

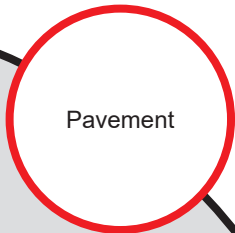


Caltrans Division of Research,
Innovation and System Information

Research



Results



Pavement

PPRC14 SPE PBS-C: Simplified Performance Based Specifications for AC Long Life

This research simplifies the asphalt mix design procedures and specification preparation for asphalt concrete (AC).

WHAT IS THE NEED?

Design and construct pavements with specifications that assure longer service lives.

WHAT WAS OUR GOAL?

Develop simplified asphalt mix design procedures and specification preparation processes for AC long life projects that are easier for contractors and districts to understand and communicate, but do not increase the risk of poor performance to Caltrans, and also of incorporating changes in mix design from the move to Superpave procedures.

Task objectives:

- Revise the mix design and specification processes.
- Evaluate the specifications on new and existing AC long life projects.
- Support Caltrans on implementation and training in the new procedures and specifications.
- Prepare a comprehensive final report summarizing project findings and recommendations.

WHAT DID WE DO?

- Propose and discuss revision to the mix design and specification process with Caltrans.
- Monitor of previous asphalt concrete long life project performances
- Conduct testing and develop performance related specification for Interstate 5 (I-5) Sacramento AC long life project.

MAY 2019

Project Title:

PPRC14 SPE PBS-C: Simplified Performance Based Specifications for AC Long Life Projects

Task Number: 2673

Start Date: October 1, 2014

Completion Date: October 3, 2017

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Caltrans provides a safe, sustainable, integrated and efficient transportation system to enhance California's economy and livability.

WHAT WAS THE OUTCOME?

The outcome of the research includes the following:

- Improved performance testing procedure and a new material classification system.
- Third year field performance data for I-5 Red Bluff AC long life project.
- Construction specification for the I-5 Sacramento AC long life project.

WHAT IS THE BENEFIT?

The improved testing procedure allows shorter turn-around time and better scheduling. The new material classification allows for pre-qualification and shorten the material approval process. This helps contractor to better estimate project cost and bid accordingly. The field performance data verifies the effectiveness performance related specification. The construction specification for I-5 Sacramento AC Long Life project implements the research results and allows more industry partners to become more familiar with the new specification.

IMAGES

HMA Performance Requirements (The actual requirements are project dependent)

Design Parameters	Test Method	Sample Air Voids	Requirement		
			HMA-LL-Surface	HMA-LL-Intermediate	HMA-LL-Rich Bottom
Permanent deformation (percent): ^{2,3} Maximum PAS ⁷ at 10,000 cycles Maximum PAS ⁷ at 20,000 cycles	AASHTO TP 79 Modified:	Mix Specifics	XXX XXX	XXX XXX	Not Required
Beam stiffness (psi): ^{3,4} Minimum stiffness at the 50 th cycle at given testing strain level	AASHTO T 321 Modified:	Mix specifics	YYY at XXX×10 ⁻⁶ in./in. strain	YYY at YYY×10 ⁻⁶ in./in. strain	Not Required
Beam fatigue: ^{3,4} Minimum of 1,000,000 cycles to failure at this strain Minimum of 250,000 cycles to failure at this strain	AASHTO T 321 Modified:	Mix specifics	XXX×10 ⁻⁶ in./in. XXX×10 ⁻⁶ in./in.	XXX×10 ⁻⁶ in./in. XXX×10 ⁻⁶ in./in.	XXX×10 ⁻⁶ in./in. XXX×10 ⁻⁶ in./in.
Semicircular beam fracture potential: Flexibility Index	AASHTO TP 124:	Mix specifics	YYY	YYY	YYY
Moisture Sensitivity: ⁵ Minimum repetitions	AASHTO T 324 Modified:	Per test method	20,000	20,000	Not Required

Notes:

- ¹ Included in the testing procedure, LLP-AC3, "Sample Preparation and Testing for Long-Life Asphalt Concrete Pavements" available at <http://www.dot.ca.gov/hq/esc/Translab/ofpm/fplab.htm>
- ² Tested at a temperature of 122°F (50°C), unconfined, 4.4 psi contact stress, and 70 psi repeated axial stress
- ³ Average value measured from tests on 3 specimens
- ⁴ Perform tests at 10 Hz load frequency and 68°F (20°C) test temperature
- ⁵ Minimum number of repetitions for rut depth of 0.5 in. at 122°F (50°C)
- ⁶ 6 ± 0.5% for HMA-LL-Surface and HMA-LL-Intermediate mix, and 3 ± 0.5% for HMA-LL-Rich Bottom mix following AASHTO T 331 ⁷ PAS is Permanent Axial Strain