CRCP in Texas

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Pavement Lane Mile (All Types)

Lane Miles by Various Pavement Types in Texas

CRCP Lane Miles

TxDOT adds approximately 400 lane miles annually
**CRCP Age vs. Distress**

[Bar chart showing the total number of distresses per lane mile vs. age of CRCP in years.]

**Classification of TxDOT CRCP Distresses**

[Pie chart showing the percentage distribution of different distress types: Large Surface Defects (46.6%), True Punchouts (14.2%), Construction Joints (30.7%), and Repair Joints (18.5%).]

0-6274 Project Level Performance Database for Rigid Pavement in Texas, Phase II
Project 0-7026
Optimization of Reinforcing Steel in 12” and 13” Continuously Reinforced Concrete Pavement (CRCP)

Are these Punchouts?
What about these distresses?

Horizontal Cracking in CRCP Section
Early-Age Horizontal Cracking

Horizontal Cracking

Horizontal Crack

Rebar Depth
TxDOT Research Project 0-7026

- 9/1/2019 ~ 8/31/2022
- Objective: Identify optimum steel depths for thick (12” and 13”) CRCP.
- Consisted of:
  - Theoretical analysis of structural behavior of CRCP
  - Field experiments with various gages installed in actual CRCP projects
  - Data acquisition and analysis
Field Testing Locations

- El Paso US62/180 July 2021
- Waxahachie IH-35E Apr/May 2021
- Hillsboro IH-35E Aug 2022
- San Antonio IH-10 Mar/Apr 2022

Test Section Plan

Longitudinal Cross-Section View

NOT TO SCALE

Paving Direction

Transition

Gages

13 in

Normal Depth

8.5 in

Upper Depth

8.0 in

Upper Depth (Low CoTE)
Strain Gauge Setup

Active Crack Control
Induced Crack

Horizontal Strains

Vertical Strains
Temperature Gradients

![Temperature Gradient Graph]

- **Temperature (°F)**
  - 40
  - 60
  - 80
  - 100
  - 120

- **Depth from Surface (inch)**
  - 1
  - 2
  - 3
  - 4
  - 5
  - 6
  - 7
  - 8
  - 9
  - 10
  - 11
  - 12
  - 13

- **Time**:
  - 12 AM
  - 3 AM
  - 6 AM
  - 9 AM
  - 12 PM
  - 3 PM
  - 6 PM
  - 9 PM

Strain Gauge and Thermocouple Setup

![Strain Gauge Setup Image]
Hillsboro Early-Age Concrete Horizontal Strain Behaviors

Vertical Strain Behavior (7 and 28 days)
**Vertical Strain Behavior (224 days)**

**Where do we go from here?**

- Based on research findings:
  - Changed CRCP standards
    - Depth of steel for 10.5” to 13” will be 5” from pavement surface
  - Low CTE Table?
    - More evaluation of data needed to determine if Low CTE table can get added back into standard.
- Proposing additional research project to optimize double mat steel CRCP.
Project 5-6910
Implementation of Concrete Overlay Evaluation and Design

JCP Section with Significant Issues
Project 0-7074
Increase the Allowable Content of Recycled Crushed Concrete Fine Aggregate in Class P Concrete
Field Trial

Test Sections

AS-PLANNED

- Test Section 1
- Test Section 2
- Test Section 3
- Test Section 4
- Test Section 5

RIGHT OF WAY

= Solar-powered data acquisition system (for thermal and strain data from vibrating wire gauges)

AS-BUILT

- Test Section 1
  - Control
- Test Section 2
  - 50% ROCFA
- Test Section 3
  - 70% ROCFA

RIGHT OF WAY

= Solar-powered data acquisition system (for thermal and strain data from vibrating wire gauges)
50% RCFA Test Section

- Workability and Finishing
  - No Issues

70% RCFA Test Section

- Workability and Finishing
  - No Issues
**Compressive Strength**

*Field Trial Data*

![Compressive Strength Field Trial Data](image1)

*Previous Lab Data*

![Compressive Strength Previous Lab Data](image2)

**Crack Spacing**

![Crack Spacing Graph](image3)

Days after paving
Questions