

Pavement

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Project Title:

Partnered Pavement Research Center (PPRC) 23: Recycling

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Continued Development of Guidance and Specifications for Cold Recycling

Further improvements on the recycling guide by refining mix designs such as gradations, stabilizers, and other pavement applications.

WHAT IS THE NEED?

The California Department of Transportation (Caltrans) employs a variety of strategies and materials in maintaining and rehabilitating the state highway system's pavements, a necessary approach given the varying characteristics of the pavements in use and their diverse properties.

There has been growing interest in in-place full-depth and partial-depth reclamation of distressed pavements in the United States and internationally. Caltrans has been using full-depth reclamation (FDR) as a rehabilitation strategy since 2001 and it is pursuing to develop detailed guidance on mix design and pavement design for FDR projects.

WHAT ARE WE DOING?

This study is a continuation of accelerated pavement testing (APT) and laboratory testing study for developing and updating project selection, pavement and mix design guidelines and specifications.

This study will assess the use of other types of cement in terms of strength, shrinkage, microcracking procedures and timing, stiffness gain, and short- to medium-term performances. It will also analyze the deep-lift full-depth recycling to assess the distribution of cement and determine whether layers can be uniformly mixed and compacted. The use of rejuvenators to mobilize some of the in-place binder to achieve recycling of both aggregates and binder will be investigated.

WHAT IS OUR GOAL?

To provide an updated cold recycling guide, test methods,



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and specifications. Guidance will be developed for the use of rejuvenators in cold recycled pavement applications.

WHAT IS THE BENEFIT?

The updated guideline for recycling will help the designers, contractors, and project specification engineers determine the optimal recycling procedure. The guideline will assist engineers determine the appropriate pavement rehabilitation strategy. It will also be utilized to update standards, plans, and specifications. It also ensures cost effectiveness through use of longer lasting pavement. In addition, the result of the study can be used for project selection in pavement management system.

WHAT IS THE PROGRESS TO DATE?

The identification of cold recycling projects in PavEM that are performing poorly and selecting representative projects for forensic investigation is ongoing. Moreover, eighty-five percent of sub-task 3A has been completed, focusing on testing documentation for compaction and strength test methods for cold recycling specifications and the Caltrans Test (CT) -313, CT-315 and CT-316. The supplemental fines study, including identifying gradation bands, developing material selection and percentage-added calculation tools, conducting mechanistic sensitivity analyses, material sampling, and testing is in progress. Additionally, ongoing work on mix design, strength, and stiffness tests continues. Refinements to test track mix designs continues, while finalizing the instrumentation plan and preparation for the test track lane. Additionally, twenty percent of activities under sub-task 3B has been initiated, such as sensitivity analyses and designs for Lane-3, finalization of instrumentation plans, and subbase stabilization for Lane-3. Fifteen percent of work on sub-task 3C including the design for test track lane for Partial Depth Recycling (PDR) layers with high Rubberized Hot Mix Asphalt - Gap Graded (RHMA-G) content, and mix design has

been completed, waiting for contractor completion. Additional samples with known high rubber content for further laboratory testing were collected as well. For sub-task 3D, the design of Lane-2 for tack coats below PDR layers and initial work on mix designs are fifteen percent completed. Similarly, sub-task 3F, including test track Lane-4 mix design refinement and instrumentation preparation, is progressing, with work on Full Depth Recycling (FDR-C) on Lane-4. Finally, sub-task 4 is twenty percent complete, covering mix-design reports and quality control procedures, phase 2 analysis of accelerated pavement testing cold-recycling guidance update.

Next steps: (1) monitor literature; (2) identify CR projects in PavEM and conduct field investigations; (3) continue mix design and testing of mixes with and without supplemental fines; (4) submit compaction and strength test methods report to Caltrans for review.