ALDOT Transportation Asset Management Plan (TAMP)

February 10, 2016
What is TAM?

- A strategic approach to managing transportation infrastructure
- Focuses on business processes for resource allocation
- Objective of better decision making based upon quality information and well-defined objectives*

*AASHTO Asset Management Guide, January 2011*
What is TAM?

- Condition assessment survey
- Identify maintenance needs
- Life Cycle Cost Analysis
- Possible Treatment Options
- Select optimal treatment
- Compare Benefit/Cost Ratios
- Estimate value produced
- Determine cost for each option
- Plan for Optimal Treatment

Steps:
1. Condition assessment survey
2. Identify maintenance needs
3. Life Cycle Cost Analysis
4. Possible Treatment Options
5. Select optimal treatment
6. Compare Benefit/Cost Ratios
7. Estimate value produced
8. Determine cost for each option
9. Plan for Optimal Treatment
Federal Asset Management Direction

• AASHTO adopted TAM as a priority initiative in 1998
• Performance and risk-based TAM plan to be formalized on a nationwide basis
• Based on AASHTO Asset Management Guide, January 2011
• MAP-21 passed, July 2012
MAP-21 TAMP Requirements

• FHWA’s required components for the TAMP include:
  – Summary list, including condition of pavements and bridges on the National Highway System (NHS)
  – Asset management objectives and measures
  – Performance gap identification
  – Life cycle cost and risk management analysis
  – Financial plan
  – Investment
What is a TAMP?

• A strategic document designed to supplement other long-range plans
  – Will help ALDOT make decisions to address asset performance gaps
  – Can provide inputs to other planning reports
  – Utilizes outputs from other planning reports
  – Is not designed to replace other planning reports
Why TAM?

Better Planning
- Links management to policy and strategic goals
- Informs cross-program decisions
- Achieves transparency, accountability, and credibility
- Increases service to the public

ROI and Cost Savings
- Optimizes investments
- Lowers life cycle costs/increases ROI
- Ability to deliver increased performance at the same cost, or
- Deliver the same performance at a lower cost

Making Better Decisions
- Better decision making based upon quality information and well-defined objectives
- Applying the right treatment, in the right place, at the right time

Strategic approach to managing assets
How Can TAM Help ALDOT?

Maximizing ROI - It’s not about cost, it’s about value

• Focus on extending life of bridges and maximizing ROI
Developing ALDOT’s TAMP
Goals and Objectives

<table>
<thead>
<tr>
<th>Instill TAM as an integral part of the ALDOT business model to foster adaptation.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utilize a risk management framework to identify threats and opportunities for projects and programs.</td>
</tr>
<tr>
<td>Preserve Alabama’s transportation assets, such as pavement and bridges</td>
</tr>
<tr>
<td>Make sure the TAMP influences and is influenced by other plans.</td>
</tr>
<tr>
<td>Enlist the TAMP to cross bureau processes and unify activities in order to advance ALDOT collaboration.</td>
</tr>
<tr>
<td>Identify sustainable funding patterns for roads and bridges in order to address needs.</td>
</tr>
<tr>
<td>Stabilize the &quot;peaks and valleys&quot; of project schedules (design and lettings) to improve project delivery.</td>
</tr>
<tr>
<td>Improve data quality and knowledge/ process retention in an effort to progress toward structured, data driven decision-making processes.</td>
</tr>
</tbody>
</table>
Current ALDOT TAM Efforts

- MQA, performance-based budgeting supported by RoadMAP
- RoadMAP – condition assessment program
- Asset inventory
- Pavement management processes/data
- ABIMS – AASHTOWare BrM Bridge Management System
Steering Committee Role

- Owns the TAM Plan
- Provide executive buy-in for TAM direction
- Provide overall strategic guidance for project
- Make TAM decisions based on recommendations
Project Tasks

• Phase 1
  – Determine asset management objectives and measures
  – Identify asset inventory, condition, and performance gaps
  – Assess ALDOT TAM systems and data
TAM Systems and Data

• Bridge Management Systems (BrM)
  – Alabama Bridge Information Management System (ABIMS)
• Comprehensive Project Management System (CPMS)
• Preliminary Prioritization Report (PPR)
• RoadMAP
These values are as of January 2015

Note that “Interstate” and “Other NHS (state-owned)” are a part of both State-owned Bridges and NHS Bridges

<table>
<thead>
<tr>
<th>Category</th>
<th>Inventory</th>
<th>Deck Area (sq ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interstate</td>
<td>1,265</td>
<td>34,700,172</td>
</tr>
<tr>
<td>Other NHS (state-owned)</td>
<td>1,851</td>
<td>24,578,081</td>
</tr>
<tr>
<td>Other NHS (non-state-owned)</td>
<td>60</td>
<td>601,656</td>
</tr>
<tr>
<td>Non-NHS (state-owned)</td>
<td>2,638</td>
<td>22,579,759</td>
</tr>
<tr>
<td>Non-NHS (non-state-owned)</td>
<td>10,143</td>
<td>29,601,375</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>15,957</strong></td>
<td><strong>112,061,043</strong></td>
</tr>
</tbody>
</table>

State-owned Bridges  5,754  81,858,012
NHS Bridges          3,176  59,879,909
<table>
<thead>
<tr>
<th>Category</th>
<th>Good</th>
<th>Satisfactory</th>
<th>Fair</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Bridges</td>
<td>7,102</td>
<td>5,236</td>
<td>2,872</td>
<td>747</td>
</tr>
<tr>
<td>NHS Bridges</td>
<td>1,168</td>
<td>1,223</td>
<td>731</td>
<td>54</td>
</tr>
<tr>
<td>State-Owned Bridges</td>
<td>2,267</td>
<td>2,233</td>
<td>1,157</td>
<td>97</td>
</tr>
</tbody>
</table>

- ALDOT currently tracks SD and posted bridges
- TAMP will utilize Good, Satisfactory, Fair, and Poor
- Condition Categories based on four NBI components
## Bridge - Condition

<table>
<thead>
<tr>
<th></th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Deck Area</td>
<td>Percent</td>
<td>Deck Area</td>
</tr>
<tr>
<td>Bridges carrying interstate highways</td>
<td>7,051,529</td>
<td>20.3%</td>
<td>26,701,208</td>
</tr>
<tr>
<td>Bridges carrying other National Highway System roads - state-owned</td>
<td>10,840,597</td>
<td>44.1%</td>
<td>13,376,933</td>
</tr>
<tr>
<td>Bridges carrying other National Highway System roads - non-state-owned</td>
<td>344,238</td>
<td>57.2%</td>
<td>257,418</td>
</tr>
<tr>
<td>Bridges carrying non-NHS roads - state-owned</td>
<td>11,207,938</td>
<td>49.6%</td>
<td>11,030,512</td>
</tr>
<tr>
<td>Bridges carrying non-NHS roads - non-state-owned</td>
<td>16,483,446</td>
<td>55.7%</td>
<td>11,808,125</td>
</tr>
<tr>
<td>Total</td>
<td>45,927,748</td>
<td>41.0%</td>
<td>63,174,196</td>
</tr>
<tr>
<td>NHS Bridges</td>
<td>18,236,364</td>
<td>30.5%</td>
<td>40,335,559</td>
</tr>
<tr>
<td>State-Owned</td>
<td>29,100,064</td>
<td>35.5%</td>
<td>51,108,653</td>
</tr>
</tbody>
</table>
Almost 102,000 total miles in Alabama
ALDOT owns 10% or 10,873 miles
98% Asphalt
Target Levels

- Quantitative goal for asset categories
- Requirement by MAP-21
- TAMP performance measures should coincide with data
  - Bridges: Condition Rating (Good/Satisfactory/Fair/Poor)
  - Pavement: PCR Score

![Graph showing condition ratings for bridges and pavements.]

- Good: PCR ≥70
- Fair: 55 < PCR < 70
- Marginal: PCR ≤ 55
Project Tasks

• Phase 2
  – Perform financial and investment analysis
  – Conduct risk analysis
  – Develop TAMP and implementation strategy
Risk Assessment Overview

1. MAP-21 requires development of risk-based asset management plans to improve or preserve the condition of the assets and the performance of the system.
2. Represents sound business practice.
3. Risk is defined as, “the effects of uncertainty on objectives” – ISO 31000.
4. These can include: threats, variability, change, uncertainty, and opportunity.
Risk Management Process

1. Identify risk
2. Quantify risk
3. Rank risk
4. Develop mitigation strategy
5. Take mitigation action
6. Update risk register

The process is cyclic, allowing continuous review and update of risk management strategies.
• Conducted a formal risk assessment workshop April 23rd (2015)
• Discussed risks and their causes, estimated the consequence and likelihoods, and refined mitigation strategies
• Finalized risk register
<table>
<thead>
<tr>
<th>Likelihood</th>
<th>Insignificant</th>
<th>Minor</th>
<th>Moderate</th>
<th>Major</th>
<th>Catastrophic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rare</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Unlikely</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>Possible</td>
<td>Low</td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Likely</td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
<td>High</td>
<td>Critical</td>
</tr>
<tr>
<td>Almost Certain</td>
<td>Medium</td>
<td>Medium</td>
<td>High</td>
<td>Critical</td>
<td>Critical</td>
</tr>
</tbody>
</table>

**Likelihood**
- Rare = less than 1 in 5,000 chance
- Unlikely = 1 in 5,000 to 1 in 50 chance
- Possible = 1 in 50 to 1 in 5 chance
- Likely = 1 in 5 to 1 in 2 chance
- Almost certain = > 7 in 10 chance

**Consequence**
- Insignificant = almost no impact
- Minor = Noticeable, not significant
- Moderate = Material effect on the area
- Major = Threatens to seriously damage
- Catastrophic = Almost all-encompassing
Example Risk Register by Risk Area

- **Key risk areas**
  - Business and System Performance
  - Environment
  - Financial
  - Health & Safety
  - Legal & Compliance
  - Reputation/Stakeholder Management
  - Security

<table>
<thead>
<tr>
<th>Risk Description</th>
<th>Cause</th>
<th>Mitigation Strategy</th>
<th>Risk Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rapid deterioration of roadways from heavy truck traffic, specifically from the energy sector</td>
<td>Energy sector contributes to deterioration rate increases on pavements and bridges</td>
<td>Study the issue. Look to other states for potential guidance (e.g., North Dakota). Adjust performance criteria/models as needed.</td>
<td>(4) Critical</td>
</tr>
<tr>
<td>Emerging technologies improve efficiencies</td>
<td>Technologies continue to improve. Pavement condition assessment, management system, etc.</td>
<td>Keep up-to-date on emerging and/or improving technologies. Also, consider a move to web-based systems and support.</td>
<td>(3) High</td>
</tr>
</tbody>
</table>
Investment Scenarios

- Determine possible LOS outcomes for asset categories (pavement and bridge) across various funding levels

<table>
<thead>
<tr>
<th>Scenario Descriptions</th>
<th>Bridge</th>
<th>Pavement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Funding Levels</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Achieve target performance levels</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Budget Increase of 10%</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Budget Increase of 20%</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Maintain Current Conditions</td>
<td>x</td>
<td></td>
</tr>
</tbody>
</table>
Federal Performance Guidelines

- Awaiting FHWA pavement and bridge performance target guidelines
- Anticipate that ALDOT will comply
  - Additional analyses for investment scenario outcomes may be required
Critical Success Factors

• The extent that the TAMP meets federal requirements in the MAP-21 legislation
• The degree to which the TAMP guides ALDOT’s asset management decisions
• The long-term sustainability and adaptability of the TAMP, once implemented
  – Annual update process
Questions?