

TRANSFORMING IDEAS INTO SOLUTIONS

Research Notes



Project Title:

Partnered Pavement Research Center (PPRC) 23: Recycling

Task Number: 4391

Start Date: November 7, 2023

Completion Date: June 30, 2026

Task Manager:

Vipul Chitnis **Research Engineer** Vipul.Chitnis@dot.ca.gov



DRISI provides solutions and knowledge that improves California's transportation system.

Use of Cold Recycling as Base for **Concrete Pavement**

Evaluating and implementing cold recycled materials in rigid pavement bases.

WHAT IS THE NEED?

The California Department of Transportation (Caltrans) seeks sustainable, cost-effective strategies to extend the life of its concrete pavements and conserve natural resources. Using cold-recycled materials as a base layer can reduce reliance on virgin aggregates, lower construction costs, and shrink the carbon footprint of pavement projects. This task evaluates cold recycling as a base for jointed plain and continuously reinforced concrete pavements and develops field-ready quidelines.

WHAT ARE WE DOING?

The work breaks down into four main areas:

- Finalize laboratory testing procedures for cold-recycled (CR) materials.
- Test reference mixtures cold central-plant recycled fly ash (CCPR-FA), CCPR-electric-arc furnace slag (CCPR-EA), and CCPR-cement (CCPR-C).
- Design and laboratory-test optimized CR mixtures (CCPR-FA and CCPR-EA) for concrete pavement bases.
- Prepare and instrument a pilot test track to validate CR base performance under real traffic.

WHAT IS OUR GOAL?

This main goal of this study is to establish validated CR base mixtures and pilot protocols that allow Caltrans to adopt cold recycling for rigid pavement foundations, achieving durable overlays, cost savings, and reduced environmental impact.

WHAT IS THE BENEFIT?

This task benefits Caltrans by promoting sustainability using

ADA Notice: Users with accessibility issues may contact the California Department of Transportation, Division of Research, Innovation and System Information. For TTY assistance, call the California Relay Service at 711, email: pm2.communications@dot.ca.gov or write Caltrans, DRISI - MS-83, P.O. Box 942873 Sacramento, CA 94273-0001



Use of Cold Recycling as Base for Concrete Pavement





cold recycled materials, resulting in significant savings, improved concrete overlay pavement performance, standardized guidelines, and reduced environmental impact associated with pavement construction and maintenance.

WHAT IS THE PROGRESS TO DATE?

The following progress has been made:

- Test protocols for cold-recycled materials have been finalized and approved.
- Reference mixtures (CCPR-FA, CCPR-EA, and CCPR-C) have been fully designed, with half of the mix designs validated in the laboratory.
- Two optimized cold-recycled mixtures for concrete bases have been designed and tested to 50% completion.
- Instrumentation setup and pre-installation on the pilot test track are 30% complete.

The contents of this document reflect the views of the authors, who are responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the California Department of Transportation, the State of California, or the Federal Highway Administration. This document does not constitute a standard, specification, or regulation. No part of this publication should be construed as an endorsement for a commercial product, manufacturer, contractor, or consultant. Any trade names or photos of commercial products appearing in this document are for clarity only.