

## Pavement

May 2025

**Project Title:**

Partnered Pavement Research  
Center (PPRC) 17: Sustainability

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## Partnered Pavement Research Center (PPRC) 17: Sustainability

With a focus on sustainability and the reduction of global warming, the University of California Pavement Research Center (UCPRC) continues its partnership with the California Department of Transportation (Caltrans) – the Division of Research, Innovation and System Information (DRISI) to explore Alternative Supplementary Cementitious Materials (ASCMs) to partially substitute Portland Cement in pavement construction.

### WHAT IS THE NEED?

The need for reducing the global warming potential of concrete and promoting sustainable construction practices is evident in the utilization of supplementary cementitious materials (SCMs) to partially substitute Portland cement. This approach not only lowers the environmental impact but also enhances the mechanical properties of concrete, leading to improved durability and performance. However, reliance on conventional SCMs like fly ash and ground granulated blast furnace slag (GGBFS) poses challenges due to limited domestic supply and the need for long-distance transportation, resulting in additional greenhouse gas emissions. To address these challenges, there is a critical need to identify ASCMs available within California. Therefore, the UCPRC aims to explore and evaluate potential ASCMs from technical, environmental, and economic perspectives.

### WHAT ARE WE DOING?

This project is a continuation of the initiatives commenced in previous projects, 4.84, aimed at identifying and assessing ASCMs abundantly present in California. The project will persist in gathering data on both existing and newly discovered ASCMs, conducting basic characterization tests, and evaluating their pozzolanic or hydraulic reactivity. Following this preliminary phase, concrete testing will follow by utilizing mix designs representative of Caltrans highway specifications. Trial batches will be produced and subjected



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to rigorous evaluation, contributing to the finalization of a comprehensive testing matrix. Ultimately, all characterization and testing outcomes will be consolidated into a detailed technical report, providing essential insights to guide Caltrans in the effective implementation of ASCMs within concrete infrastructure projects statewide.

## WHAT IS OUR GOAL?

The anticipated outcome of this research is a comprehensive evaluation of ASCMs for potential use in Caltrans' concrete projects. There will be a detailed technical report compiling findings from characterization, reactivity evaluation, and durability testing of ASCMs.

## WHAT IS THE BENEFIT?

The benefit of this research is the potential to integrate ASCMs into concrete mixes, reducing reliance on traditional cement sources. This enhances sustainability, durability, and performance, contributing to global warming reduction by lowering carbon emissions associated with concrete production and improving long-term infrastructure resilience.

## WHAT IS THE PROGRESS TO DATE?

All tasks have been completed; only the final report is pending.