NCDOT’s Improvements in Operational Performance Reporting

Jennifer P. Brandenburg, PE
State Asset Manager

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Outline

• Legislation
• Measuring Condition
• Measuring Performance
• Measuring Efficiency
• Lessons Learned
• What’s Next
NC State Highway System

- 79,578 road miles
- 163,176 paved lane miles
- 4,251 miles of unpaved roads
- 18,048 structures
- 95.1 M sf bridge deck area
NCDOT Central Organization

• Asset Management Division
  – Fleet and Materials Management
  – Management Systems and Assessments
  – Pavement Management
  – State Maintenance Operations

• Purpose
  – Assist Central HQ in the oversight and implementation of statewide programs
  – Provide technical support for the 14 divisions in their daily operations
  – Provide condition and performance data to various stakeholders groups
  – Guide the Agency in the implementation of asset management principles
Outline

• Legislation
• Measuring Condition
• Measuring Performance
• Measuring Efficiency
• Lessons Learned
• What’s Next
Stakeholders

Governor
Legislature
Transportation Oversight
Board of Transportation
Field Divisions
Public
1997 Legislation

• Cost to meet & sustain established performance standards:
  – Routine maintenance & operations
  – System preservation
  – Pavement and bridge rehabilitation

• Project system condition and optimal funding for a 7 year plan
Condition Reporting (circa 2012)

### 2012 Report on the Condition of the State Highway System

<table>
<thead>
<tr>
<th>Roadway</th>
<th>Interstate</th>
<th>Primary</th>
<th>Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELEMENT</td>
<td>PERFORMANCE MEASURE</td>
<td>2012 State Average</td>
<td>2012 Target</td>
</tr>
<tr>
<td>Surfaced Stairways</td>
<td>No dropoff greater than 5 inches and no dropoffs higher than 5 inches</td>
<td>90</td>
<td>90</td>
</tr>
<tr>
<td>Roller (Maintenance)</td>
<td>No breakups, cracks, or nonfunctioning catchbasins</td>
<td>95</td>
<td>95</td>
</tr>
<tr>
<td>Shoulder (Maintenance)</td>
<td>Greater than 12.5% terminus opened</td>
<td>90</td>
<td>90</td>
</tr>
<tr>
<td>Overflow Pipe (Damaged)</td>
<td>No damage or structural deficiency affecting functionality</td>
<td>90</td>
<td>90</td>
</tr>
<tr>
<td>Guard Rail (Damaged)</td>
<td>No damage from greater than 2.5 inches for a Steel Guard Rail</td>
<td>90</td>
<td>90</td>
</tr>
<tr>
<td>Barriers (Blacked or Damaged)</td>
<td>Lanes and adjacent lanes of traffic marked with 100% solids and outlet of barrier are not damaged, and gaps are preserved and not broken</td>
<td>90</td>
<td>90</td>
</tr>
</tbody>
</table>

### Bridges

<table>
<thead>
<tr>
<th>Bridges</th>
<th>Interstate</th>
<th>Primary</th>
<th>Secondary</th>
<th>Statewide</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete</td>
<td>% of deck rating less than or equal to 6</td>
<td>65</td>
<td>65</td>
<td>65</td>
</tr>
<tr>
<td>Steel Plates</td>
<td>65</td>
<td>NA</td>
<td>65</td>
<td>65</td>
</tr>
<tr>
<td>Open Golf Tee</td>
<td>Concrete</td>
<td>65</td>
<td>NA</td>
<td>65</td>
</tr>
<tr>
<td>Steel Plates</td>
<td>65</td>
<td>NA</td>
<td>65</td>
<td>65</td>
</tr>
<tr>
<td>Concrete</td>
<td>% of superstructure rating less than or equal to 6</td>
<td>65</td>
<td>65</td>
<td>65</td>
</tr>
<tr>
<td>Steel Plates</td>
<td>65</td>
<td>NA</td>
<td>65</td>
<td>65</td>
</tr>
<tr>
<td>Concrete</td>
<td>65</td>
<td>NA</td>
<td>65</td>
<td>65</td>
</tr>
<tr>
<td>Steel Plates</td>
<td>65</td>
<td>NA</td>
<td>65</td>
<td>65</td>
</tr>
</tbody>
</table>

### Projected Pavement Condition Based on Funding

![Graph showing projected pavement condition based on funding](image)

**Figure 5 - Projected Roadway Level of Service Declines from an Overall Grade of 84 to 76**
2014 Legislation

• Cost to meet & sustain established performance standards
• Project system condition and optimal funding for a 7 year plan
• List most deficient pavements and bridges
• Identify targeted LOS by activity
• Congestion & reliability statistics
• Project delivery rates
• Field division staffing
2014

Percentage of good primary pavements up 8%
Percentage of good secondary pavements up 3%
Crash fatality rates drop 22%

Bridge condition is down at least 4%

From 2004 – 2014:

Pavement condition increases each year

2014 Division LOS - Secondary System

NCDOT MAINTENANCE AND OPERATIONS
Performance Analysis Report

2014
Outline

• Legislation
• **Measuring Condition**
• Measuring Performance
• Measuring Efficiency
• Lessons Learned
• What’s Next
Measuring Condition

Bridges

Pavements

Roadsides
Changing Measures

- Mowing
- Litter
- Fences
- Incident Response
- Snow & Ice
Measuring Condition

- Maintenance scorecards
- Weighted elements
- Decision making tool
- Established and modified by work groups
# Measuring Condition

## (Infrastructure Health Index)

**STATEWIDE – ALL SYSTEMS**  
**EXISTING INFRASTRUCTURE HEALTH WEIGHTED BY VMT (80% AND LM (20%))**  

## Table: Infrastructure Health Index

<table>
<thead>
<tr>
<th>System</th>
<th>VMT %</th>
<th>Lane MI</th>
<th>Factor</th>
<th>% Good</th>
<th>LMG</th>
<th>Score</th>
<th>Weight Value</th>
<th>Overall</th>
<th>ALL</th>
<th>EXIST</th>
<th>TOTAL IHCS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interstate</td>
<td>45</td>
<td>5,038</td>
<td>36.59</td>
<td>84.9%</td>
<td>4,277</td>
<td>31.06</td>
<td>80%</td>
<td>40</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary</td>
<td>30</td>
<td>35,640</td>
<td>28.15</td>
<td>66.1%</td>
<td>23,568</td>
<td>18.61</td>
<td>20%</td>
<td>25</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary</td>
<td>25</td>
<td>131,074</td>
<td>35.26</td>
<td>67.5%</td>
<td>88,475</td>
<td>23.80</td>
<td></td>
<td>35</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>171,752</td>
<td>35.26</td>
<td>67.5%</td>
<td>88,475</td>
<td>23.80</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Composite Values

- **PAVEMENTS:** 29.4
- **MCA:** 21.8
- **BRIDGE HEALTH INDEX:** 24.0

**Rolling it all up**
Outline

- Legislation
- Measuring Condition
- **Measuring Performance**
- Measuring Efficiency
- Lessons Learned
- What’s Next
1997-2013 Performance

- Employees
- Management
- Legislature
- Governor
- Public
2014 Performance Measurement

- Compare field divisions:
  - Staffing numbers
  - Program delivery
  - Cost of delivering maintenance
  - Indirect costs
  - Project delivery rates
- Explain significant divisional differences
Say What????

- 19 new operational measures
- Lots of management system data
  - AMS (PMS, MMS, BMS)
  - HiCAMS
  - SAP
  - TIMS
- No single owner of the data
- No current reporting mechanisms
- No common “language”
Outline

- Legislation
- Measuring Condition
- Measuring Performance
- **Measuring Efficiency**
- Lessons Learned
- What’s Next
Technology

- Mobile data collection
- GIS enabled database
- Handheld devices
- ArcMap routing
- Cameras
Tracking Division Efficiency

- Culture shift
  - Central Units
  - Field Divisions
- Broken silos
- Changes in work function reporting and monitoring
- Field training
Outline

• Legislation
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• Measuring Performance
• Measuring Efficiency
• Lessons Learned
• What’s Next
Setting Priorities

• Stakeholders – External
  • Legislators, Public, etc.

• Stakeholders – Internal
  • Management

• Other – Safety, Funding, appearance, etc.
Lessons Learned

• Ahead of MAP-21
  – Setting the pace
  – Bleeding edge
• Communication!
• It’s a journey
• Drowning in Data
• Use technology to your advantage
Outline

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HB 927 “The Good Roads” Bill

- Responsiveness
  - Respond to customers = 10 days
  - Patch potholes = 2 days

- Efficiency
  - Average unit prices (10% report)

- Performance
  - Job satisfaction survey

- Report

- Restructure
MAP-21

• National performance measures
• Greater accountability
• Greater transparency
• “We can’t do it like we’ve always done it”