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
- Current Procedures
- On-Going Research and the Future of FDR in SC
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: 3795
- Primary: 23,983
- Secondary FA: 41,393
- Secondary Non FA: 21,427

Lane Miles
South Carolina Secondary System

Driving Factors: Initial Construction and Funding for Rehabilitation

December 31, 2015 Data
South Carolina Primary System
SCDOT FDR
Program Began
1994
SC Route 97 (1994)
SC Route 97 (2016)

8 Inches CMRB, 225 psy Intermediate, 175 psy surface
Growth and Current FDR Program
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.
Recent Program Summary

- During 2015 and 2016 the program has remained relatively constant at more than 600 lane miles. 2017 saw a decline due to design procedures.

- 4,494,223 square yards let in 2015
- 4,989,643 in 2016
- 3,788,751 in 2017

- 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
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
  - List of candidates is provided to OMR for investigation and design.
Investigation and Pavement Design

- Investigation of existing conditions
  - Confirmation of reclamation as the proper treatment.
  - Thickness of existing pavement structure.
  - Encountered roads that are only top down cracking and changed project scope to mill and overlay.
  - Encountered excessive asphalt thicknesses that would be best to mill prior to Reclamation.

- Pavement design recommendations are provided by OMR.
Specifications and Construction

- New specification focuses on pulverization, cement mixing and moisture.
  - Requires contractor QC plan and test strip during construction.

- Contractor performs mix design
  - Samples prepared at 3%, 6% and 9%
  - Design Strength is 450 - 600 psi
    - Not always achieved

- Treatments
  - 8, 10 and 12 inches of mixing. Mostly 10’s and 12’s
  - Generally cure with single treatment (chip seal)
  - Mill treatment off and overlay with 175 to 400 psi of HMA
  - Occasionally place triple treatment as final riding course
On Going Research - Improving the Program by Looking at the Past
Past Performance

- 17 existing Roads have been investigated so far.
Past Performance – Shrinkage Cracking
Structural Coefficient of 12 Roads

CMRB Relative Strength Coefficient

Percent of Tests Exceeding

Relative Strength Coeff.
Future of FDR in SC

- Synthetic Reclamation
- MEPDG Calibration of Semi-Rigid Model
- Use on High Volume Roadways
  - Included on several recent Interstate Widening and Reconstruction jobs.
- Dealing with airborne silica dust.
Questions