The Future of Pavement Preservation

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BUREAU CHIEF OF RESEARCH
Outline

OVERVIEW
- Network and Condition Ratings
- IDOT’s Previous Practices
- Why Change Philosophy?

IDOT AND ASSET MANAGEMENT
- New Pavement Management Philosophy
- Selecting Treatments
- Guidance and Processes

FURTHER EFFORTS
OVERVIEW

Network and Condition Ratings
Illinois Highway Network Overview

• Highway Network
  • All Highways - 145,054  (3rd Overall Nationally)
  • Federal-Aid Highways - 34,550  (5th Overall Nationally)
  • National Highway System - 7,937  (5th Overall Nationally)

• IDOT Maintained:
  • Interstate - 1,892
  • Other Marked Routes - 11,427
  • Unmarked Routes - 2,580
Pavement Condition Monitoring

- Network condition collected by Mandli Communications
  - LCMS (Laser Crack Measurement System)
  - High Speed Cameras: 3D profiles, 2D Road Images
  - Sensor Data: Roughness (IRI), Rutting, Faulting
- Entire network collected over 2 years
  - Interstate every year
  - Non-interstate split over two years
    - Even Years: Cook County; Districts 4, 5, 8, and 9
    - Odd Years: Collar Counties; Districts 2, 3, 6, and 7
Determination of Condition Index

- Vendor data used to conduct semi-automated survey
  - Condition Rating Survey (CRS) Models
  - Direct input of sensor data
  - Up to 5 Predominant Distresses
- Manual override possible
  - More than 5 predominant distresses
  - Model inaccurately representing section

NETWORK AND CONDITION RATINGS
OVERVIEW

IDOT’s Previous Practices
Historical Programming Approach

Lowest CRS = Highest Priority: “Worst First Strategy”

Performance measures focused on:
- Backlog (repairs needed now or past due)
- Accruing Backlog (repairs needed within 6 years)

Target of 90% Good Condition
- Entire system
- Unrealistic goal
Backlog Definitions

- Based on CRS values (Condition Rating Survey) and traffic levels for each system

- CRS is a 1.0 to 9.0 scale, with ratings < 4.5 representing a Poor condition

- Other Backlog = current need

- Critical Backlog = past due need

IDOT'S PREVIOUS PRACTICES
Pavement Preservation Program – The Early Years

FY 2005
- Executive Staff Commitment
- 3 Projects
- $100K per project
- Limited Treatments

FY 2008 - 2014
- Various Funding Levels
- Even split
- District project selection

FY 2015 - 2017
- Statewide Line Item - $7.5M
- Percentage of network
- District choice

FY 2018
- Districts submitted projects
- Committee decided final selection
OVERVIEW

Why Change Philosophy?
Federal Changes

• MAP-21 and FAST Act
  • MAP-21: July 6, 2012
  • FAST Act: December 4, 2015

• New Requirements
  • Transportation Asset Management Plan (TAMP)
  • Minimum components for Pavement Management System
  • Performance Measures
IDOT AND ASSET MANAGEMENT

New Pavement Management Philosophy
Transformed Vision at IDOT

- Federal Requirements and TAMP Development Critical in changing philosophy
- Embrace Asset Management Principles
  - Developed improved Performance Measure
  - Keep roads in Good and Fair Condition as long as possible
  - Set realistic targets

IDOT’s Asset Management Activities Are Raising the Bar by Taking Advantage Of:

- New technology
- New ways of doing business
- Improved transparency and accountability
Improved Performance Measure

- Desired State of Acceptable Condition
  - Set consistent threshold
  - Condition level where preservation treatments are viable option

- Impact on Network
  - FHWA Focus on NHS System
  - IDOT will use measure on all functional classes
  - Use percent acceptable to establish priorities.

IDOT is ... Raising the Bar
by extending the useful lives of existing assets while reducing long-term preservation costs.
Desired State of Acceptable Condition

![Graph showing the desired state of acceptable condition for different types of mileage. The graph indicates that Interstate Mileage has the highest percentage of CRS ≥ 5.5 Acceptable Condition, followed by Other NHS Mileage, Marked Route Mileage, and Unmarked Route Mileage. The CRS values and condition ranges are also shown on the right side of the graph.](image-url)
Predicted 10-Year Performance

- Comparison to Targets
  - Interstates ✓
  - Other NHS ✗
  - Non-NHS Marked ✗
  - Unmarked ✗
- Other refinements
  - Improved treatment selection
  - Better project selection
IDOT AND ASSET MANAGEMENT

Selecting Treatments
Redefined Treatment Categories

- Started with FY 2019 program
- Established CRS Ranges for each category

<table>
<thead>
<tr>
<th>Category</th>
<th>Subcategory</th>
<th>CRS Range</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Interstate</td>
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<tr>
<td>Reconstruction</td>
<td>--</td>
<td>&lt; 4.0</td>
</tr>
<tr>
<td>Rehabilitation</td>
<td>Designed Overlay</td>
<td>4.0 – 4.5</td>
</tr>
<tr>
<td></td>
<td>Standard Overlay</td>
<td>4.6 – 5.4</td>
</tr>
<tr>
<td>Preservation</td>
<td>High Preservation</td>
<td>5.5 – 6.5</td>
</tr>
<tr>
<td></td>
<td>Low Preservation</td>
<td>6.6 – 7.5</td>
</tr>
<tr>
<td></td>
<td>Proactive Maintenance</td>
<td>&gt; 6.0</td>
</tr>
<tr>
<td>Reactive Measures</td>
<td>--</td>
<td>&lt; 5.5</td>
</tr>
</tbody>
</table>
Rehabilitation Treatments

- Designed Overlay
  - Former Structural Exception
  - Thickness determined through investigation

- Standard Overlay
  - Former Policy Overlay
  - No Structural Distresses Allowed
  - Thickness range for interstate and non-interstate
  - Select mixtures using minimum layer thicknesses
Preservation Treatments

- Expanded treatment options
- Percentage of Unrestricted Program
- Final approval by Preservation Committee

<table>
<thead>
<tr>
<th>High Preservation</th>
<th>Low Preservation</th>
<th>Proactive Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Longitudinal Joint Partial Depth Repair</td>
<td>Micro-Surfacing</td>
<td>Joint Sealing/Sealing</td>
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<tr>
<td>Ultra-Thin Bonded Wearing Course</td>
<td>Slurry Seal</td>
<td>Fog Seal</td>
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<tr>
<td>Functional Cold In-Place Recycling</td>
<td>Cape Seal</td>
<td>Micro-Milling</td>
</tr>
<tr>
<td>Hot In-Place Recycling</td>
<td>Half-SMART</td>
<td>Diamond Grinding</td>
</tr>
</tbody>
</table>

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Revisions to Policies

• Pavement Working Group revising policies
• New Decision Trees and Updated Information
  • Projected CRS
  • Distresses (Functional vs. Structural)
• Updated Programming Guidelines
• BDE Manual will be updated with revisions
  • Chapter 52 (Preservation)
  • Chapter 53 (Rehabilitation)
Category Selection Process
Do Nothing
Rehabilitation

GUIDANCE AND PROCESSES
FURTHER EFFORTS
Continued Focus to Implement

• Continue refining policies
• Review performance data and adjust
• Work toward Preservation Agreement with FHWA
Other Activities

- Every Day Counts (EDC-4)
  - Pavement Preservation: When, Where, How
- FHWA Preservation Workshops
  - Planning for Spring 2019
- Transportation Pooled Fund Studies
  - NCAT – MnROAD
  - National Road Research Alliance
Thank you!

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