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CALTRANS DIVISION OF RESEARCH, INNOVATION AND SYSTEM INFORMATION

TRANSFORMING IDEAS INTO SOLUTIONS

Research Notes

Continued Support for Implementation of Performance Related Tests and Specifications for Balanced Mix Design, Increased Recycling of Asphalt Mixes, and Integration of Mix Design and Structural Design

Facilitating the adoption of Balanced Mix Design (BMD) through enhanced Performance Related Tests (PRT) and Performance Related Specifications (PRS).

Pavement

NOVEMBER 2024

Project Title:

Continued Support for Implementation of Performance Related Tests and Specifications for Balanced Mix Design, Increased Recycling of Asphalt Mixes, and Integration of Mix Design and Structural Design

Task Number: 4214

Start Date: October 23, 2023

Completion Date: September 30, 2026

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WHAT IS THE NEED?

The implementation of a BMD approach is critical for ensuring that asphalt mixes used by the California Department of Transportation (Caltrans) meet performance expectations, especially in the context of diverse asphalt mix types and evolving industry standards. The refinement and optimization of Performance Related Tests (PRTs) are necessary to expedite the approval process, making it faster, easier, and more cost-effective for both major rehabilitation projects and routine endeavors.

Moreover, the project addresses the growing need for sustainable practices in pavement maintenance. The evaluation of a wider range of asphalt mixes, including those with recycled materials, aligns with environmental goals and contributes to reducing life cycle costs. The development of alternative tests and the creation of a BMD framework not only enhance the overall efficiency of Caltrans' operations but also position the department as a leader in adopting environmentally conscious approaches to infrastructure maintenance.

WHAT ARE WE DOING?

The project involves refining existing PRTs to make them more efficient for initial mix approvals on larger projects, developing

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alternative, faster, and cost-effective PRTs for routine projects, and assessing a broader range of asphalt mixes, including those with recycled materials.

This task includes the following subtasks:

- Evaluation of alternative routine PRT for BMD using accelerated pavement testing.
- Sampling and testing of high recycled content and other new mix types using PRT.
- Testing, analysis, and other support for full-scale asphalt rehabilitation/reconstruction projects with PRS.
- Development of alternative test methods for fatigue cracking.
- Recommendations for BMD tests and specifications and improvements to full-scale PRS and test methods, and communication support for implementation.

WHAT IS OUR GOAL?

The goal of this task order is to implement a BMD strategy for asphalt mixes within Caltrans to reduce life cycle costs, to minimize environmental impacts, and to enhance the sustainability of asphalt-surfaced pavements across the state highway network.

WHAT IS THE BENEFIT?

The anticipated benefits of the project are substantial, aiming to yield cost savings and environmental advantages for Caltrans. The project seeks to streamline the approval process for asphalt mixes, reducing both time and costs associated with large-scale and routine projects. Additionally, the incorporation of recycled materials aligns with environmental goals, contributing to a decrease in life cycle costs and minimizing the environmental impact of maintaining asphalt-surfaced pavements.

WHAT IS THE PROGRESS TO DATE?

The research team has made the following progress to date:

- Completed construction, quality control, and instrumentation for the reflective cracking section, coordinating with DRISI, OAP, METS, and BMD WPG, and discussed materials for an Interlaboratory Study (ILS) with METS.
- Discussed BMD recommendations and binder specifications with METS and PMPC, consulted with Texas A&M and FHWA center at the University of Nevada, Reno, for additional tests, and drafted a BMD summary.
- Finalized the 40% High RAP mix on Ven-150, coordinated upcoming CC-4 paving, and collaborated with Granite and George Reed to develop mix designs for cold recycling tracks. Monitored five RAP pilots for 2025 analysis.
- Completed testing on five RAP pilots and began monitoring, including lab tests for D8 I-40's HyRAP, RHMA-G, and HMA-M mixes.
- Advanced database and monitoring for RAP and RAS pilots, and summarized performance results for D8 HyRAP and LCA.
- Addressed comments on RAP in RHMA, prepared reports, and provided updates to stakeholders on BMD methods and MTOA protocol options.