

Research

Further Development Towards

Supplementary Cementitious

Enhance implementation readiness and mainstream use of likely Supplementary Cementitious Materials in California and

Supplementary cementitious materials (SCMs) from industrial by-products can partially replace high-carbon Portland cement

that refine the pore system and reduce the permeability of concrete. However, supplies of fly ash, the most used SCM, are

and improve the durability of concrete by consuming calcium hydroxide and producing secondary calcium-silicate-hydrates

declining due to regulatory restrictions on coal-fired power plants.

US and global demand. Therefore, there have been efforts to find

alternative SCMs such as calcined clay, volcanic ashes, and ash

from waste biomass. However, these materials vary in chemical

composition depending on location and source material, and some are local to certain areas and thus are expensive or not available. In an ongoing study, likely SCMs are identified in California and other regions for mainstream use in concrete pavements. A parallel study will be looking at remined fly ash from historic deposits and recycled glass. A follow-on study to the review of calcined clay, and volcanic and biomass ashes is required to advance likely SCMs' readiness through testing and characterization for mainstream implementation in concrete pavements, culverts, pipes, curbs and gutters, and flatwork

Another accepted SCM is ground granulated blast furnace slag from steel making, but its insufficient supply does not support the

Implementation of Likely

other states for concrete pavement

Materials

WHAT IS THE NEED?

Notes





DRISI provides solutions and knowledge that improves California's transportation system WHAT ARE WE DOING?
Extend information gathering and practice survey to newly identified likely alternative SCMs (ASCMs) beyond those assessed in 4.84

associated with vehicle and active transportation.

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: Drisi.Communications@dot.ca.gov or write Caltrans, DRISI – MS-83, P.O. Box 942873 Sacramento, CA 94273-0001



Further Development Towards Implementation of Likely Supplementary Cementitious Materials

Research



- Continue the sample collection, material characterization and determination of suitable fineness
- Preliminary concrete performance evaluation beyond those to be tested in 4.84
- Preliminary environmental and economic assessment on more ASCMs than those assessed in 4.84

WHAT IS OUR GOAL?

The goal of this project is to enhance implementation readiness and mainstream use of likely SCMs in California and other states for concrete pavements, including performance engineered mixture design and field testing and validation.

WHAT IS THE BENEFIT?

Identify sources of SCMs from California and other states for concrete pavement construction in lieu of diminishing standard fly ash and slag.

WHAT IS THE PROGRESS TO DATE?

As of February 2023, the research team has made the following progress:

- Completed literature and practice surveys. Prepared report and submitted to UCPRC editor.
- Continued to collect samples of ashes and alternative SCMs for testing. Continued reactivity testing and characterization of ashes including available alkalis and ASR evaluation.

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.