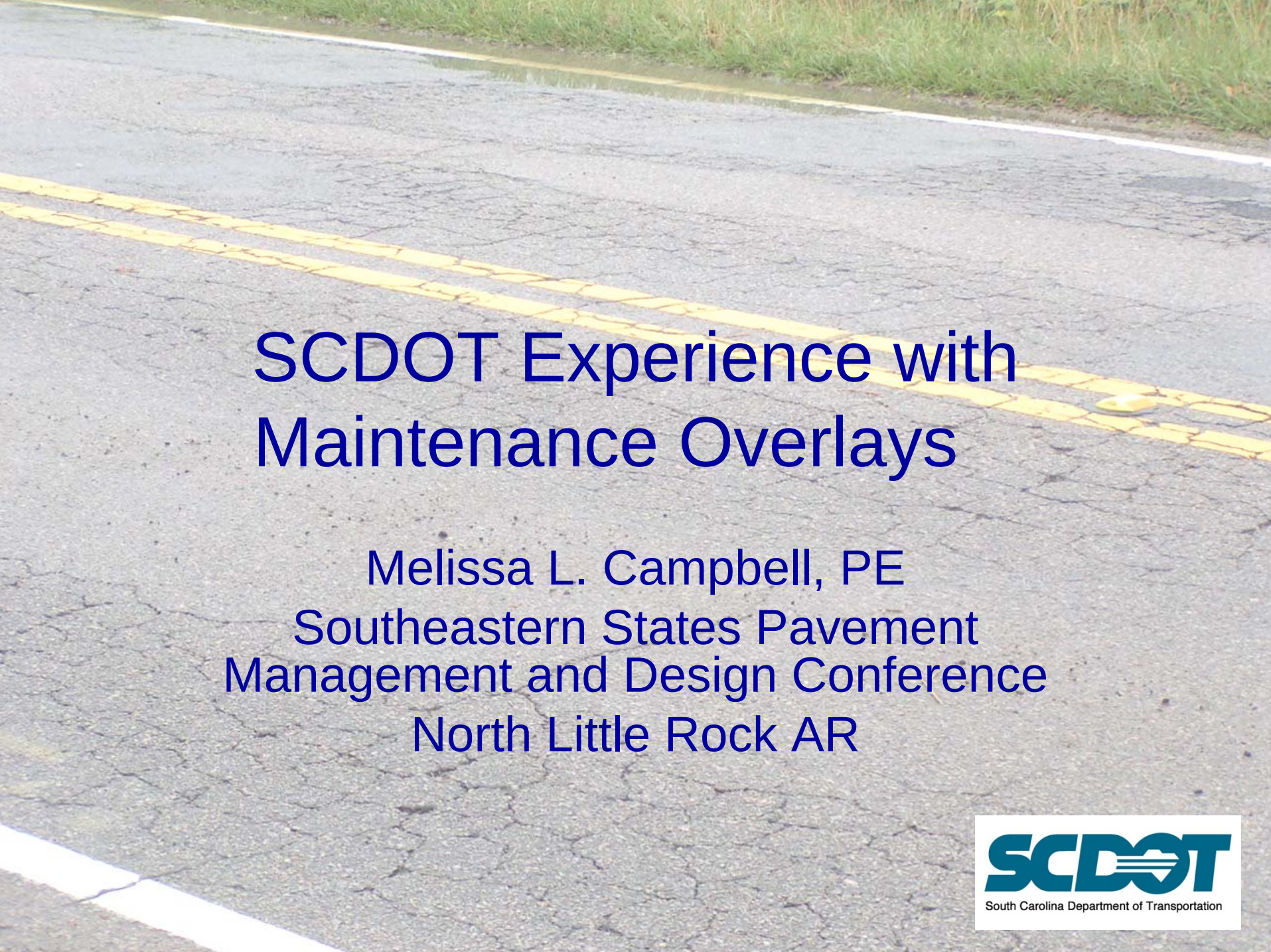

SCDOT Experience with Maintenance Overlays

Melissa L. Campbell, PE

Southeastern States Pavement Management and Design Conference

North Little Rock AR

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SCDOT Background

- SCDOT maintains 41,475 lane miles of roads
- 4th largest ** or 5th largest state-owned system in the US*
- SCDOT Ranked 2nd in overall performance and 1st in total state source disbursements($14,580) per mile of responsibility*

*(FHWA)
**(Reason Foundation Report)

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SCDOT System Facts

- Interstate 843 miles
- Primary 9,483 miles
- Secondary 31,150 miles
- Total System 41,475 miles
- Non-Federal Aid 20,877 miles
- Percent NonFA Eligible Roads 50.34

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Funding Issues

- SCDOT has the 4th lowest Motor Fuel User Fee at 16.75 cents per gallon
- Last increase to user fee was in 1987

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Funding Issues

- State Source funding in 2008 is approximately $435 million but $106 million is needed for Federal Match Funds
- As Federal Funding has increased, so has dollars needed for FA Match
- Maintenance Funds have been depleted by this need

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Weather Issues

- Southeast USA in a drought over the last decade
- Officially still in a drought
- Rainfall has increased in last several years

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Traffic Issues

- USA more and more a trucking economy
- SC and Georgia ports
  - Overweight trucks
- Limited state funds for load limit enforcement

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Where we are now

- Our system has deteriorated
- Recent news release estimated $22 billion shortfall in highway funding
- Agency was restructured by a 2007 state law

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Where we are now

- New state law requires selecting all projects using certain criteria at a minimum:
  - ADT
  - Truck numbers
  - Maintenance Costs
  - Pavement Condition
  - Local Significance
- Management decision to perform designs on all overlays, even maintenance overlays

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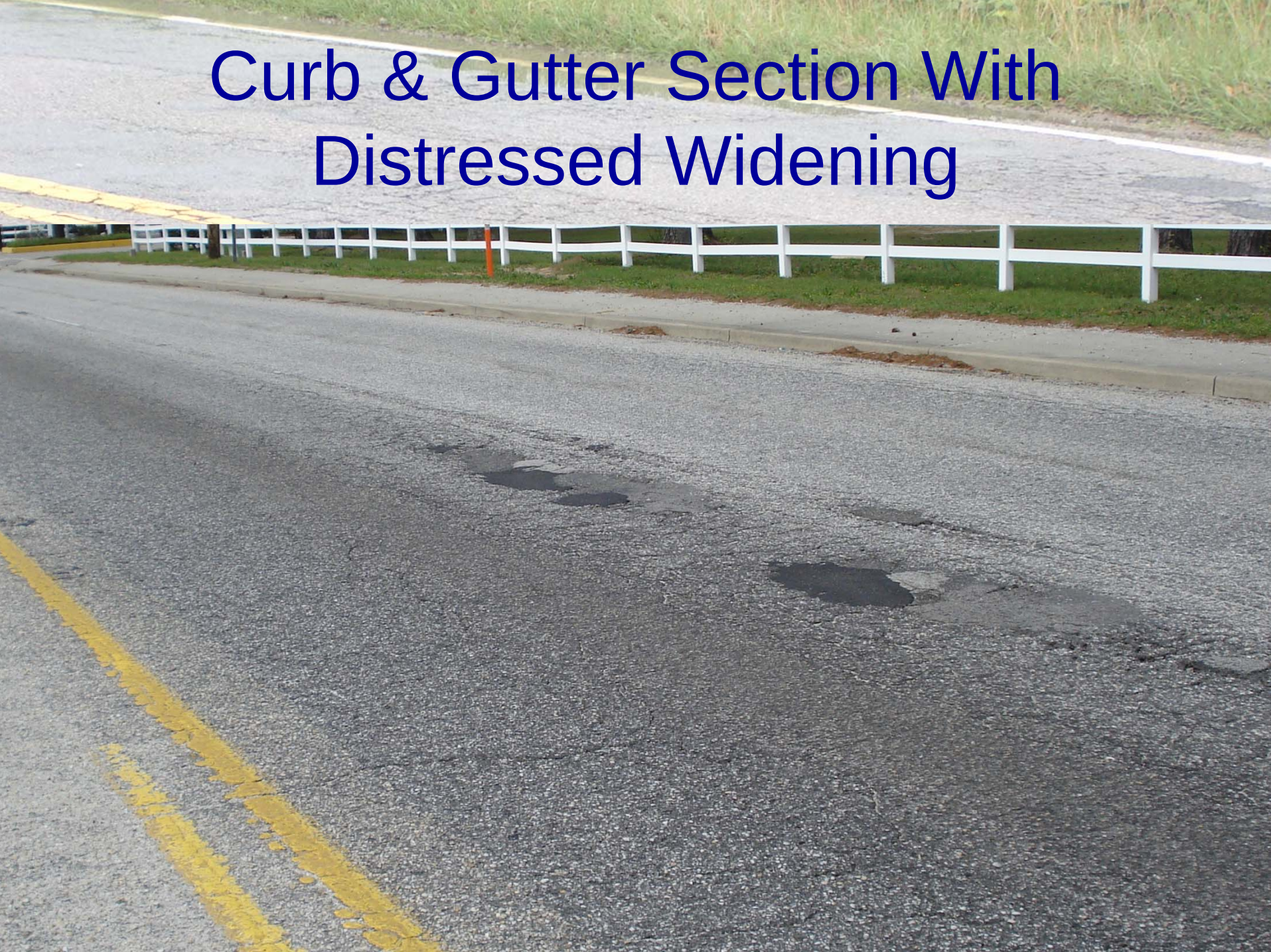
Typical Distress

Curb & Gutter Section With Distressed Widening



Age and Load Related Distresses

SCDOT Pavement Design Section

- Contained in The Office of Materials & Research
- State Pavement Design Engineer
  - Also supervises Pavement Evaluation, Soils Testing & Subsurface Investigation
  - Pavement Design Engineer
    - Supervises Cement Lab, Chemistry Lab, & Traffic Markings Coordinator
    - Pavement Design Coordinator
- Typically design 40-60 projects per year

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Existing Maintenance Overlay Process Prior to 2007

- Money allocated to each county
  - 46 counties
  - 7 districts
- Resident Maintenance Engineer chose resurfacing candidates and assigned an overlay thickness based on their own criteria
- This created multiple approaches to resurfacing selections
  - Not all bad
  - Some choices influenced by non-engineering factors
- Tendency to spread money as thin as possible
- Some roads failed within 3 years of overlay

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New Process

- Rank all FA roads using formula based on criteria from the new law
  - PQI
  - IRI
  - ADT
  - Truck percentage
  - Maintenance $
  - Local Significance
- Divide list into three categories:
  - Preservation
  - Rehabilitation
  - Reconstruction

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Criteria Used

- From Pavement Management System:
  - PQI
  - IRI
  - ADT
- From Traffic Data Services:
  - Functional Class
    - Used to estimate truck %
- From HMMS:
  - Maintenance Costs
- From Resident Maintenance Engineer
  - Local Significance

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Maintenance Candidate Selection

- List was broken into three categories:
  - Reconstruction
    - Lowest scoring sections
  - Rehabilitation
    - Middle scoring range
  - Preservation
    - Highest scoring sections
- Funds were allocated for each category
- Roads were selected until funds depleted
  - Based on rough cost estimates
- Ranked on a statewide basis

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Provided to Pavement Design Section

- Listing of 296 sections for pavement design
  - Vast majority Primary routes
  - A few FA secondary routes
  - Shortest section was 0.06 miles
- List had the following information:
  - County
  - Road Number
  - Beginning and Ending Milepoints
  - ADT
  - Functional Class
  - Treatment Type (Preservation, Rehabilitation, or Reconstruction)

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Requested by Maintenance

- Full pavement design
  - FWD and coring
  - Site Visit
  - Design
- Data provided early October
- Designs needed in three stages:
  - December, January, February

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Work Plan

- Negotiate contract modifications for 4 on-call consulting firms with pavement design experience
- Negotiate contract modifications for on-call firms to perform coring
- Train consultants to use our process
  - Easier to review designs
- Distribute work
- Perform FWD and some coring in-house
- Review designs
- Submit to districts

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Challenges to Process

- Low staffing level
  - Pavement Design Coordinator position was vacant
- No maps provided
- Short sections needed to be combined
- Other work

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Challenges to process

- Sorting out road sections
  - Many contiguous sections were not combined
  - Some roads had two or more treatments proposed
  - Producing maps
- Dividing work into logical groups
  - Tried to eliminate duplication of travel
- Time, time, and time

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Design Issues

- Assumed values used for some data
  - SSV by county (some counties split)
  - Truck % by functional class
- Thick overlays
- Resistance to change
  - Funding still an issue
- Curb and gutter sections
  - Mill and fill not enough

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Solutions to Challenges

- Training course for consultants
  - Computer training
  - Field training
  - Phone contact and visits for follow up
- Lots of hours
- Drafted help from other sections
- Unfortunately, neglected other work
- Learned new techniques
  - ITMS

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Solutions to Design Challenges

- Curb and gutter sections
  - Let two test sections using roller compacted concrete
  - Both will have 10 inches RCC and 2 inches of HMA
- Thick overlays
  - Encouraged using full depth reclamation
    - FDR with Portland Cement
    - One test section of FDR using asphalt emulsion

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Results of Program

- 63 roads designed by consultant
  - Reviewed, condensed and edited by SCDOT staff
- 21 designed by in house staff
- Designs delivered by March 15

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Secondary Resurfacing

- Developed computer application using MS Access
- Used same soils data as for FA Roads
- User Inputs:
  - ADT & growth rate
  - truck percentage & functional class
  - pavement type
  - pavement thickness, age and condition
  - percent full depth patching required
- Returns recommendation for overlay and /or FDR

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Lessons Learned

- Allow more time
- Start with good information
- Educate your customers
- Assumptions increase pavement thickness

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Questions?
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