SCDOT FDR Program

Jay Thompson, PE
State Pavement Design Engineer
SCDOT - Office of Materials and Research
Overview

- Why FDR is a good fit in South Carolina
- History of FDR Program
- Past Procedures
- Moving Forward
South Carolina System

2015 State of the Pavement

- Pavement System
  - 4th Largest in Country
  - 41,377 Centerline Miles

- 90,598 lane miles

- Primaries and Secondaries Carry 70% of Traffic

Lane Mile Breakdown

- Interstate
- Primary
- Secondary FA
- Secondary Non FA

Lane Miles:

- 41,393
- 23,983
- 21,427
- 3795
South Carolina Secondary System

Driving Factors: Initial Construction and Funding for Rehabilitation

December 31, 2015 Data
SCDOT FDR
Program Began
1994
SC Route 97 (1994)
SC Route 97 (2013)

9 Inches CMRB, 225 psy Intermediate, 175 psy surface
Growth of the Program Over 20 Years

- Modest Beginnings

- Within in the first 10 years FDR became recognized across the state but was still less than 100 lane miles per year.

- By the year 2011 the use of FDR was accelerating beyond 100 lane miles per year.

- Due to Funding and Program needs this fluctuated between 100 and 200 lane miles per year until 2015 when the program grew by more than 3x to 600 lane miles per year.
Current Program

- During 2015 and 2016 the program has remained relatively constant at more than 600 lane miles

- 4,494,223 square yards let in 2015

- Our cost is approximately $5 per square yard

- Overall the program has been very successful

- Some issues with quality as new competition has entered the market and application of FDR has significantly increased
Current Program – Contract Development

- All Projects are Prioritized by ACT 114
  - Traffic, Truck%, Condition, Etc..

- Districts choose FDR candidates
  - Condition, Traffic, Project Size
  - Determine the Percentage of FDP Required, 15% is a trigger or judgment of Resident Engineer
Current Program – Pavement Design done by Districts

- Pavement Design Estimator Inputs
  - Existing Pavement Structure is estimated from plans
  - Traffic Data from ITMS

- Pavement Design Estimator Outputs
  - Structural Number Estimations (0.26 for FDR)
  - 2 Design Alternatives
    - Overlay
    - FDR
Current Program – Mix Design

- Contractor performs mix design
  - Representative Samples?
  - Samples prepared at 3%, 6% and 9%
  - Design Strength is 600 psi
    - Not always achieved

- Treatments
  - 6, 8, 10 and 12 inches of mixing
  - Generally cure with single treatment (chip seal)
  - Mill treatment off and overlay with 125 to 400 psi of HMA
  - Occasionally place triple treatment as final riding course
Moving Forward - Improving the Program
Moving Forward

- **Contract Development**
  - Projects moving into PreConstruction from Maintenance
  - Increased efforts during investigation and candidate selection
  - Coring, DCP and hand auger borings to be provided in contract documents

- **Pavement and Mixture Designs**
  - Utilize lessons learned from mechanistic design studies to optimize cement usage
    - Increase mixing depths and reduce cement content (effective 2016)
  - Complete in house research
    - Gradation – Compaction – Moisture – Cement Content - Compressive Strength - Durability
Moving Forward

• Growth
  • Education of SCDOT construction personnel and contractors to help improve quality with the expectation of industry turnover and growth

• Optimization
  • Investigate procedures and specifications to allow for increased use on higher volume roadways
  • Complete research and implement into MEPDG

• End Result
  • Keep things reasonable for technicians and contractors. Find key factors to focus on.
  • Continue to investigate end result specification
  • Maintain a good cost benefit ratio for SCDOT
Questions