Long-Life Pavements

Pre-Bid Conference
District 2
Redding, CA
October 12, 2011

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Presentation Overview

- **Long Life Pavement (LLP)**
  - What it is?
  - What are the benefits?
- **California Experience**
  - Rehabilitation of I-710
- **Long Life Pavement Projects**
  - Red Bluff project 02-3E8104
  - Weed project 02-3E7504
Long Life Pavement – What is it?

- **Design Life 40+ years**
  - Bottom-Up Design and Construction

- **Renewable Pavement Surface**
  - High Rutting and Cracking Resistance
  - Smooth Driving Surface
Long Life Pavement - What is it?

Repeated Bending Leads to Fatigue Cracking

HMA

Base

Subgrade

Repeated Deformation

Leads to Rutting

Leads to Fatigue Cracking
Long Life Pavement
What are the Benefits?

• **Lower Life Cycle Cost**
  - Better Use of Resources
  - Low Incremental Costs for Surface Renewal

• **Lower User Delay Cost**
  - Fewer or Shorter Work Zone Periods for Future Maintenance
Long Life Pavements in the US
The California Experience
Rehabilitation of I-710
Long Life Pavement
I-710 Project Considerations

- Materials Selection & Testing
- Structural Design
- Specs
- Construction
Rehabilitation of I-710

- Full-Depth Hot Mix Asphalt
  - replacement under overpasses
- HMA Overlay of Existing PCC (cracked & seated)

March 2003
Rehabilitation of I-710 LLP
Materials Selection & Testing

- Modified Mix Design, based on Performance Tests (shear and fatigue)
- Polymer Modified Binder Used
- More Stringent Aggregate Quality Requirements
- Introduction of “Rich Bottom” Layer
I-710 Full Depth HMA Structural Design

- 1.0 in AR-OGFC
- 3.0 in PBA-6A (4.7%)
- 6.0 in AR-8000 (4.7%)
- 3.0 in AR-8000 (5.2%)(rich bottom)

6% air voids

Existing Subgrade
I-710 HMA Overlay Structural Design

1.18 in

8.0 – 10.0 in

8.0 in

6.0 in

Asphalt Concrete
Fabric
Leveling Course
Jointed PCC
Cement treated Base
Existing Subgrade
I-710 Lessons Learned

- Recommend mandatory Pre-bid conference for all potential bidders
- A mandatory “Partnering Meeting” between Caltrans and the successful bidder at the outset of the project is recommended
At the “Partnering Meeting” ensure that the performance test procedures referred to in the Special Provisions are understood by the successful bidder and the laboratory staff selected to perform these tests.
Long Life Pavement Projects
Red Bluff Project 02-3E8104
Weed Project 02-3E7504
Long Life Pavement (LLP) Mix Design

Establish target binder content for performance testing

Performance Testing
1. Shear testing at target binder content ± X
2. Select design binder content based on shear test results
3. At design binder content
   Fatigue *
   Hamburg Wheel Track (HWT)

* For “rich bottom” mix design for Red Bluff project conduct stiffness and fatigue at design binder content + 0.5%.
LLP Performance Testing

- **Specimen Fabrication**
LLP Mix Design – Shear & Fatigue Testing
LLP Mix Design – Hamburg Wheel Tracking for Moisture Sensitivity
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Questions?