GENERATING INFRASTRUCTURE FUNDS THROUGH INNOVATIVE PAVEMENT MANAGEMENT

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Generating Funds

• Florida Department of Transportation (FDOT) has reallocated 3 billion dollars from resurfacing work program.

• Survival Analysis
  ▪ Characterization of behavior for different materials through different regions.
  ▪ Part of Florida’s Analysis System for Targets (FAST) program suite.
  ▪ Historical data analysis.
• Pavement Condition Survey (PCS) data have been collected since 1976.
• Since 2006 we have surpassed the 80% performance standard per FL Statute.
Pavement Condition Collection

- State Wide (SW).
  - 7 Geographical Districts.
    - Turnpike.
    - Interstate.
What is FAST?

Implemented in 2008

- Improves section level condition forecasts of the State Highway System (SHS).
- Able to calculate future resurfacing allocations based on forecasted conditions.
- Capable of performing impact analyses for different funding scenarios and policy decisions.
These tools have been used to:

- Develop and enhance the FAST software system for predicting the rutting, cracking, and ride performance of individual pavement sections and the highway network.

- Answer frequently asked questions from the Executive Level as well as the Districts:
  - What have been the impacts of previous decisions?
  - Were the underlying assumptions valid?
  - If we take a specific action - what is the expected impact?
Historical and Predicted Percent of Lane Miles Meeting Standards
PCS Ratings

• The PCS rates pavements using three indices.

CRACK   RUT   RIDE

• The rating scale for the PCS is from 0 (worst) to 10 (best).

• A rating under 6.5 in most cases is considered deficient.
Analysis of PCS Ratings

- Current Surface Types active on the SHS.

<table>
<thead>
<tr>
<th>OPEN</th>
<th>FC-2</th>
<th>FC-5</th>
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</thead>
<tbody>
<tr>
<td>DENSE</td>
<td>Marshall</td>
<td>Superpave</td>
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- FC-2 and Marshall mixes are used for normal survival curve analysis due to their extensive use in Florida dating back to the late 1970’s, providing a complete life cycle.
Comparison of Indices for FC-2 and Marshall

- Graph is based on percentage of sections surviving after a specific age for a State Wide System.
- Crack rating deficiency dominates on these materials.
Benefits of Using Crack Survival Curves

- Conservative Forecasting.
  - Underestimation of survival age of a section.
  - Predominate deficiency.
- More efficient analysis for new materials.
New Materials

• Service life for new materials such as FC5 and Superpave cannot be calculated until they reach 50% survival.
• When comparing them to known materials such as FC2 and Marshall an analysis can be performed.
Analysis of Materials

- **Open Vs. Dense**
  - Dense is surviving 16% longer than Open.

- **Marshall Vs. SP**
  - SP is surviving 6% longer than Marshall.

- **FC2 Vs. FC5**
  - FC5 is surviving 20% longer than FC2.
Forecasting

• Utilizing a known material to determine the behavior or the new material.
Forecasting

• Generating the Master Curve for undocumented materials from known material.
• Allows for section and system forecast.
• Survival Age of
  - FC2: 11 yr.  FC5: 14 yr.
Forecasting From Master Curve
Total SHS Deficient Lane Miles (Observed vs. Predicted) FY 2005 - FY 2010

Deficient Lane Miles vs. Year

- **Observed**
- **Predicted**
Application towards new Materials

- Using the same methods, new materials can be analyzed and predicted.
Utility of Results

• Based on these survival curves and other predictive algorithms, it is feasible to generate resurfacing targets based on forecasts of future performance.

• In order to meet the desired standards, funds may be added or removed from the resurfacing program proactively.
Overall Savings So Far

- In the past 10 year work program, Florida’s Resurfacing program has reallocated roughly 7400 lane miles. ($3 Billion)
Survival analysis has proven to be an effective tool in learning about the behavioral characteristics of Florida pavements.

The survival analysis procedure has also allowed the development of predictive models that enable the effective and efficient management of the resurfacing program.
Future Impact

- Proactive analysis of decisions being made today and their affect on the whole system.
- Allow a natural deterioration of pavement preventing over-preservation of the system.
- Reallocate more funds from resurfacing to other infrastructure needs.
Questions?

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