for rehabilitation design. AASHTO has adopted the pavement rehabilitation design procedures developed under the NCHRP 1-37A project for flexible and rigid pavement structures. These new procedures are based on mechanistic-empirical principles and they replace the earlier empirical procedures from the 1993 AASHTO Design Guide. The new procedures are incorporated in the AASHTOWare Pavement ME Design software.

The main objective of this research project is to conduct the local calibration of the AASHTOWare Pavement ME design procedure for pavement rehabilitation in Kansas and New York state. The results of the research will enable KDOT and NYSDOT to expedite the use of this new tool for the design of rehabilitated pavements. The results will also provide KDOT and NYSDOT with the necessary input values to design rehabilitated pavements using the mechanistic-empirical methods.

Progress this Quarter (includes meetings, work plan status, contract status, significant progress, etc.):

In this quarter, KSU, with help from KDOT, has compiled performance and section data for all projects for local calibration of the AASHTOWare Pavement me Design software for rehabilitation application. KSU has already assembled the data base for AC over JPCP pavements in Kansas. Calibrations of most models for AC over JPCP and AC over AC pavements are complete. The automated calibration process is now complete and plans are underway to migrate from a Python platform to a more user-friendly format. A cost and time extension has been for this project. Significant new tasks have been added with a new completion data. A draft interim report has been submitted to KDOT.

The new cracking models in the new version of the software released in July 2018 are being studied to understand the sensitivity. The subcontractor has been providing NYSDOT with pavement and overlay design support. A list of data items needed for the local calibration was discussed with NYSDOT engineers, along with potential sources for assembling the data. The assembly of calibration data has continued. The challenge has been to find complete calibration data for a sufficient number of sections. The literature review on the calibration activities conducted by other states has been continued. The new models and material testing requirements developed under several NCHRP projects have also been reviewed. Several new NCHRP projects related to the AASHTOWare Pavement ME models started during the project period; their developments are being followed since it will impact the models and material tests to be incorporated in the design software in the future. The AASHTOWare Pavement ME has a new version (2.5) which contains new models for cracking in flexible pavements. Therefore, calibration coefficients for the cracking, rutting and IRI models are also new. The calibration in response to version 2.5 of the software, including a new laboratory testing has commenced. The focus has been on the calibration of the models for the design of new flexible pavement structures. It will continue with the calibration of models for HMA overlay of distressed flexible pavements.

Anticipated work next quarter:

KSU, in cooperation with KDOT, has planned out the next phase. Lab tests have started on materials from one project. Materials from the state of New York have been received. Work got interrupted due to the university closure due to Covid-19 issue. The subcontractor will continue the development of the software for FWD data processing for the NYSDOT part of the contract. The collection of data necessary for the calibration and the analysis of the traffic data will also continue. The literature review on the calibration activities conducted by other states and countries, and the recently developed models to be incorporates into the AASHTOWare Pavement ME will continue. Sampling of materials will continue and the laboratory testing will commence. The project progress is slow at KSU due to lack of a graduate student (a new student is expected to start in June 2020).

Significant Results:

This research work aims to contribute to the implementation of the AASHTOWare Pavement ME design software for rehabilitation design in Kansas and New York by performing the local calibration first.

Circumstance affecting project or budget. (Please describe any challenges encountered or anticipated that might affect the completion of the project within the time, scope and fiscal constraints set forth in the agreement, along with recommended solutions to those problems).

The AASHTOWare Pavement ME has a new version (2.5) which contains new models for cracking in flexible pavements, new material parameters and new calibration coefficients.