Strategies for Concrete Pavement Preservation

Mark B. Snyder, Ph.D., P.E
PERC, LLC

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Strategies for Concrete Pavement Preservation

- FHWA-sponsored project initiated 2017
- Team: APTech, NCE, PERC
- Objective: Develop guidelines focused on long-term preservation of concrete pavements
  - More effective management of concrete pavements over complete life cycle
    - Designing for long life
    - What treatments to apply and when?
    - Application of meaningful cost evaluation procedures
Background

● Concrete pavements are traditionally designed for limited life
  ➢ Finite design period
  ➢ Threshold levels of distresses at end of design period
● “Preservation” treatments are applied to address distress-oriented structural and functional deficiencies
● Underlying causes of problems may not be addressed
Redefine “Concrete Pavement Preservation”

Strategy of extending concrete pavement service life for as long as possible by arresting, greatly diminishing, or avoiding pavement deterioration processes

Accomplished through:
- Long-life concrete pavement designs
- Concrete pavement restoration treatments
- Overlays to maintain structure and serviceability

IN SUM: Build long-life pavements Proactively preserve pavement
Work Activities

- Literature search/interim report
- Site visits/case studies for 10 projects featuring:
  - LLCP
  - CPR
  - PCC Overlays
- Development of Guideline Documents
  - Preservation Strategies
  - Cost Evaluation
Project Status
Completed Activity: Interim Report

• Contents
  ➢ Concrete pavement preservation concepts
  ➢ Evaluation of existing concrete pavements
  ➢ Strategies for concrete pavement preservation
  ➢ Engineering economic analysis and concepts for strategy selection

• Available at:
Project Status
Completed Activity: Site Visits

- 10 PCC pavement projects with good performance
<table>
<thead>
<tr>
<th>State</th>
<th>Route</th>
<th>Project Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minnesota</td>
<td>I-35 W, Greater MSP</td>
<td>Long-Life Concrete Pavement (LLCP)</td>
</tr>
<tr>
<td>Iowa</td>
<td>US-20, Blairsburg</td>
<td>Concrete Pavement Restoration (CPR)</td>
</tr>
<tr>
<td>Michigan</td>
<td>US-41, Chassel</td>
<td>CPR</td>
</tr>
<tr>
<td>Michigan</td>
<td>US 23, Brighton</td>
<td>Unbonded PCC Overlay (UBOL) of PCC</td>
</tr>
<tr>
<td>Florida</td>
<td>US 1, Edgewater</td>
<td>UBOL of HMA</td>
</tr>
<tr>
<td>Colorado</td>
<td>I-70, Rifle</td>
<td>CPR</td>
</tr>
<tr>
<td>California</td>
<td>I-10, Ontario</td>
<td>CPR (70+ years of service!)</td>
</tr>
<tr>
<td>Washington</td>
<td>I-5, Olympia</td>
<td>CPR (50 years of service)</td>
</tr>
<tr>
<td>Texas</td>
<td>US 281, Wichita Falls</td>
<td>Bonded Latex-Mod CRC on CRCP</td>
</tr>
<tr>
<td>North Carolina</td>
<td>I-85, Durham</td>
<td>UBOL, CPR</td>
</tr>
</tbody>
</table>
I-35W, Richfield, MN  
(Const. 2000)
CPR

US 41, Chassel, MI
(Const. 1958, CPR ~2000)

US 20, Blairsburg, IA
(Const. 1968, CPR 2014)
Serial CPR

I-10, Ontario, CA
(Const. 1947, CPR x 4)

I-5, Olympia, WA
(Const. 1969, CPR 1996 [lane 1], 2010 [lane 2], 2014)
Serial CPR

I-70, near Rifle, CO
(Const. 1975-76, CPR 2003-05, 2014)
PCC Overlays

US 1, Edgewater, FL
(UBOL over HMA, Const. 1988)

US 23, Brighton, MI
(UBOL over PCC Const. 1992)
PCC Overlays

US 281 Wichita Falls, TX
2002 Bonded CRC Overlay of CRCP

I-85, Granville Co., NC
(Unbonded Overlay of CRCP
CRCP Const. 1971
Project Status

Current and Future Plans

- Case study reports on 10 field projects
  - Documenting performance and costs
- Guidelines for concrete pavement preservation (focused on the “what” and “why”)
  - Long-life pavement design and construction
  - Concrete pavement evaluation for feasibility
  - Identification of appropriate treatments
  - Creating composite pavements with overlays
  - Maintaining serviceability through CPR
Project Status
Current and Future Plans

- Cost evaluation guidelines
  - Conventional LCCA and DLMY for project- and network-level analyses
  - Considerations for selecting discount rate
  - Normalization for quality of service (traffic, IRI)

- Case study data trends
  - Value of doing long-life treatments
  - Impact of CPR, overlay timing on treatment cost-effectiveness
Project Timeline

December 2018
Completed Site Visits

April 2019
Submit Case Study Reports

September 2019
Develop Draft Guidelines for Concrete Pavement Preservation
Develop Draft Cost Evaluation Procedures

January 2020
Publish Final Guidelines
Questions?

Kurt Smith
ksmith@appliedpavement.com

Mark Snyder
mbsnyder2@yahoo.com

Tom Van Dam
tvandam@ncenet.com

Tom Yu, FHWA
Tom.Yu@dot.gov