ASSET MANAGEMENT
WHAT IS IT AND WHY SHOULD YOU CARE?

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U.S. Department of Transportation
Federal Highway Administration
Presentation Outline

• What is Asset Management
• NCDOT Overview
• Drivers for Change
• Asset Management Approach
• Linkage to NCDOT Mission
• Next Steps & Research
• Lessons Learned
National Statistics:

3,963,262 miles of Roads
590,685 Bridges
The Old Approach

- Limited Preservation
- Underestimated Use
- Bought Locally
- Repaired Worst First
- Lowest Initial Cost
- Limited Design Life
- Limited Economic Analysis
- Insufficient Funds
Asset Management
The New Approach

- Assets Viewed as Utilities
- Investments in Assets Rather than the Traditional Public Idea of Mere Expenditures of Funds
- Preservation & Life cycle cost
Changing the culture from “maintenance” to “asset management”
How Does Transportation Asset Management Work?

• Decisions are based on **accurate data**, and sound engineering and economic analysis
• Improved decision-making supported by policies, **performance-based goals**, performance measures, and appropriate service levels
• **Long-term** view of assets
• More robust monitoring and **management systems**
Transportation Asset Management

RESOURCES

- Preservation
- Operations
- Capital Improvement
- Safety, Etc.
Goals and Objectives

Analysis of Options and Tradeoffs
Preservation, Operations, Capacity Expansion

Decision-Making & Resource Allocation

Implementation

Monitoring and Performance Measures

Overview

Inventory and condition assessment

Policies

Budgets

Expectations

Feedback
What Makes TAM Strategic?

- Focus on the strategic goals of the agency, performance measures, and system performance
- All assets considered comprehensively
- Tradeoff analysis and life cycle performance used to support decision making
- Apply economics, business and engineering principles, needs assessment, and risk assessment to manage assets and evaluate tradeoffs
Why is Data Important?

- Asset management efforts are data-driven.
- There should be a strategic plan for data acquisition and storage.
- Data should have a clear purpose and be directly linked to AM decision making.
- Data acquisition can be expensive – collect only what you need.
- Collect and update data cost-effectively.
Why is Data Important?

• Poor quality data may be worst than no data at all
• Data collection should be automated as much as possible and accessible to all parties
• Data should be viewed as a corporate asset and data collection process seen as an important decision support function
North Carolina Experience
North Carolina – Mountains to Sea
$3.9 Billion Transportation Budget
NCDOT Facts

- 9.5 Million residents
- Supports 74 public airports
- 2 Passenger train routes
- Statewide bicycle routes
- 7 Coastal ferry routes
- 8,800 Traffic Signals
- 25,000 heavy equipment, acquisition cost $633 M
- 79,800 road miles
- 156,000 paved lane miles
- 4,600 unpaved road miles
- 18,000 structures
- 72.4 Million SF bridge deck
- $3.9 Billion Transportation Budget
NCDOT- Div. of Highways

Field Operations
14 Highway Divisions
Responsible for carrying out NCDOT’s Construction & Maintenance Programs

Asset Management
5 Central Units (BMU, PMU, Secondary Roads, SRMU, Equipment & Inventory)
Technical support, Program Management in support of the Divisions
<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>MQA NHI Class</td>
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<tr>
<td>1998</td>
<td>Legislation Need Based Report</td>
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<td>2001</td>
<td>Implemented Modern MMS</td>
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<td>2003</td>
<td>Operations Retreat</td>
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<td>2004</td>
<td>Long Range Transportation Plan</td>
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<tr>
<td>2005</td>
<td>Hired McKinsey &amp; Company</td>
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<td>2006</td>
<td>Implemented New NCDOT Operation Performance Measure Workshop II</td>
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<td>2007</td>
<td>Workshop I</td>
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<td>2008</td>
<td>New Governor and Administration</td>
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<td>2009</td>
<td>Established Pavement Preservation Engineer</td>
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*Timeline of Evolution*
Why Change?

- Aging Highway System
- High Growth State with Capacity needs
- Traffic growth
- System growth
- Heavier and more trucks
- Funding Constraints
- Higher Customer Expectations
- Younger Managers
2004 What do we want to do?

- Move NCDOT from a reactive organization to an outcome based organization
- Clearly define mission and expectations for NCDOT and its employees
- Operational priorities consistent with Strategic Plan
- Use appropriate LOS measures as defined by the Strategic Plan
- Develop management tools and systems to measure outcomes and performance and make appropriate adjustments
- Management flexibility with accountability
2005 What Did We Do?

• Committee and Workgroup members for establishing Performance Measures:
  – Steering committee- Chief Engineers office Division Engineers, & FHWA
  – Functional Area Workgroups Established - Division Engineers and Unit Head Co-Chairs, with Assistant Division Engineer, Assistant Unit Head and FHWA staff members
Performance Based

- Performance Measurement:
  - Clearly defines organizational objectives or outcomes
  - Uses data/statistical evidence to determine progress toward established goals/outcomes
  - Measures efficiency, effectiveness of organization’s programs and operations (condition, quality, timeliness, reliability, etc.)
  - Simple, understandable, logical, repeatable
  - Shows a trend over time
Equipment Performance Measures – Initial effort

- % of Equipment with PM’s accomplished on time
- % of Fleet Depreciated out
- % of time equipment is used – Utilization Rate
<table>
<thead>
<tr>
<th>Goal</th>
<th>Metric</th>
<th>Metric Definition</th>
<th>Target</th>
<th>Data Source</th>
<th>Sub. Wt.</th>
<th>Wt (%)</th>
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<tbody>
<tr>
<td>1</td>
<td>Crash Rate</td>
<td>Reduce 5 Yr. Statewide Avg. (Crash Rate per 100M VMT)</td>
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<td>Traffic Eng.</td>
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<td>2</td>
<td>System Reliability</td>
<td>Composite</td>
<td></td>
<td></td>
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<td>5</td>
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<tr>
<td></td>
<td>A) Incident Clearance</td>
<td>% of Incidents Cleared within 90 Minutes of Standard</td>
<td>70-85%</td>
<td>TIMS</td>
<td></td>
<td>1.5</td>
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<td></td>
<td>B) Signal Timing and Maintenance</td>
<td>% of Signals Meeting Timing and Maintenance Standards</td>
<td>80-94%</td>
<td>Signal Mgmt. System</td>
<td></td>
<td>3.5</td>
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<tr>
<td>3</td>
<td>Infrastructure Health and Performance</td>
<td>Composite</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td>A) Infrastructure Health</td>
<td>Improve Index Score (3 year avg.) toward Goal</td>
<td>68-72</td>
<td>Asset Management</td>
<td></td>
<td>28</td>
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<tr>
<td></td>
<td>B) Facility Health</td>
<td>Statewide Avg. Condition Scores of Rest Areas and Welcome Centers</td>
<td>90-92</td>
<td>Asset Management/REU</td>
<td></td>
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<td></td>
<td>C) Construction Quality</td>
<td>% of Projects Meeting Construction Quality Index Standard</td>
<td>70-85</td>
<td>Construction Unit</td>
<td></td>
<td>8</td>
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<tr>
<td>4</td>
<td>Programs/Projects/Services Meeting Standards</td>
<td>Composite</td>
<td></td>
<td></td>
<td></td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>A) Projects and Programs on Schedule</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>1) % Central Let Projects Completed on Time</td>
<td>70-85%</td>
<td></td>
<td>HICAMS</td>
<td></td>
<td>6.4</td>
</tr>
<tr>
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<td>2) % Div. Let/Built Projects Completed on Time</td>
<td>70-85%</td>
<td></td>
<td>SAP</td>
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2009 - New NCDOT

NCDOT Transportation Reform - Five Year Work Program Briefing

September 2, 2009
Alignment & Linkage

Transportation Reform (Plan Components)

- NC Transportation Plan (20 Year)
  - Documents the mission & goals, objectives and strategies of the Department
  - Guides investment decisions

- NCDOT Program and Resource Plan (10 Year)
  - Allocations of funds between programs (Highway, Rail, Aviation, Public Transportation, Ferry, Bicycle and Pedestrian, etc.)
  - Programs and projects evaluated and prioritized based on objective criteria

- NCDOT Work Program (5 Year)
  - Comprehensive work plan that guides the daily activities of Departmental staff
  - Reliable, stable and fiscally constrained
Results, Benefits and Expectations

- Uniformly acquired, maintained & operated Assets
- Data drives decision making
- Shift to Outcome Based approach with clear goals
  - Move from a reactive to a planned approach
  - Increased focus on preventive maintenance
  - Agree on Target LOS
  - Emphasis on planning & scheduling
- Highest & best use of resources
- Clearly defined performance expectations for all employees
- Increased accountability and flexibility – let managers manage
- Challenging and rewarding workplace
Next Steps! – Some Research

- Fleet Optimization Study
  - Initiated a Fleet Management Study by East Carolina University

- Objectives
  - Develop Methodology for 6 classes of equipment
  - Appropriate rate of depreciation
  - Appropriate disposal point
  - Appropriate level of utilization
  - Apply Methodology for 3 geographical areas of state
Research - Solutions

• What overall % of a fleet should be depreciated out at any one point in time for effective fleet operation?
• At what point in time should each piece of fleet be disposed of before major repair cost take an exponential jump?
• How many pieces of the 6 classes are needed based on the amount of time the piece of equipment is used?
Wrapping Up - Lessons Learned

- **Bad**
  - Don’t try to measure too many things
  - Keep it simple
  - Most important
  - Don’t let the process overshadow the purpose
  - Collect only what you need
  - Don’t wait for the perfect solution
  - Don’t let a passionate person set unreasonable targets
  - Too much data to internalize and prioritize
Lessons Learned

- Good
  - Communicate with stakeholders in terms they understand
  - Involve lots of people
    - Gets buy in at the beginning
    - Creates ownership
  - Communicate with managers
    - Meet with field managers to rolled it out
    - Reviewed at Conferences
  - Give feedback on LOS and Deficiencies
  - Set priorities – Can’t do it all at once
  - Flexibility with Accountability