Updates on Rigid Pavement Research

TxDOT Construction Conference
March 20, 2014
San Antonio, Texas

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Texas Tech University
Outline

- Condition of Rigid Pavements in Texas
- CPCD
- CRCP
- Summary
“Good” or Better Ride Scores
(PMIS Ride Score 3.0 or above)

<table>
<thead>
<tr>
<th>Pavement Type</th>
<th>Percentage of Lane Miles</th>
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<tbody>
<tr>
<td>State</td>
<td>80%</td>
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<tr>
<td>ACP 91.19% of Lane Miles</td>
<td>70%</td>
</tr>
<tr>
<td>CRCP 6.80% of Lane Miles</td>
<td>70%</td>
</tr>
<tr>
<td>JCP 2.01% of Lane Miles</td>
<td>20%</td>
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- FY 2009
- FY 2010
- FY 2011
- FY 2012
“Good” or Better Distress Scores
(PMIS Distress Score 80 or above)

Pavement Type

- State
- ACP 91.19% of Lane Miles
- CRCP 6.80% of Lane Miles
- JCP 2.01% of Lane Miles

Percentage of Lane Miles

- FY 2009
- FY 2010
- FY 2011
- FY 2012

TxDOT PMIS
“Good” or Better Condition Scores (PMIS Condition Score 70 or above)

Pavement Type

- State: 91.19% of Lane Miles
- ACP: 91.19% of Lane Miles
- CRCP: 6.80% of Lane Miles
- JCP: 2.01% of Lane Miles

Percentage of Lane Miles

- FY 2009
- FY 2010
- FY 2011
- FY 2012

TxDOT PMIS
CPCD in Texas

• Condition not as bad as CS indicates….
• More use of CPCD expected in the future
• Use of dowels minimizes faulting & keeps relatively good ride score.
• However, if design standards are not followed, or construction quality is compromised, we have a problem……
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<th>Location</th>
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CPCD in Texas

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Challenges

• Construction inspection
GENERAL NOTES

1. CONCRETE SLABS WIDER THAN 10' WITHOUT A FREE JOINT, ARE NOT COVERED BY THIS STANDARD.

2. FOR FURTHER INFORMATION REGARDING THE PLACEMENT OF CONCRETE AND LOAD TRANSFER DEVICES REFERS TO THE GOVERNING SPECIFICATIONS FOR "CONCRETE PAVING" AND "REINFORCING STEEL."

3. DETAILS FOR PAVEMENT WIDTH, PAVEMENT THICKNESS, AND CROWN CROSS SLOPE SHALL BE SHOWN ELSEWHERE IN THE PLANS.

4. THE DETAIL FOR THE JOINT SEALANT AND RESERVOIR WILL BE SHOWN IN CONCRETE PAVEMENT DETAIL, JOINT SEALANT STANDARD (JS-94).

5. PAVEMENT WIDTHS IN EXCESS OF 16' SHALL BE PROVIDED WITH A LONGITUDINAL JOINT (SECTION Z-Z OR Y-Y). THESE JOINTS SHALL BE LOCATED WITHIN 6' OF THE LINE LINES UNLESS SHOWN ELSEWHERE ON THE PLANS.

6. THE JOINT BETWEEN OUTSIDE LANE AND SHOULDER SHALL BE A LONGITUDINAL WARPING JOINT (SECTION Z-Z) UNLESS OTHERWISE SHOWN IN THE PLANS.

7. THE SPACING BETWEEN TRANSVERSE JOINTS SHALL BE 15 FEET UNLESS OTHERWISE SHOWN IN THE PLANS.

8. WHERE A MONOLITHIC CURB IS SPECIFIED, THE CURB SHALL COINCIDE WITH PAVEMENT JOINTS AND MAY BE FORMED BY ANY MEANS APPROVED BY THE ENGINEER.

9. TRANSVERSE CONSTRUCTION JOINTS MAY BE FORMED BY USE OF METAL OR MOULD FORMS EQUAL IN DEPTH TO THE NOMINAL DEPTH OF THE PAVEMENT, OR BY METHODS APPROVED BY THE ENGINEER.


11. MULTIPLE PIECE TIEBARS SHALL BE USED AT LONGITUDINAL CONSTRUCTION JOINTS UNLESS OTHERWISE SPECIFIED IN THE PLANS.

12. THE SAW CUT FOR LONGITUDINAL WARPING AND THE TRANSVERSE CONSTRUCTION JOINTS BE ONE FOURTH THE SLAB THICKNESS WHEN CRUSHED LIMESTONE IS USED AS THE COARSE AGGREGATE.
No Dowel
CRCP in Texas
CRCP in Texas

• Overall, excellent performance
• Could be further improved by……
  – Quality construction
  – Appropriate material (coarse aggregate type)
• Design?
• Repairs/Rehabilitations
CRCP Distress Rate
(FY 10)

- Punchout: 1 per 8.8 lane miles
- Concrete Patch: 1 per 4.6 lane miles
- Asphalt Patch: 1 per 88 lane miles
Large Surface Defects: 46.6%
True Punchouts: 14.2%
Construction Joints: 20.7%
Repair Joints: 18.5%
CRCP in Texas

- Overall, excellent performance
- Could be further improved by…….
  - Quality construction
  - Appropriate material (coarse aggregate type)
- Design?
- Repairs/Rehabilitations
CRCP in Texas

• Overall, excellent performance
• Could be further improved by…….
  – Quality construction
  – Appropriate material (coarse aggregate type)
• Design?
• Repairs/Rehabilitations
Full-Depth Repair of CRCP

• Conduct only when needed. (i.e., when CRCP distress extends through the slab depth)
• If distresses are limited to the top half of the slab, use partial-depth repair.
361.3. Construction.

Epoxy-grout all tiebars for at least a 12-in. embedment into existing concrete. Completely fill the tiebar hole with Type III, Class A or Class C epoxy before inserting the tiebar into the hole.
Epoxy injecting method
361.3. Construction.

tiebars as shown on the plans. Epoxy-grout all tiebars for at least a 12-in. embedment into existing concrete. Completely fill the tiebar hole with Type III, Class A or Class C epoxy before inserting the tiebar into the hole.
Specification Method

Non-Compliance #1

Non-Compliance #2
Summary
- CPCD -

• Challenge for the use of CPCD in Texas is construction inspection.

• Pavement Design Guide, Design Standards, Specifications
  o Dowels (tolerances), Tie Bars
  o Stabilized Base
  o Adequate saw-cut depth
Summary
- CRCP -

- Excellent performance in Texas
- However, most of the distresses related to quality of construction/materials
- Importance of specification requirements for repairs (inspection)