

TRANSFORMING IDEAS INTO SOLUTIONS

Research Notes



Project Title:

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

Task Number: 4201

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DRISI provides solutions and knowledge that improves California's transportation system.

Implementation of New Models in CalME

Improving, refining, and updating CaIME for mechanisticempirical design of flexible pavements.

WHAT IS THE NEED?

The California Department of Transportation (Caltrans) has transitioned from an empirical pavement design method to a mechanistic-empirical (M-E) approach, which more effectively accounts for local materials, climate, and traffic conditions. Ongoing research continues to improve M-E methodologies by refining models to better represent the physical processes influencing pavement performance. Additionally, there is a growing need to replace retired desktop design programs and provide local governments with updated, consistent tools and a flexible pavement design catalog that aligns with Caltrans' adopted M-E framework.

WHAT ARE WE DOING?

This task order focuses on enhancing the models within the CalME software to improve prediction accuracy and reduce uncertainties in design outcomes. It involves updating existing models, adding new ones to address additional performance factors, updating climate and traffic databases as needed, and periodically recalibrating the empirical components of the M-E methodology based on the latest performance data. Subtasks include:

- Improving CaIME's user interface and functionality
- Updating models and databases within CalME
- Updating the calibration of CalME performance models
- Developing a flexible pavement design catalog for local governments

WHAT IS OUR GOAL?

The primary goal is to advance the CalME program by enhancing its functionality, refining the accuracy of its models,

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and expanding its design capabilities. The task also aims to support local governments by providing a new, web-based design catalog and user-friendly tools consistent with CaIME, ensuring a seamless transition from retired software.

WHAT IS THE BENEFIT?

Enhancing the CalME program will improve the efficiency and accuracy of pavement design workflows at Caltrans. Refined models will better reflect actual pavement performance under local conditions, reducing uncertainty in predicted outcomes. This enables designers to optimize pavement structures without relying on overly conservative assumptions, resulting in more costeffective, reliable designs.

Local governments will also benefit from new, consistent design tools aligned with Caltrans' mechanistic-empirical methodology, ensuring smoother project delivery and greater statewide consistency in pavement design practices.

WHAT IS THE PROGRESS TO DATE?

The research team has made the following progress:

- Continued development of software components for use in CaIME and related applications, including improvements to the user interface.
- Developed a framework to account for field aging of materials in CaIME and initiated its verification.
- Completed all factorial runs for designs incorporating recycled materials, including expanded traffic volume scenarios. These results will inform initial design assumptions in CaIME.

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