DRISI
Caltrans Division of Research, Innovation and System Information

Research Results

Expanding the Pavement Design Materials Database

Adding the mechanistic-empirical properties of more materials to the CalME library provides engineers with more design options

Pavement

DECEMBER 2015

Project Title:
Updated Standard Materials Library

Task Number: 2356

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WHAT IS THE NEED?

Caltrans is transitioning from using an empirical method to a mechanistic-empirical (ME) approach for flexible pavement design and rehabilitation. As part of the transition, Caltrans developed the CalME software to help designers predict pavement performance. A major benefit of the ME method is the ability to account for regional conditions, such as climate, traffic, and materials. The Standard Materials Library is a vital component of CalME, providing engineers with a number of commonly used materials across California. To better serve pavement designers, more data on regional materials representing various parts of California needs to be collected and added to the library.

WHAT WAS OUR GOAL?

The goal was to populate the CalME materials library with information on a range of regional materials, such as hot mix asphalt (HMA) materials, samples of in-place recycled materials, and cemented bases.

WHAT DID WE DO?

Caltrans, in partnership with the University of California Pavement Research Center at UC Davis, collected regional materials that needed to be incorporated based on input from designers, engineers, and industry. For this phase, the researchers added HMA materials (including rubberized) from various Caltrans districts and different types of base materials. The properties of these materials were measured in the laboratory or field.

WHAT WAS THE OUTCOME?

The continually expanding Standard Materials Library is a complex, powerful tool that aids designers of HMA pavements in assessing fatigue cracking performance. For HMA materials, mixes are designed with both the older Hveem method and new Superpave method recently adopted by Caltrans for the same binder and aggregates. During Task 2667, the library will be further updated with data focusing on conventional and rubberized HMA mixes with higher recycled asphalt pavement contents, a more extensive sampling of full-depth reclamation materials with different stabilizing agents, and more HMA designed with the Superpave method.

WHAT IS THE BENEFIT?

For designers to select appropriate materials for the ME process requires a comprehensive materials library that reflects the various materials available in different regions in California. Designers can use the Standard Materials Library database and CalME performance model to run different scenarios to compare the performance and cost of new materials or materials available from nearby sources. The library also provides data for comparing the performance of mixes designed with the Hveem method to the recently adopted Superpave method, helping Caltrans transition from the older mix design to the new Superpave method.

LEARN MORE

To view the complete report:
www.ucprc.ucdavis.edu/PDF/UCPRC-RR-2015-01.pdf

IMAGES

Figure 1: HMA materials being compacted in the laboratory for testing

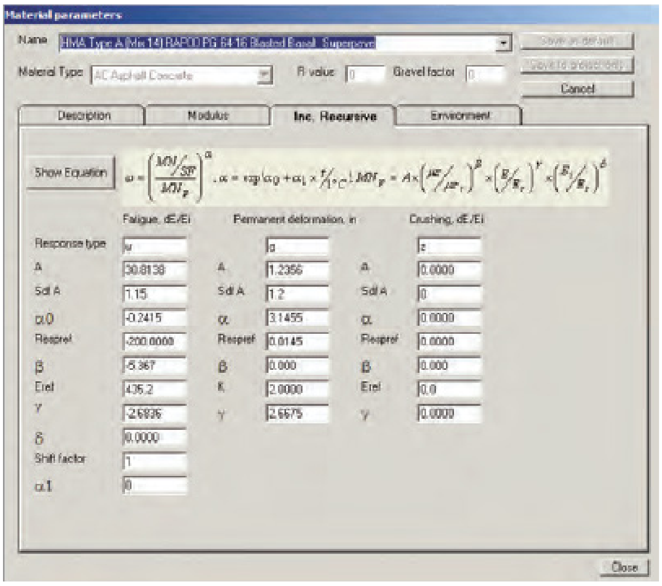

Figure 2: Material parameters for an HMA mix design using the new Superpave method