DRISI

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

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Project Title:
Further Improvement for CalME and Integration with PRS Into Routine Practice

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WHAT IS THE NEED?

In order to accomplish its mission of providing an efficient transportation system to enhance California's economy and livability, The California Department of Transportation (Caltrans) is transitioning from using empirical method to mechanistic-empirical (M-E) method for pavement design. 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 ultimately simulating pavement deterioration over time. M-E design method needs to be continuously improved by conducting research to better understand various physical processes affecting pavement deterioration and implementing the findings.

WHAT ARE WE DOING?

This task will continue improving, refining, and updating various models for ME design of asphalt surfaced pavements. This will include changes in the user interface and use experience based on feedback from headquarters and district users, as well as work on existing and new models, including effect of traffic wander on permanent deformation and moisture effects on the mechanical properties of unbound and partially bound layers. Data from recently completed projects will be used to develop, refine, and recalibrate damage models.

WHAT IS OUR GOAL?

The goal is to gain more knowledge on pavement behaviors and use them to improve M-E design methods for California pavements, ultimately to increase the understanding of physical processes in pavements and to minimize the need to use empirical factors to cover critical processes affecting pavement performance.

WHAT IS THE BENEFIT?

Compared to empirical methods, M-E method is better at accommodating new materials and construction processes. The transition to M-E design helps Caltrans design more cost-effective pavements and accomplish the mission of providing an efficient transportation system to enhance California's economy and livability. 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.

WHAT IS THE PROGRESS TO DATE?

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

- Use CalME to help Caltrans evaluate some design directives regarding rubberized hot mix asphalt-gap graded (RHMA-G) thickness limits, multi-layer structure design, use of Performance Grade (PG) 70 binder in RHMA-G mixes, and the use of low percentages of rubber in dense-graded mixes. Identify features
- to be implemented based on outside reviews Continuing to develop a thermal reflective cracking model and continuing to test field-aged specimens for use in developing an aging model
- Continuing Quality Control (QC) testing for SAC-5 project. Help District 3 with re-design of the pavement between Pocket Road and Florin Road
- Document production and testing results in the database