PMS to AMS – Kentucky Experience
KYTC’s Road Towards Better Pavement Management

Stuart Hudson, PE, AgileAssets
Chad Shive, PE, Kentucky Transportation Cabinet
Overview

• Introduction AgileAssets Enterprise
• KYTC Implementation
• Overview of Pavement Analyst
• Problems faced and driver for a solution
• Goals of PMS Implementation
• Process of implementing solution
• Outcomes and achievement of goals
AgileAssets Enterprise Asset Management System

Overview
AgileAssets Core Purpose

Maximize Infrastructure Value and Safety
AgileAssets Platform

AgileAssets Transportation Asset Management Solution

Planning and Analysis
- Portfolio Analyst™
- Summit™
- Pavement Analyst™
- Structures Analyst™
- Safety Analyst™

Operations Management
- Maintenance Manager™
- Structures Inspector™
- Fleet & Equipment Manager™
- Facilities Manager™
- Right-of-Way Manager™
- Sign Manager™
- Signal and ITS Manager™

Foundation
- System Administration • Security • Configuration • Reporting

Third-Party Integration
- ERP
- Financial
- Purchasing
- Materials
- LRS/GIS
Kentucky’s AgileAssets EAMS Deployment

- FMS: Fleet & Equipment Manager
- MMS: Maintenance Manager
- PMS: Pavement Analyst
- Users
- Security
- LRS Reporting
Pavement Inventory
## Pavement Structural History

<table>
<thead>
<tr>
<th>Contract ID</th>
<th>Contract Name</th>
<th>Year Completed</th>
<th>Treatment</th>
<th>Layer</th>
<th>Material Code</th>
<th>Thickness (in.)</th>
<th>Work Type</th>
<th>Color</th>
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**Route:** IS00064EB  **Direction:** Increasing  **Lane:** 1  **Begin Mile:** 0

0.44 to 3.121
Pavement Condition and Deterioration
Multi-year Work Program
Overview of Pavement Analyst

objectively evaluate agency’s pavement management program
KYTC’s Road Towards Better Pavement Management
Business Driver

- Limited Funding
- Costs Inflation
- Unstructured Management Practice

Uncertain Network Performance
Strategic Goals

- Improve Network
- New Forecast Models
- Focus on PM
- Diversify Treatments
- Pavement Management System
- Improve ROI
- SHIFT
Pavement Management Goals

• Automated Data Collection and Management
• Forecasts of Pavement Condition
• Generate Multi-Year Workplans
• Optimized Treatment Selection and Application Interval
• Focus on Preservation
• Performance Reporting Towards Objectives
Pavement Management Solution

- Implement AgileAssets’ Pavement Management System
- Develop Deterioration Models
- Robust Data Management
Robust Data Management
Robust Data Management

Transportation Data Enterprise

• Functional Classification
• NHS vs State Highway System
• Pavement Type & Other Attributes
  – Number of Lanes
  – Lane Width
  – AADT + Truck Traffic
• Route Log (Termini Description)
• HPMS Evaluation Section
Robust Data Management

- IRI
- Rutting
- Faulting
- GPS
- Texture
- Curve

- Grade
- Cross Slope
- Lane Width
- AASHTO Distress Report
- HPMS Distress Report
- Crack Width Severity Report
Develop Deterioration Models
Develop Deterioration Models

Partnership with University of Louisville

• Data Conversion
• New Deterioration Models
Implement AgileAssets Pavement Analyst
Implementation Details

Data Import Interface

Updated Treatment Types

New Decision Trees

Performance Analysis

Condition Improvements from Treatments
## Treatment Types

<table>
<thead>
<tr>
<th>Non-PM</th>
<th>PM</th>
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<tr>
<td>Replace</td>
<td>Thinlay ($\frac{5}{8}''$ or $\frac{3}{4}''$ HMA)</td>
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<tr>
<td>Structural Overlay</td>
<td>Micro Surface (Single &amp; Double)</td>
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<tr>
<td>Thick Overlay (&gt; 4.5'')</td>
<td>Chip Seal (Scrub Seal)</td>
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<tr>
<td>Intermediate Overlay (&gt; 1.5'')</td>
<td>Cape Seal</td>
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<tr>
<td>Thin Overlay</td>
<td>Diamond Grind (PCC)</td>
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<tr>
<td>Repair (PCC)</td>
<td>Crack Seal</td>
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Treatment Selection

- Mix of Category and Treatment Specific
- PM and Thin Overlay Determined by PMS Data
- All Other Treatments Grouped as “Further Investigation”
- Rehab Projects Require Data not Currently in PMS to Determine Exact Treatment
- Exploring Traffic Speed Deflection Testing to Better Predict Rehab Type Projects
Trigger Values

- Trigger Values for all PM Treatments Based on Historic Data & Expert Review
- Trigger Values for Thin Overlay Based on Historic Data
- Trigger Values for all Other Treatments In-Progress
Decision Trees

- **OC SEV<3**
  - **WPC JD EXT<7**
  - **AADT<3000**
    - Scrub Seal
  - **AADT>=3000**
    - 5/6" Thinlay

- **5<=WPC JD SEV<=9**
  - **OC SEV>=3**
    - **WPC JD EXT>=7**
      - Cape Seal
    - **Joint Separation<4**
      - **WPC JD EXT<5**
        - **Other Crack, Tct Plt<6**
          - Crack Seal
        - **WPC JD EXT>=5**
          - Mill 1.5", Resurface 1.5"
    - **Joint Separation>=4**
      - **Mastic Joint Seal**

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## Condition Improvements

### Chip Seal

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<th>Condition Improvement Script Other</th>
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<tr>
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<td>WPC JD SEV</td>
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### Thin Overlay

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Performance Analysis
## Results

### Analysis Scenarios

**Software Driven**

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<th>Constraint Limit Value</th>
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<td>Overall Performance Index</td>
<td>Weighted Avg</td>
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<td>Treatment Cost</td>
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**Funding Restricted**

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## Results

### Funding Not Constrained

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<th>Treatment</th>
<th>Miles</th>
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<td>3/4&quot; Thinlay</td>
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<td>5/8&quot; Thinlay</td>
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<td>Cape Seal</td>
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<td>Crack Seal</td>
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<td>Double Microsurface</td>
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### Funding Constrained

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<td><strong>Total</strong></td>
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Comparison

• How does this compare to our current program?
• What changes should be made?
• Where should research time be focused?
Questions

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