Kansas Department of Transportation

TECHNICAL SUMMARY

Implementation of AASHTOWare Pavement ME Design Software for the Kansas Department of Transportation

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Introduction

The AASHTOWare Pavement ME Design (PMED) software uses the mechanistic-empirical pavement design approach. PMED prediction models need to be calibrated to local conditions to produce accurate, reliable pavement performance predictions. Previously, multiple efforts were made to locally calibrate performance models in Kansas across various AASHTOWare versions.

Project Description

This study was initiated to revise the local calibration factors for version 2.6.2, released in September 2022. Another objective was to find any significant changes between the two versions that might affect the performance prediction. Also, several issues related to input material characteristics were studied.

Project Results

The results show that the re-calibration process is pretty straightforward. The local calibration process depends on measured performance data. Not all global coefficients need to be changed during calibration or recalibration.

Engineering judgment is critical in the calibration process. The AASHTO (1993) design guide yielded higher slab thicknesses for projects with high truck traffic than the PMED software did when no friction is assumed between the jointed plain concrete pavement (JPCP) slab and the portland cement-treated base (PCTB). For sections with medium truck traffic, PMED produced a higher thickness than that specified in the 1993 AASHTO design guide. An assumption of full friction between the JPCP slab and PCTB had a discernible effect on the JPCP slab thickness obtained from PMED. When the distress predictions from Level 1 and Level 3 HMA dynamic moduli inputs were compared, the effect was pronounced in some projects, particularly for fatigue-cracking distresses. Level 1 creep test inputs affect the predicted AC thermal cracking, which may reach the failure criteria. The total transverse cracking values increased sharply with Level 1 inputs but not with Level 3 inputs. A stiffer mix resulted in higher thermal and total transverse cracking for Level 1 inputs. On the other hand, the mixtures with softer binders produce less thermal cracking on asphalt overlays over existing asphalt pavements.

Lower subgrade moduli resulted in higher IRI and a higher percentage of AC bottom-up fatigue cracking in HMA pavements, but other distresses remained practically unchanged. Lower subgrade modulus also resulted in a slight increase in slab thickness for projects with higher truck traffic.

Project Information

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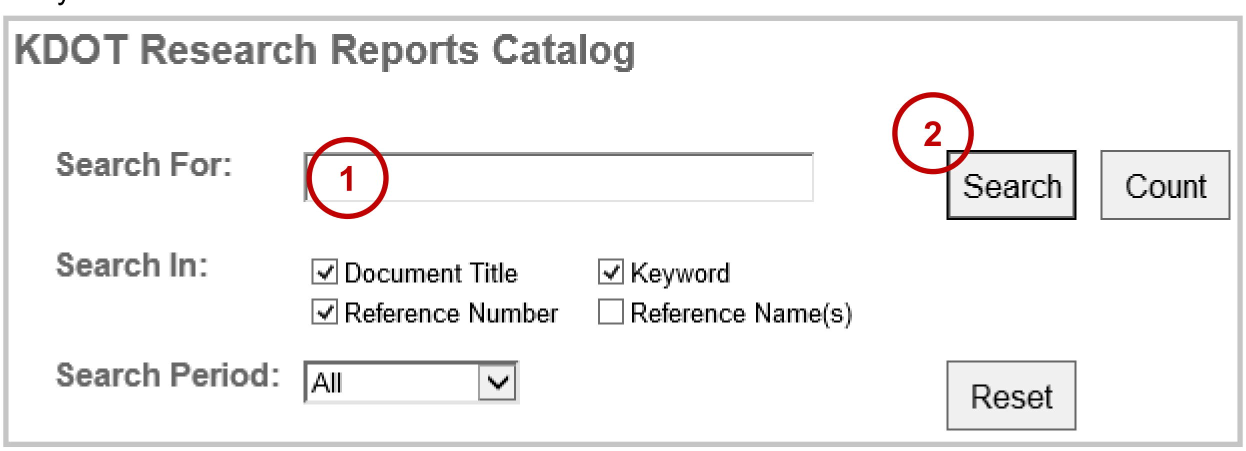

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