Selection and Use of CRCP in Oregon

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Overview

• Oregon’s Climate and Traffic
• CRCP History in Oregon
• Long-Life and “30-year” life CRCP
• Current Strategy
• Design Solutions
Oregon’s Climates and Traffic

- ADT = 80,000 – 125,000
- ADT = 20,000 – 30,000
- ADT = 8,000 – 10,000

CRCP History in Oregon
CRCP History in Oregon

CRCP History: 1962 to 2022

<table>
<thead>
<tr>
<th>640 +/- Directional Miles Constructed</th>
<th>CRCP Age</th>
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<tbody>
<tr>
<td>Still in Service without Overlay ~ 64%</td>
<td>Age = Up to 60 years. Average ~ 28 years. Approximately 22% has received diamond grinding</td>
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<tr>
<td>Rut Repair (2” Overlay) ~ 22%</td>
<td>Age = 30 - 50 years. Average ~ 40 years. Overlays were placed at 17 to 44 years old due to rutting.</td>
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<tr>
<td>Structural Overlay (4” or more) ~ 14%</td>
<td>Overlays were placed at 30 - 42 years old due to punchout and cracking issues.</td>
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<tr>
<td>Rubblize/Reconstruct ~ 3%</td>
<td>30 - 37 years old or older.</td>
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Recent Use

- Interstates needing reconstruction
  - Stripped asphalt concrete
  - Deteriorated jointed reinforced concrete
- 11 and 12 inches thick
- About 1 project every 2 years.
- None programmed for future
  - Budget and need.

Long-Life CRCP

- 8 to 12 inches thick
- 1-1/2-inch or 2-inch max aggregate. Later changed to max 1-1/2-inch crushed.
- Granular, CTB, lean concrete base
  - Rigid base un-bonded
  - Recent decade: Asphalt base
- Traffic level had moderate impact
Freeze-Thaw Climate – Low Traffic

“30-year” CRCP

- Workmanship
  - Construction joints
  - Unknowns
- Materials
  - Aggregate size/gradation
  - Mix design
- Design
  - Some bonding with CTB
  - 8-inch CRCP is too thin for current traffic
  - Subgrade drainage
Harsh Climate – Lower Traffic
De-Icing: Magnesium Chloride

Current Strategy

• Build it to last
  – MEPDG for design thickness and percent steel
  – Low shrinkage mix
    • Optimized gradation
    • Adequate coarse aggregate
  – Low permeability concrete
• Localized Repairs
• Diamond grind 1 or 2 times for wear ruts (20-50 years)
• Place 2-inch overlay with asphalt (+/-50 years)
Build it to Last

• Material Challenges
  – Total Shrinkage
  – Autogenous Shrinkage?
  – Cluster Cracking

Build It to Last

UPC’s

FLY ASH

0.05mm
CRCP Wear Rut Overlay

Design Solutions

- Placing CRCP on milled surface
- Using CRCP for only the truck lane
- Using FDR with cement for subbase
CRCP on Milled Surface

CRCP for Truck Lane Only
FDR for Subbase

Details – Lessons Learned

Old Terminal Joint

- Anchor bars at end of wall and at approach

New Terminal Joint

- 1 1/2" preformed exp. joint filler in joint
- Fill top 1" of joint with poured joint sealant
- 18" dowel bars @ 12" centers

See Detail "B"
I-Beam Replacement
I-Beam Replacement

New Terminal Joint Detail
Resources