DRISI
Caltrans Division of Research, Innovation and System Information

Research Results

PPRC14 SPE ME-B: Improved ME Design Algorithms and Reliability

This research is an effort to improve the Mechanistic Empirical (ME) design tool for asphalt pavement. .

Pavement

MAY 2019

Project Title:
PPRC14 SPE ME-B: Improved ME Design Algorithms and Reliability Approach

Task Number: 2668

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WHAT IS THE NEED?

Improve the ability and reliability of Caltrans and national Mechanistic Empirical procedures to predict pavement distresses.

WHAT WAS OUR GOAL?

The goal of this project is to continue improving the ME design system developed by University of California Pavement Research Center (UCPRC) for California pavement design.

WHAT DID WE DO?

- Research on various subjects that can help improve mechanistic empirical design o Effect of rest period on fatigue damage
  - Expose different asphalt binder to direct sunlight and monitor change in chemical composition over time
  - Reflective cracking o Traffic inputs
- Conduct laboratory testing to evaluate the effect of deflection waveform on fatigue testing result.
- Use PaveM data to develop performance models for slab replacement, lane replacement, and compare Mechanistic-Empirical Pavement Design Guide (MEPDG) performance prediction against field performance.

WHAT WAS THE OUTCOME?

- Findings on various subjects related to mechanistic-empirical pavement design o Rest period recovery of asphalt binder fatigue damage o Binder oxidative aging behaviors and recommendation for future research o Updated equations for calculating reflective cracking strain

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Caltrans provides a safe, sustainable, integrated and efficient transportation system to enhance California's economy and livability.

- Updated traffic inputs incorporating recent data
- There is no difference in fatigue test results between tests following sine and haversine deflection waveforms.
- Performance models for slab replacement and lane replacement. Comparison of MEPDG simulation results and actual field performance of rigid pavements.

WHAT IS THE BENEFIT?

This research provides Caltrans with the first statewide estimates of pedestrian exposure, which will allow Caltrans to improve the quality of their pedestrian safety analyses by evaluating risk. In addition, the identification of a pedestrian crash typology allows alternative crash frequency-based HCCL identification methods to be applied which can evaluate the statistical significance of the presence/absence of specific crash types.

IMAGES