CRCP MEPDG (TxCRCP-ME)

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Texas Transportation Short Course 2012
- M = Mechanistic (Based on Engineering)
- E = Empirical (Corrected by Observations)
- P = Pavement
- D = Design
- G = Guide
Too Many Acronyms

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For Continuously Reinforced Concrete Pavements for TxDOT
• TxDOT has used (essentially) AASHTO Pavement design guide
  ◦ Empirically based on jointed pavements constructed in another state in another century
  ◦ Have limited inputs so that traffic has been only real variable
  ◦ Superb performance
    • 30-year design life achieved and surpassed
  ◦ Need for more accurate (cheaper initial cost) design method
Replacing AASHTO ‘93

Previous Work
- 0-1244
  - 13 reports ranging from aggregate properties to pavement performance prediction to modeling conducted mostly in early ‘90’s
- NCHRP 1-37(A) ~2004
  - TxDOT decided not to implement for CRCP
Replacing AASHTO ‘93

Recent TxDOT Funded Efforts
- 0-5832 - TxCRCP-ME Design
- 0-5445/0-6274 – Rigid Pavement Database
- 0-5549 – Horizontal Cracking
- 0-6037 - Alternatives to ACP Subbase 0-6326
- 0-6687 – Minimizing Premature Distress
- 0-5444 – Longitudinal Joint Separation
- 0-6326 – Concrete Pavement Terminals
- 0-1887 - Perf-Based Durability Tests & Specs for CP
- 0-6681 - Optimizing CP Type Based on Agg Avail
- 0-6111 - Treatment for Clays in Conc Agg
- 0-6255 - Use of Man Sands for CP
- 0-6617 - Revamping Agg Requirements for PCC
- Others
• 3-D Modeling

(a) Distribution of principal stress in CRCP with CTE= 4×10^-6/°F (1MPa=145 psi)

(b) Directional vector of principal stress in CRCP with CTE= 6×10^-6/°F
Steel Design

Two Options
- Standard (thin CRCP 0.68%; 0.61-0.63%)
- Low CoTE (thin CRCP 0.58 – 0.60%; 0.55-0.57%)

Ec = 4×106 psi; ac = 4×10^-6/°F; 4th degree gradient; one-mat; steel ratio = 0.6%

Products

0-5549;
0-1700
- **Supporting Layers**
  - 2 historically used (successful!) standard options in Pavement Design Guide
    - 4”HMAC
    - 6” CTB + 1”ACP
  - Need to determine structural/uniformity contributions
  - Need to assess alternatives

- **Design and construction verification process** still being developed
• Material Requirements
  ◦ CoTE
  ◦ Frictional Properties
  ◦ Cleanliness
  ◦ Durability
  ◦ Others
• Function of Specification Requirements and not design inputs
Timetable for Implementation

- Training/Education to start with District Pavement Engineers December – February
- Update of on-line Pavement Design Guide to correspond with completion of initial training schedule
- Full implementation by Spring 2013
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