Integration of Maintenance and Pavement Management Systems in North Carolina

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Outline

• Background
• Challenges and Objectives
  – General and Specific
• Issues and Solutions
  – Specific Highlights
• Potential Benefits
• As far as investment goes…

“The Nations highways are valued at more than $1.75 trillion”

“Nearly $130 billion is invested annually to preserve and improve the highway system”

(FHWA Office of Asset Mgt)
Some Perspective...

• NCDOT has one of the largest state DOT maintained road networks in the country
  – 78,615 road miles
  – 158,592 paved lane miles
  – 6,644 miles of unpaved roads
  – 17,756 structures
  – 78.8 M sf bridge deck area
PMS Background

• Collected Data
  – Annual Interstate Pavement Condition Survey
  – Bi-annual Pavement Condition Survey
  – Maintenance and Construction Histories
  – Profile/Roughness Data
  – Skid Resistance
PMS Background

• Pavement Condition Survey
  – Windshield survey of all NCDOT maintained paved roads in NC
  – Huge effort on the part of Division and PMU staff
  – Conducted since 1982 (20+ yrs of data)
  – Survey results are one component used in the funding equation that assigns maintenance dollars statewide
Analysis

- Based on Decision Trees
- Performance Models will be generated statistically from condition data
- Will use multiyear optimization to generate long term strategic recommendations/plans
- These recommendations/plans will be closely integrated with field planning
Bi-annual Maintenance Condition Survey

- 21 Condition Ratings on 6 major Asset Types
  - Pavement (from Pavement Survey)
  - Unpaved Shoulders and Ditches
  - Drainage
  - Roadside
  - Traffic Control Devices
  - Environmental

- Also huge effort on the part of Division staff
- Survey results are used in allocations of maintenance dollars
• Analysis
  – Condition survey together with expenditures allows about 12500 individual performance models to be maintained
    • These are generated for each combination of Defect/County/Road System
    • They give the expected ‘average percent failed’ for varying funding levels
    • Automatically calculated
• Analysis (cont.)
  – Currently able to use these performance models
    • To generate ‘Ideal’ recommendations based on optimization analysis (LOS Target)
    • To generate ‘Baseline’ recommendations (Allocation/Budget target)
• Analysis (cont.)
  – Best (most efficient) LOS for a given budget
  – Best (most efficient) mix of work for a given LOS
General Challenges

• What does “Integration” mean anyway?

• Do we try to integrate ALL Maintenance activities with major Pavement rehab. and reconstruction?

• Decided to break up into Pavement vs Other Roadway activities…
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