

Research Notes

Program Steering Committee (PSC): Pavement

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Title: Recycling of Rubberized Hot Mix Asphalt in Reclaimed Asphalt Pavement and Full-Depth Reclamation Projects and with Warm Mix Technologies

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TITLE:

Recycling of Rubberized Hot Mix Asphalt in Reclaimed Asphalt Pavement and Full-Depth Reclamation Projects and with Warm Mix Technologies

Developing a comprehensive guideline for the rehabilitation and capital maintenance design of pavements using partial- or full-depth reclamation techniques

WHAT IS THE NEED?

Caltrans has been using Full-Depth Reclamation (FDR) as a rehabilitation strategy since 2001, following its introduction at a workshop in 2000. Partial-Depth Reclamation (PDR) or Cold In-place Recycling (CIR) has been also used as a rehabilitation strategy on a limited scale since 2009.

However, no comprehensive guidelines exist to guide engineers on how to choose between PDR and FDR, or on how to choose the most appropriate stabilizer or stabilizer combination in each of the strategies. No comparative studies between any of the recycling strategies have been documented to support the writing of comprehensive guidelines for selecting the most appropriate recycling strategy for a particular project. No comprehensive monitoring of long-term field performance of FDR-asphalt emulsion and FDR-portland cement or any type of PDR projects has been documented. No documentation exists on the collection of data for the development of mechanistic-empirical design/performance models for FDR, beyond the initial parameters developed for CalME by the University of California Pavement Research Center (UCPRC). No comparative studies between the different types of PDR construction procedures have been documented. No studies have been undertaken to assess the influence of recycled rubberized asphalt on FDR or PDR performance.

WHAT ARE WE DOING?

We performed a literature review on research related to the topic, with special emphasis on project selection, identifying the most suitable recycling strategy, identifying the most suitable stabilizer or stabilizer combination, mix design, empirical and mechanistic-empirical pavement design, equipment, construction guidelines, construction specifications, and accelerated and long-term performance, with special emphasis on cracking behavior, rutting, freeze-thaw, moisture sensitivity, and densification under traffic. We constructed a test track to compare full-depth cement, foamed asphalt, and asphalt emulsion stabilization. We used accelerated load testing to compare full-depth cement, foamed asphalt, and asphalt emulsion stabilization. We performed laboratory testing to refine mix-design procedures and identify suitable criteria for mechanistic-empirical design procedures and performance models.

WHAT IS OUR GOAL?

Our goal is to prepare project selection and mechanistic-empirical design guidelines for partial- and full-depth recycling in California. We will also prepare recommendations for implementation of a “Recycle First” policy in California.

WHAT IS THE BENEFIT?

The benefit is to develop a comprehensive guideline for the rehabilitation and capital maintenance (CAPM) design of pavements using partial- or full-depth reclamation techniques.

WHAT IS THE PROGRESS TO DATE?

The accelerated load testing of full-depth cement, foamed asphalt, and asphalt emulsion stabilization is done. The final report is underway.