Kansas Department of Transportation

TECHNICAL SUMMARY

Implementation of the AASHTO Mechanistic-Empirical Design Guide (AASHTOWare Pavement ME Design) for Pavement Rehabilitation

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Introduction

The AASHTOWare Pavement ME Design (PMED) is a novel design method for new and rehabilitated pavement designs based on mechanistic-empirical design principles. The design process includes several empirical models calibrated with pavement performance data from pavement sections throughout the United States. Improved accuracy of the design process requires that the models be calibrated to local conditions. Therefore, the objective of this study was to implement the AASHTOWare PMED software for rehabilitated pavement design by performing local calibration for state-managed roads in Kansas, New Jersey, and Maine.

Project Description

Transfer functions for translating mechanistic pavement responses into visible distresses embedded in the AASHTOWare PMED software were locally calibrated to eliminate bias and reduce the standard error for rehabilitated pavements in Kansas and New York. Calibration was performed using version 2.5 and then verified with version 2.6.2.2, which was released in September 2022. Rehabilitated pavement sections included asphalt concrete (AC) over AC in Kansas and the New England region and jointed plain concrete pavement (JPCP) sections in Kansas. Because the PMED software requires periodic recalibration of the prediction models to account for improvements in the models, changes in agency design and construction strategies, and updates in performance

data, this study also developed an automated technique for calibrating the AASHTOWare PMED software performance models. This automated methodology incorporated robust sampling techniques to verify calibrated PMED models. In addition, statistical equivalence testing was incorporated to ensure PMED-predicted performance results tended to agree with the in-situ data.

Project Results

A comparison of results for the AASHTOWare PMED versions 2.5 and 2.6.2.2 showed that most predicted distress values in Kansas remained the same, except for the predicted AC total fatigue cracking, specifically asphalt bottom-up fatigue cracking. For both distress types, slightly higher values were obtained with version 2.6.2.2. Results of three candidate crack tests showed that IDEAL-CT test results can be used as cracking-resistance criterion for mixtures in Kansas. The rehabilitation models were also successfully calibrated for the New England region.

Project Information

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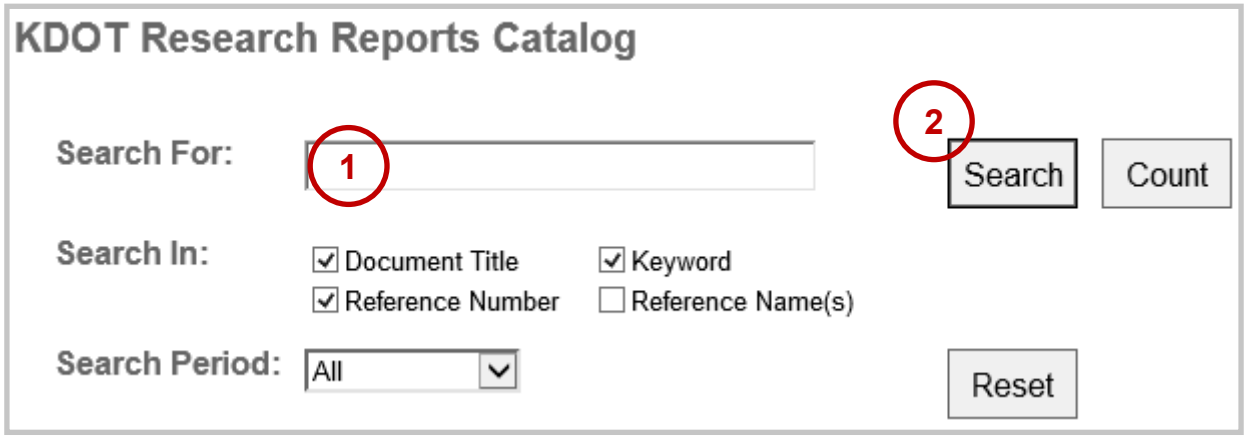

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