FULL-DEPTH RECLAMATION SYMPOSIUM

THE MISSING LINK IN PAVEMENT MANAGEMENT

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Agenda

• The Challenge
• The Missing Link Explained
• The Solution
• Case Studies
• Summary
• Questions
The Challenge

• What are we trying to achieve?
  • Maintain Current Condition
  • Improve Condition
  • Reduce Backlog Cost
  • Move Away from a “One Size Fits All Maintenance”
  • Optimal Investment Strategies

• Are you selecting the right mix of projects to maximize performance with the available revenue?

• Sustainability!!
Size and Complexity of Network
Constraints and Trade-Offs

Performance Goals

Needs (Backlog)

Other Assets

Funding Sources
Many Variables

- Functional Class
- Truck Traffic
- Speed Limits
- Pavement Types
- Soils
- Drainage
- Pavement Condition
- Repair Alternatives
Pavement Management Goal

Spend the least amount of money to maintain the roadway network at the highest Level of Service

Easy to say!
Hard to achieve!
The Missing Link Explained

• So what do we mean by “The Missing Link”?
• Most consider Pavement Management to be
  • Pavement Condition Surveys (data)
  • Metrics
  • Project Selection/Pavement treatments
  • Construction
  • Pavement Management Systems (Software)
  • Data Analysis and Reporting
  • Work Programs
PAVEMENT CONDITION SURVEYS (PCS)
Pavement Condition Surveys

• Comprehensive Rating System
  • Reasonably reflect the true level of deterioration
  • Distress Identification
    • Structural vs. Environmental
  • Distress Severity
  • Distress Extent
Pavement Condition Surveys

- Measures the deterioration produced by use, environment and material aging.

Goal: Quality Data, Not Quantity!

- Collect only the Data that is required.......

<table>
<thead>
<tr>
<th>Information</th>
<th>Optimization</th>
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<tbody>
<tr>
<td>• Condition</td>
<td>→ Repairs</td>
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Metrics

• Average PCI/PCR (Composite Index)
• IRI
• Cracking
• Rutting
• Good/Fair/Poor-Definition?
• Targets
  • Percent Good/Fair/Poor
There is a most Cost-effective Treatment for every combination of Distresses
Proper Timing of Treatments

- **Optimal Timing**
- **Preservation** $30,000/mile
- **Minor Rehabilitation** $100,000/mile
- **Major Rehabilitation** $225,000/mile
- **Reconstruction** $350,000/mile

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<thead>
<tr>
<th>Level</th>
<th>Timing</th>
<th>Cost</th>
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<tr>
<td>Excellent</td>
<td>Preservation</td>
<td>$30,000/mile</td>
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<tr>
<td>Good</td>
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<tr>
<td>Poor</td>
<td>Reconstruction</td>
<td>$350,000/mile</td>
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<tr>
<td>Very Poor</td>
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Construction Practices

- Quality Specifications
- Testing and Verification Protocols
- Trained and Certified Inspectors
- Experienced and Qualified Contractors
- Proper Equipment for the job
- Documentation
PAVEMENT MANAGEMENT SOFTWARE
Components of a PMS

- Inventory Management
- Pavement Condition Data and Indices
- Pavement Repair Strategies
- Decision Modeling
- Performance Modeling
- Construction History
- Work Plans
- Optimization and Project Selection
- Reporting
The Missing Link Explained

- Individually, all of these are important for managing pavements, but........
- The “Missing Link” is actually “Pavement Management”!
  - Pavement Management is a Process that embodies all of these individual elements to achieve (desired) network level performance results
Complete Pavement Management

- Business Process Review
- Data Acquisition
- Software Analytics
- Program Dev
- Program Champion
- Project Selection
- Maint Mgmt
- Constr Mgmt
- Perf Mgmt
The Solution

• Leverage the Pavement Management Process to Drive Decision Making
  • Establish Measures, Goals, and Targets
  • Select the most appropriate data collection method and frequency to meet your agency objectives
  • Utilize PMS software tools capable of handling models, decision trees, **optimization analysis** (vs ranking)
  • Incorporate all work types, i.e. maintenance, preservation, rehabilitation, reconstruction (3R’s)
  • Reporting capabilities should meet all decision making needs (network and project level; Manager and Exec)
Optimization: “Benefit” Over Time

Proper Timing:
• Better Performance
• Lasts Longer
• Less Cost

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Results of Optimization Analysis

The Right Mix of Fixes

Work Plan for the Scenario

Annual Mileage by Treatment
Monroe, NC Project Case Study
Monroe, NC

- Ranking vs. Optimization Comparison
- Data Source: Monroe, NC
- 170 Centerline Miles
- Scenario: $2.1 Million/Year for 10 Years
- Metric 1: Average Network Condition (PCI)
- Metric 2: Backlog Cost of Untreated Network
- Metric 3: % of Network Treated
Ranking vs. Optimization Results

6 Point Difference in PCI by Year 10

Difference in Backlog Cost in Year 10 = $4.2 Million
Ranking vs. Optimization Results

- Ranking 10 Year Treated Length = 123 Miles
- Optimized 10 Year Treated Length = 234 Miles
Carroll County, MD Project Case Study
Comparison of Utilizing Reconstruction vs. FDR

- Scenario: $10 Million/Year for 10 Years
- Data Source: Carroll County, MD
- 900 Centerline Miles
- Metric 1: Average Network Condition (PCI)
- Metric 2: Backlog Cost of Untreated Network
Reconstruction vs. FDR Results

3 Point Difference in PCI by Year 10

Difference in Backlog Cost in Year 10 = $35 Million
Summary

• Managing pavement networks is complex
• Pavement management is a process

Results!

• Program, Program, Program, Program