Pavement

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Project Title:
Partnered Pavement Research Center (PPRC) 23: Mechanistic-Empirical Design

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Modify CRCP Mechanistic-Empirical Models used in PavementME and Update Rigid Pavement Design Catalog for CRCP

Improving continuously reinforced concrete pavement models and design guidelines for California.

WHAT IS THE NEED?

The California Department of Transportation (Caltrans) relies on a rigid pavement design catalog for continuously reinforced concrete pavement (CRCP) created in 2005 using an early release of the Mechanistic-Empirical Pavement Design Guide (MEPDG) software. That version had known limitations, which have since been addressed in later updates. However, Caltrans has not revised its CRCP catalog to reflect those improvements.

While Caltrans' jointed plain concrete pavement (JPCP) catalog was updated in 2019–2020 using the latest condition data and software calibrations, the CRCP catalog now requires similar attention. Updating it will improve consistency, enhance performance predictions, and support statewide use of a modernized Rigid Pavement Design Catalog, yielding economic, user, and environmental benefits.

WHAT ARE WE DOING?

To align Pavement Mechanistic-Empirical (ME's) CRCP models with California conditions and update the design catalog, the research team is:

- Conducting a literature review of CRCP performance models and field data requirements.

- Collecting experimental data from California CRCP projects, measuring crack spacing, crack widths, and load transfer efficiency (LTE) via Falling Weight Deflectometer tests.

- Developing and calibrating improved CRCP performance models in PavementME based on the new field data.

- Preparing the updated models for implementation in the AASHTOWare Pavement ME software.

- Revising Caltrans' Rigid Pavement Design Catalog to incorporate the new CRCP model enhancements.

WHAT IS OUR GOAL?

The main goal of this task is to modify PavementME's CRCP mechanistic-empirical models using California field data and to update Caltrans' Rigid Pavement Design Catalog for CRCP, ensuring more realistic performance predictions and consistent design guidance.

WHAT IS THE BENEFIT?

This work will provide Caltrans with a reliable, modernized design tool for CRCP, ensuring better alignment with actual field performance and California-specific conditions. It will also support updates to design guidance, standards, and specifications, contributing to improved pavement longevity, reduced life-cycle costs, and more sustainable infrastructure decisions.

WHAT IS THE PROGRESS TO DATE?

The research team has:

- Completed literature review on CRCP design procedures, model limitations, and relevant field studies.

- Continued field evaluation of Caltrans CRCP projects and Long-Term Pavement Performance Test sections.

- Continued evaluation of Pavement ME CRCP models.