DRISI
Caltrans Division of Research, Innovation and System Information

Research Notes

Pavement

AUGUST 2022

Project Title:
Updated Caltrans Rigid Pavement Design Catalog Using Pavement ME

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Updated Caltrans Rigid Pavement Design Catalog Using Pavement ME

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 design catalog and software tool for pavement designers to use.

WHAT ARE WE DOING?

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

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 mechanistic-empirical 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?

The updated mechanistic-empirical design will provide a catalog for Caltrans pavement designers to use. This catalog will improve pavement design in California and lead to longer lasting JCPC pavements. The research will also be used in developing design guidance and updating the Highway Design Manual.

WHAT IS THE PROGRESS TO DATE?

As of August 2022, the research team has made the following progress:

- Completed JPCP design catalog tables. Concrete overlay on asphalt (COA) design tables was approved by Caltrans
- Completed Continuously Reinforced Concrete Pavement (CRCP) design tables. Made several attempts to address unrealistic thicknesses obtained with PavementME. Proposed a solution to Caltrans
- Continued development of beta version of the web-based tool, including user interface and calculations