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CALTRANS DIVISION OF RESEARCH, INNOVATION AND SYSTEM INFORMATION
TRANSFORMING IDEAS INTO SOLUTIONS

Research Notes

Continued Development of Guidance and Specifications for Cold Recycling

Enhancing cold recycling mix designs, materials, and pavement applications.

Pavement

MAY 2025

Project Title:
Partnered Pavement Research Center (PPRC) 23: Recycling

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WHAT IS THE NEED?

The California Department of Transportation (Caltrans) uses various strategies and materials to maintain and rehabilitate pavements, addressing the diverse characteristics of its highway system. Interest in in-place pavement recycling methods like full-depth reclamation (FDR), cold central plant recycling (CCPR), and partial-depth reclamation (PDR) continues to grow in California and nationally. Since 2001, Caltrans has used FDR and is working to develop updated guidance on mix designs, pavement designs, specifications, and procedures for cold recycling. Revised specifications are needed to reflect new findings on material performance, construction practices, and emerging materials like rejuvenators and geosynthetics, supporting the goal of expanding cold recycling in pavement projects.

WHAT ARE WE DOING?

This study continues Caltrans' program of accelerated pavement testing (APT), lab testing, and field monitoring to improve cold recycling practices. Focus areas include:

- Literature reviews of recent national and international research.
- Long-term field monitoring of cold recycling projects.
- Lab and APT testing of material performance, structural improvements, and construction techniques.
- Developing procedures and specifications for specialized applications, including incorporating supplemental fines; using subgrade stabilization or geogrids with CCPR; recycling pavements containing gap-graded rubberized hot mix asphalt (RHMA-G) and geosynthetics; applying

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tack coats or spray pavers in PDR; using rejuvenators to mobilize in-place binders; and refining mix designs and procedures for FDR with cement.

WHAT IS OUR GOAL?

To deliver updated cold recycling guidance, specifications, and test methods based on recent research, field observations, and lab testing. The project aims to optimize California's cold recycling practices by addressing material performance, constructability, and long-term pavement performance. Guidance will cover rejuvenator use and improved stabilization techniques.

WHAT IS THE BENEFIT?

Updated guidance will help Caltrans designers, contractors, and engineers select optimal pavement recycling strategies. It will promote cost-effective, durable pavements by extending service life and improving performance. Results will inform updates to standards, plans, specifications, and project selection criteria in Caltrans' pavement management system (PaveM), supporting sustainable practices and innovative construction methods.

WHAT IS THE PROGRESS TO DATE?

The research team has made the following progress:

- Monitored current literature and identified cold recycling projects for future forensic review.
- Advanced the supplemental fines study, refining gradations, developing a material selection tool, conducting sensitivity analyses, and performing mix and strength tests.
- Completed FDR-C subbase mix designs, construction, and installed instrumentation on the test track.
- Tested PDR layers with high RHMA-G content and continued lab testing with varied gradations.
- Developed new mix designs for evaluating tack coats under PDR.
- Refined FDR with cement mix designs, completed construction, performed microcracking, and monitored shrinkage.
- Continued updating cold recycling guidance and prepared reports on mix designs, quality control, and material stockpiling.