

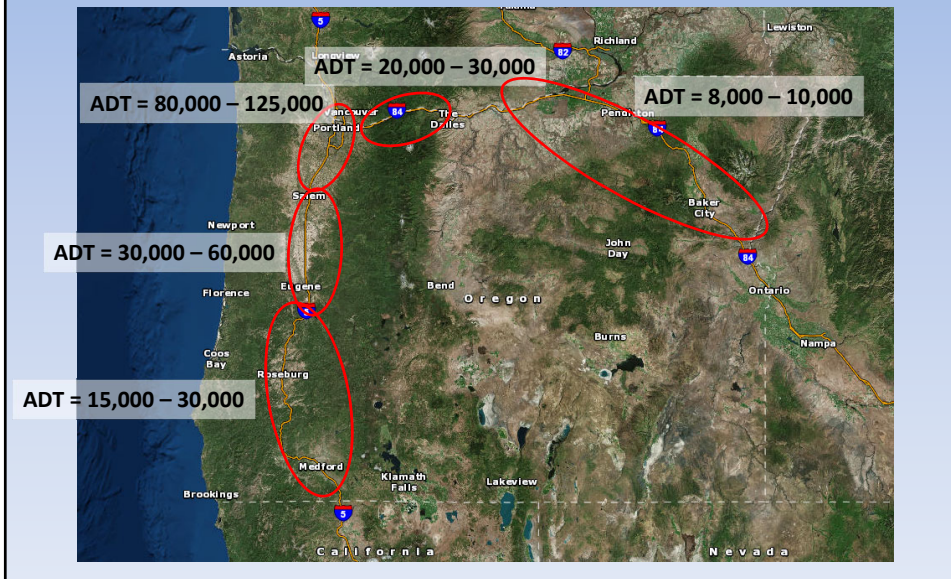
Selection and Use of CRCP in Oregon

Jeff Shambaugh, P.E.
ODOT State Pavement Engineer

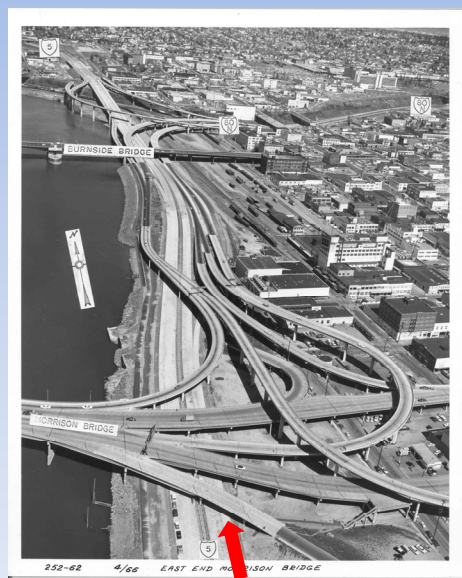
Overview

- 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



CRCP History in Oregon



CRCP History in Oregon



CRCP History: 1962 to 2022

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

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



Workmanship: Tube Feeders



De-Icing: Magnesium Chloride



De-Icing: Magnesium Chloride

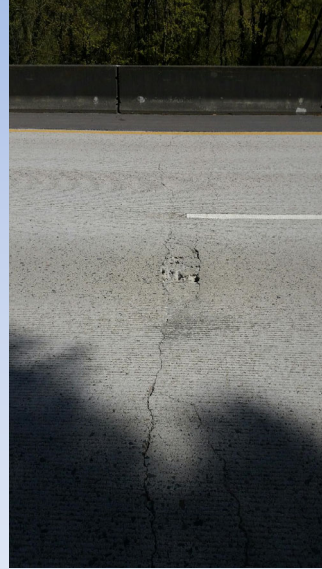


Current Strategy

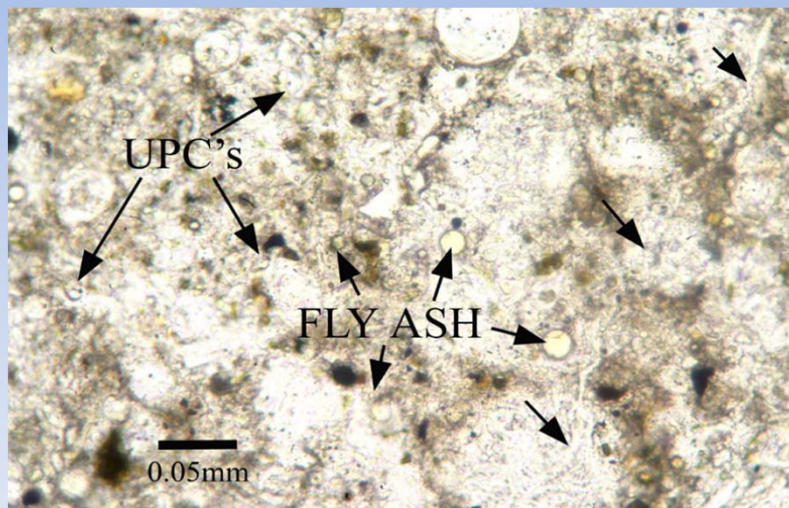
- Build it to last
 - MEPDG for design thickness and percent steel
 - Low shrinkage mix
 - Optimized gradation
 - Adequate coarse aggregate
 - Low permeability concrete
- Localized Repairs
- Diamond grind 1 or 2 times for wear ruts (20-50 years)
- Place 2-inch overlay with asphalt (+/-50 years)

Build it to Last

- Material Challenges
 - Total Shrinkage
 - Autogenous Shrinkage?
 - Cluster Cracking



Build It to Last



Localized Repairs



Localized Repairs



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

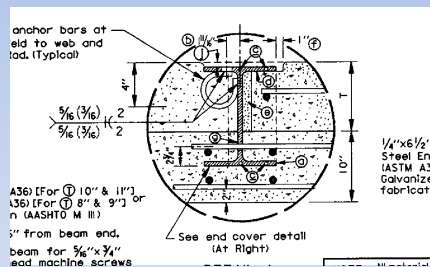


FDR for Subbase

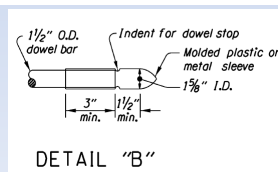
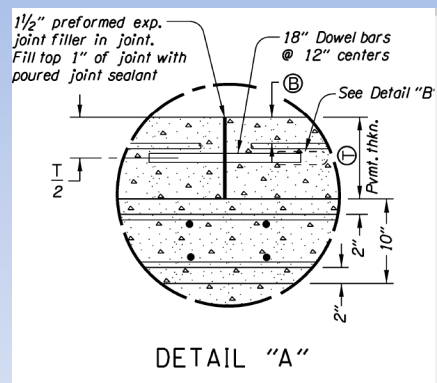


Details – Lessons Learned

Old Terminal Joint



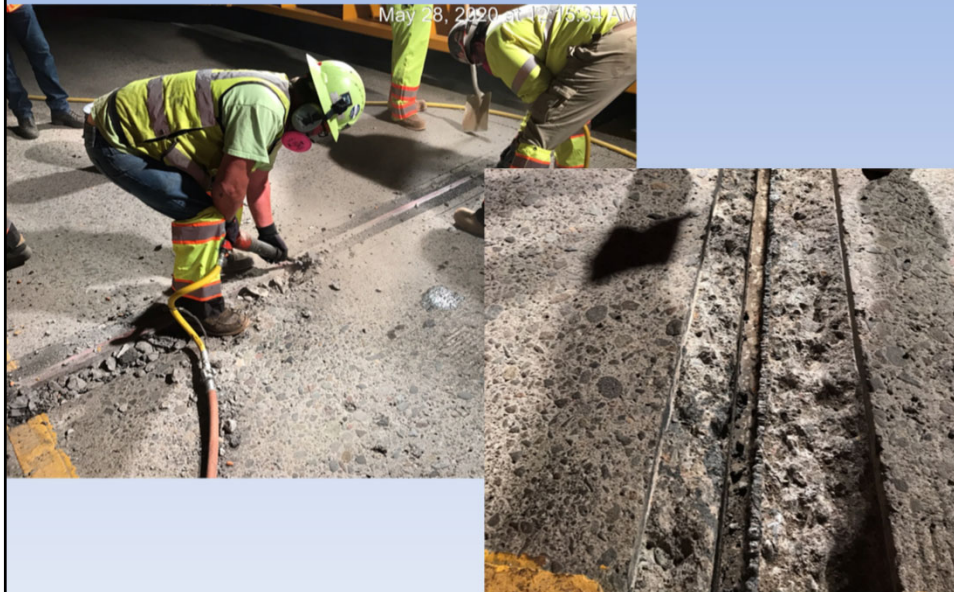
New Terminal Joint



I-Beam Replacement



I-Beam Replacement



I-Beam Replacement



New Terminal Joint Detail



Resources

