Implement Concrete Mechanistic-Empirical Design Tool

Calibrate pavement mechanistic-empirical (ME) models and develop concrete design tool

WHAT IS THE NEED?

Jointed plain concrete pavement (JPCP) design method and delivery approach used by California Department of Transportation (Caltrans) was updated more than 10 years ago. It was based on a very early version of Mechanistic Empirical Pavement Design Guide (MEPDG) with the sparse data that was available at that time.

An updated version of Pavement ME (MEPDG software) has been thoroughly reviewed. New and better as-built and performance data are available to calibrate an updated version of Pavement ME. Updated climate and traffic databases are also obtained to calibrate Pavement ME. Caltrans needs to produce an updated catalog or software tool for designers to use.

WHAT ARE WE DOING?

Caltrans, in partnership with the University of California Pavement Research Center (UCPRC), will develop Pavement ME input databases and calibration database. Initial data will be used to check the sensitivity of the current version of Pavement ME. Once variables that are sensitive are identified, a set of calibration data will be developed that is representative of input information for California’s conditions.

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The local calibration information and the results of sensitivity analysis will be used to perform local calibration of Pavement ME. A design catalog using locally calibrated Pavement ME will be created. UCPRC will assist Caltrans with development of design guidance.

**WHAT IS OUR GOAL?**

The goal of this project is to support Caltrans in the implementation of JPCP ME design based on Pavement ME. Based on a sensitivity analysis of current version of Pavement ME, this design software will be calibrated for traffic, materials, and construction practices in California. The calibrated Pavement ME software will be available to Caltrans.

**WHAT IS THE BENEFIT?**

Proposed ME design will provide a tool for Caltrans pavement designers to use. This tool can improve pavement design procedure in California. The research will also be used in developing design guidance and updating highway design manual.

**WHAT IS THE PROGRESS TO DATE?**

The sensitivity analysis is complete. The research team developed the mixed-effects model for first/third stage cracking in JPCP and the first stage to the transverse/longitudinal cracking model. Calibration was completed and the draft calibration report was prepared.

A full factorial design catalog for JPCP based on the calibrated Pavement ME model was developed. The JPCP design catalog decision document was also completed.