Texas Pavement Performance Maintenance Management System

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Texas Department of Transportation
User Requirements

- Identify pavement sections of interest
- Classify pavement sections to various levels of “Attention”
- Allocate available funds to pavement sections
- Estimate future budget needs according to target performance goals over a planning horizon

Pavement Performance & Maintenance Management (PPMM) Web-based System
Basic Characteristics of the GIS-PMIS

- Web-based format
- Uses GIS Technology but requires no GIS training or software
- Allows the user to visualize PMIS data by year, roadbed, and pavement type
- Allows the user to query for pavement sections with user-specified criteria
- Allows the user to visualize the history of a pavement section
Data Included in GIS-PMIS

- Ride Score
- Condition Score
- Distress Score
- Skid
- Failure
- Cracking
- Pavement Type
- Traffic (AADT)
Ride – Zoomed to County

ArcIMS Viewer - Windows Internet Explorer

ArcIMS Viewer

Layers
- Visible Active
- Selected_2007(Ride)
- Ride_Score_2007
- Condition_Score_2007
- Distress_Score_2007
- Skid_Score_2007
- Failures_2007
- Pavement_TY_2007
- Traffic_2007
- Roads
- Districts
- Counties

CNYT_NM = "Collin" AND RDDD = "K"(selected)

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<th>BRR</th>
<th>BM_DISP</th>
<th>FROM_M</th>
<th>TO_M</th>
<th>COND_SR</th>
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System Overview

Decision Support Tool

- GIS-based PMIS Information Access and Visualization (GIS-PMIS)
- Pavement Performance Maintenance Management (PPMM)
Basic Characteristics of the PPMM

- Web-based format
- Can use and analyze multi-year data from the PMIS database
- Can perform multi-year budget planning
- Can be user-customized based on local requirements
PPMM Home Page

Pavement Performance & Maintenance Management (PPMM) Web-based Application

Performance Monitoring Module
- Section Tool
- Network Tool

Maintenance Management Module
- Budget Allocation Tool
- Budget Planning Tool

Prepared by: Transportation Infrastructure and Information Systems (TIIS) Group Center for Transportation Research The University of Texas at Austin

Prepared for: Dallas District Texas Department of Transportation
PPMM Key Functions (1 of 2)

- **Section Tool**
  - **Identify** pavement sections of interest based on their location characteristics and **retrieve** their performance history according to available performance indices

- **Network Tool**
  - **Classify** pavement sections according to various levels of “Attention” needs based on their recorded historical performance
PPMM Key Functions (2 of 2)

- **Budget Allocation Tool**
  - Allocate available funds to pavement sections based on a prioritization algorithm that takes into account pavement performance and traffic, and estimate the resulting gain or loss in the future performance of the overall network.

- **Budget Planning Tool**
  - Estimate future budget needs according to targeted performance goals for the pavement network over a user-defined (short, medium or long) planning horizon.
Budget Planning Tool

- Performance chart

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<tr>
<th>District</th>
<th>County</th>
<th>Roadbed ID</th>
<th>BRM</th>
<th>BRM Disp</th>
<th>ERM</th>
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**Observed Ride Score Data**

- Fiscal Year: 1995-2012
- Estimated Ride Score: 3.5
- Estimated Distress Score: 100
- Estimated Cost: 10,000
- Estimated M & R: PM
State-Wide 90% "Good" or Better Score

Year | Measured Performance | Predicted Performance
--- | --- | ---
2002 | 85 | 85
2003 | 85 | 85
2004 | 85 | 85
2005 | 85 | 85
2006 | 85 | 85
2007 | 85 | 85
2008 | 85 | 85
2009 | 85 | 85
2010 | 85 | 85
2011 | 85 | 85
2012 | 85 | 85
# 4-Year Plan: Pavement Stratification

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<th>Highway Functional Class</th>
<th>Pavement Type</th>
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<tr>
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4-Year Plan: Climatic Regions

Climatic Region 1
- Wet - Freeze

Climatic Region 2
- Wet - No Freeze

Climatic Region 3
- Dry - No Freeze

Climatic Region 4
- Dry - Freeze

Frozen Thaw Division Line
Zero Thornthwaite Index Line
Conclusions

- PPMM is a success story due to:
  - Close collaboration between CTR and TxDOT
  - Management support

- Degree of sophistication is customized to agency needs but can be modified and/or upgraded if necessary

- Modular structure makes models and methods easy to calibrate/modify based on future needs

- Work is still ongoing...
Thank you!

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