High Early Strength Concrete Overlays: Oregon’s Approach

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National Concrete Consortium
September 12th – 14th

Aging Infrastructure

Large number of structures 50 – 70 years old, in fair condition
## National Research - Decks

**National Concrete Pavement Technology Center – Concrete Infrastructure Research Database**

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### Bridge Deck Maintenance

- **Material Selection**
  - Bridge Needs and Service Life
  - Project Scope, Budget, and Traffic Control
  - Material Limitations

### Material Selection

- Polymers
  - Membranes
  - MPCO
  - PPC
  - Structural

- Deck Patching
McKenzie River Highway

Fish Hole Bridge
Br No. 13570
 Constructed 1972
McKenzie River Hwy
Blue River, OR

2012
40 years old

Photo Credit
Travel Oregon - Left
1859OregonMagazine, Mike Putnam - Center
1859OregonMagazine, Greg Vaughn - Right
Structural Overlay

- Need a structural overlay solution
- With or without hydrodemolition
- Standard High Performance Concrete – HPC4500 – ¾”
- 7 day wet cure = long closures
- Temp detour bridges and cross-overs are expensive,
  - Narrow bridges, adjacent traffic concerns
HESC Mix Design

- No existing LMC program
- Nation’s Mini-Mix & CTS Cement
  - CSA cement
  - ¾” aggregate
  - Macro fibers hand broadcasted into mix
  - CTS Low-P admixture, permeability reduction
  - Air entrained – but problematic
  - <1,000 coulombs permeability
  - <0.045% shrinkage
Project Details

Traffic Control
Two weekend full closures
Single lane work zone

Quantities
1000 sqyd deck area
56 cuyd HESC
Acceptance Criteria:

- 175 psi bond strength
- 4000 psi compressive strength
- ¼” over 12’ straightedge
Next Steps:

- Incorporate OSU research into Mix Design Methodology
- Update service life expectations
- Develop construction best practices
- Continue projects on a as-needed basis

Discussion

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