

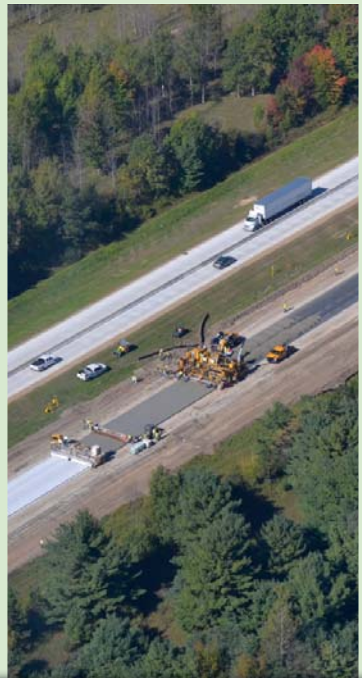


Mechanistic-Empirical Pavement Design Guide

~ *A Manual of Practice* ~




August 2015 • Second Edition

American Association of State Highway and Transportation Officials
AASHTO




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Publication Code: MEPDG-2

ISBN: 978-1-56051-597-5

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PREFACE

This document describes a pavement design methodology that is based on engineering mechanics and has been validated with extensive road test performance data. This methodology is termed mechanistic-empirical (M-E) pavement design, and it represents a major change from the pavement design methods in practice today.

Interested agencies have already begun implementation activities in terms of staff training, collection of input data (materials library, traffic library, etc.), acquiring of test equipment, and setting up field sections for local calibration. This manual presents the information necessary for pavement design engineers to begin to use the MEPDG design and analysis method.

This manual refers to AASHTOWare Pavement Me Design™, M-E Pavement design software which is commercially available through AASHTOWare, AASHTO's software development program (see http://www.aashtoware.org/Pavement/Pages/default.aspx). AASHTOWare Pavement ME Design has been revised from the software described in the previous edition of this manual based upon evaluations performed by state Departments of Transportation and others in the community of practice.

The following table summarizes the key differences noted between the format and calibration factors used in the MEPDG version 1.1 software and the AASHTOWare Pavement ME Design software.

Table i-1. Summary of Key Differences in Software Format and Calibration Factors

Format and Calibration Factors	MEPDG Version 1.1	AASHTOWare Pavement ME Design
Output Format	Excel-based	PDF- and Excel-based
Climatic Data in Output Summary	Not included	Included
Axle Configuration Data in Output Summary	Not included	Included
Special Axle Load Configuration	Included	Not included
Reflection Cracking	Not included	Included
Coefficient of Thermal Expansion (CTE)	CTE for Basalt of 4.6	CTE for Basalt of 5.2
PCC Zero Stress Temperature	PCC Zero Stress Temperature (Range 60° to 120°F)	PCC Set Temperature (Range 70° to 212° F)
Heat Capacity of Asphalt Pavement	Default value of 0.23 BTU/lb-°F	Default value of 0.28 BTU/lb-°F
Thermal Conductivity of Asphalt Pavement	Default value of 0.67 BTU/(ft)(hr)(F)	Default value of 1.25 BTU/(ft)(hr)(F)
Surface Shortwave Absorptivity	Default value of 0.95	Default value of 0.85
Global Calibration Coefficient for Unbound Materials and Soils in Flexible Pavement Subgrade Rutting Model	k_{S1} granular of 1.63	k_{S1} granular of 2.03
Global Field Calibration Coefficients in the Fatigue Cracking Prediction Model in Flexible Pavement	k_{f2} of -3.9492	k_{f2} of 3.9492
	k_{f3} of -1.281	k_{f3} of 1.281
Global Field Calibration Coefficients in the Thermal Cracking Model for HMA	k_t (Level 1) of 5.0	k_t (Level 1) of 1.5
	k_t (Level 2) of 1.5	k_t (Level 2) of 0.5
	k_t (Level 3) of 3.0	k_t (Level 3) of 1.5
Global Field Calibration Coefficients in the Rut Depth Prediction Model	k_{2r} of 0.4791	k_2 of 1.5606
	k_{3r} of 1.5606	k_3 of 0.4791
Calibration Coefficients in the Rigid Pavement Faulting Prediction Model	C_1 of 1.29	C_1 of 1.0184
	C_2 of 1.1	C_2 of 0.91656
	C_3 of 0.001725	C_3 of 0.0021848
	C_4 of 0.0008	C_4 of 0.0008837
	C_7 of 1.2	C_7 of 1.83312
Calibration Coefficient in the Rigid Pavement Punchout Prediction Model	A_{PO} *of 195.789*	C_3 of 216.8421
	α_{PO} of 19.8947	C_4 of 33.15789
	β_{PO} of -0.526316	C_5 of -0.58947

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