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CALTRANS DIVISION OF RESEARCH, INNOVATION AND SYSTEM INFORMATION

Research Notes

Further Improvement for CalME and Integration with PRS Into Routine Practice

Continue Improving the M-E Design System for California Pavement Design and Integration with Performance-Based Specification (PRS) Into Routine Practice

Pavement

MAY 2024

Project Title:
Partnered Pavement Research Center (PPRC) 20: Mechanistic-Empirical Design

Task Number: 3810

Start Date: June 1, 2020

Completion Date: September 30, 2023

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WHAT IS THE NEED?

Caltrans has adopted the mechanistic-empirical (M-E) method for pavement design to provide an efficient transportation system to enhance California's economy and livability. Caltrans is looking to expand the use of M-E methods for flexible pavement design and rehabilitation so that local conditions such as material, climate and traffic can be effectively accounted for. M-E methods involve using computer models to describe various physical processes that change pavement conditions and to simulate pavement deterioration over time. Researchers have continuously improved M-E design method and implemented the findings to better understand various physical processes affecting pavement deterioration.

WHAT ARE WE DOING?

This task continues improving, refining, and updating various models for ME design of asphalt surfaced pavements. The changes include updating the user interface based on feedback from Caltrans engineers and improving models to consider the effects of traffic wander on permanent deformation and moisture effects on the mechanical properties of unbound and partially bound layers. Data from recently completed projects are used to develop, refine, and recalibrate damage models.
This study includes the following sub-tasks:

- To develop/implement new CalME features.
- To improve CalME models.
- To calibrate CalME damage models with recently collected data.

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- To update performance tests for design and construction.
- To integrate CalME and the DIME database.
- To prepare project documentation.

WHAT IS OUR GOAL?

The goal of this research is to gain more knowledge on pavement behaviors and use the knowledge to improve M-E design methods for California pavements, minimizing the need to use empirical factors to cover critical physical processes.

WHAT IS THE BENEFIT?

Compared to empirical methods, M-E method is better at accommodating new materials and construction processes. M-E methods account for local conditions such as climate, traffic, and material and can therefore optimize pavement designs for the specific conditions rather than having to cover the worst-case scenario. The transition to M-E design helps Caltrans design more cost-effective pavements and improve pavement performance, thereby reaching the goal of efficiency and sustainability.

WHAT IS THE PROGRESS TO DATE?

The research is complete. The research team is in the process of delivering the final report.