Risk-Based Asset Management for a Performance-Based Program: Practices in the U.S.

Prepared for EPAM4

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Challenges in US Transportation Agencies
The Times They Are a Changin’...

• Focus on preserving existing assets
• Limit investments in new assets that can’t be maintained
• Make better use of available resources

Circa 1964
Hurdles to Overcome

Stovepipes

Different methodologies for assessing asset condition
Some Agencies Adopted TAM Principles

<table>
<thead>
<tr>
<th></th>
<th>Principle</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>POLICY DRIVEN</td>
</tr>
<tr>
<td>2</td>
<td>PERFORMANCE-BASED</td>
</tr>
<tr>
<td>3</td>
<td>EVALUATES OPTIONS</td>
</tr>
<tr>
<td>4</td>
<td>DATA DRIVEN</td>
</tr>
<tr>
<td>5</td>
<td>TRANSPARENT</td>
</tr>
</tbody>
</table>
TAM Guidance Published in 2011
Status in the US (From NCHRP Synthesis 43-01)

- **Organization** - 60% of respondents have an asset management group
- **Data** – In addition to pavements, 70 to 90% collect data on signs, guardrail, culverts, & lighting
- **Decision Making** – Still focused primarily on pavements & bridges, formal consideration of risk is rare
- **Documentation** – Few agencies produce an Asset Management Plan
Inventory Status

- Pavements & bridges 100%
- Signs 77%
- Guardrail 63%
- Culverts 60%
- Roadway lighting 49%
- Pavement markings 33%
- Earth retaining walls 27%

Findings from TAM Synthesis
Asset Management Plan Status

- Not really managing assets – 14%
- Starting to develop a Plan – 45%
- Plan is developed, but not implemented – 2%
- Plan is developed, with some implementation – 31%
- Plan is developed and fully implemented into business processes – 2%
- Other – 5%
## Barriers

<table>
<thead>
<tr>
<th>Barriers</th>
<th>Responses*</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of resources</td>
<td>35</td>
<td>81%</td>
</tr>
<tr>
<td>Lack of staff</td>
<td>29</td>
<td>67%</td>
</tr>
<tr>
<td>Resistance to change</td>
<td>26</td>
<td>60%</td>
</tr>
<tr>
<td>Inter-departmental interactions</td>
<td>25</td>
<td>58%</td>
</tr>
<tr>
<td>Higher/other priorities</td>
<td>22</td>
<td>51%</td>
</tr>
<tr>
<td>Lack of expertise and training</td>
<td>22</td>
<td>51%</td>
</tr>
<tr>
<td>Staff commitment</td>
<td>18</td>
<td>42%</td>
</tr>
<tr>
<td>Executive commitment</td>
<td>14</td>
<td>33%</td>
</tr>
<tr>
<td>Staff turnover</td>
<td>11</td>
<td>26%</td>
</tr>
<tr>
<td>Availability of adequate tools in the marketplace</td>
<td>9</td>
<td>21%</td>
</tr>
<tr>
<td>Outside pressure to have a subjective approach</td>
<td>8</td>
<td>19%</td>
</tr>
<tr>
<td>Lack of guidance/support</td>
<td>2</td>
<td>5%</td>
</tr>
</tbody>
</table>

*43 responding agencies (multiple answers allowed)
## Agency Staffing & Support

<table>
<thead>
<tr>
<th>Agency staffing and support</th>
<th>Responses*</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>My agency has an identified AM champion</td>
<td>25</td>
<td>63%</td>
</tr>
<tr>
<td>My agency has developed strategies to promote AM</td>
<td>18</td>
<td>45%</td>
</tr>
<tr>
<td>My agency has an AM implementation task force</td>
<td>21</td>
<td>53%</td>
</tr>
<tr>
<td>Our AM efforts are led by mid-level management</td>
<td>24</td>
<td>60%</td>
</tr>
<tr>
<td>Our AM efforts are led by top-level management</td>
<td>24</td>
<td>60%</td>
</tr>
</tbody>
</table>

*40 responding agencies (multiple answers allowed)
State Practices - Minnesota DOT

- Robust performance measures
- Varying levels of maturity across assets
- Quasi risk-based – resources invested in critical areas of pavements and bridges
- Core group working on Implementation Guide
- Evaluating enterprise software solutions
- Learning areas: Risk, Culture (shift from local decision making to global decisions), Goals, Data Needs & ROI
<table>
<thead>
<tr>
<th>Level</th>
<th>0 - Ad Hoc</th>
<th>1 - Aware</th>
<th>2 - Planning</th>
<th>3 - Defined</th>
<th>4 - Managed</th>
<th>5 – Integrated</th>
<th>6-Continuous Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tech /</td>
<td>Not aware of need for improved data management to support performance</td>
<td>Aware of need for improved data management to support performance</td>
<td>Aware of need for improved data management to support performance</td>
<td>Implemented some tools to support data management but not widespread across</td>
<td>Widespread implementation of tools to support data management but not</td>
<td>Integrated, widespread implementation of tools to support data management and</td>
<td>Ongoing assessment of new technology to support and improve data management and</td>
</tr>
<tr>
<td>Tools</td>
<td>management processes</td>
<td>measurement processes</td>
<td>measurement processes</td>
<td>agency.</td>
<td>integrated.</td>
<td>performance measurement</td>
<td>performance measurement.</td>
</tr>
<tr>
<td>People</td>
<td>No tools in place</td>
<td>Planning for tools to support data management in some offices</td>
<td>Planning for tools to support data management across agency or for a specific</td>
<td>implemented some tools to support data management but not widespread across</td>
<td>Widespread implementation of tools to support data management and performance</td>
<td>Integrated, widespread implementation of tools to support data management and</td>
<td>Agency is able to develop performance measures and predict outcomes for programs based on success with other programs.</td>
</tr>
<tr>
<td>Process</td>
<td>No data governance in place</td>
<td>Some level of data program assessment and formulation of roles for data</td>
<td>Data Business Planning underway – including development of governance model</td>
<td>Data Business Plan developed with data assessment complete and data governance</td>
<td>Fully operational data governance structure in place</td>
<td>Data governance structure fully supports data management activities across the</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>managers is underway in one or more offices of agency.</td>
<td>model for multiple offices in agency.</td>
<td>structure defined</td>
<td></td>
<td>agency.</td>
<td></td>
</tr>
</tbody>
</table>
Utah DOT Investment Decisions

• Budget: $145M in federal funds + $20M in state funds
  – Interstate - $60M
  – Level 1 Roads (> 2,000 cars/day) - $95M
  – Level 2 Roads (< 2,000 cars/day) - $10M
National Call for Accountability & Performance

- National Revenue Study Commission called for accountability
- The GAO (General Accounting Office) endorsed performance metrics
- AASHTO has proposed a performance measurement process
- Congress incorporated performance management into new legislation (MAP-21)
Defined as a **systematic approach** to making investment and strategic decisions using information about the **condition and performance** of the system and developing an **approach** to achieve a desired set of **national goals**
Moving Forward – Some Confusion

- The principles of TAM & performance management are identical
  - Asset management has a long-term focus
  - A performance-based program may lead to investments with short-term gains in performance
- Asset management applies to physical assets
- Performance management pertains to safety, infrastructure conditions, system & freight reliability, project delays & environmental sustainability
MAP-21

- State Performance Management-
- (1) IN GENERAL- A State shall develop a risk-based asset management plan for the National Highway System to improve or preserve the condition of the assets and the performance of the system.
• (2) PERFORMANCE DRIVEN PLAN- A State asset management plan shall include strategies leading to a program of projects that would make progress toward achievement of the State targets for asset condition and performance of the National Highway System in accordance with section 150(d) and supporting the progress toward the achievement of the national goals identified in section 150(b).

• (3) SCOPE- In developing a risk-based asset management plan, the Secretary shall encourage States to include all infrastructure assets within the right-of-way corridor in such plan.
(4) PLAN CONTENTS- A State asset management plan shall, at a minimum, be in a form that the Secretary determines to be appropriate and include--

- (A) a summary listing of the pavement and bridge assets on the National Highway System in the State, including a description of the condition of those assets;
- (B) asset management objectives and measures;
- (C) performance gap identification;
- (D) lifecycle cost and risk management analysis;
- (E) a financial plan; and
- (F) investment strategies.
Selecting National Performance Measures

- 3 Tiers Identified
  - Tier 1: Consensus on definition, common method of data collection
  - Tier 2: Close to meeting Tier 1 criteria
  - Tier 3: Significant work is needed to meet Tier 1 criteria

- Infrastructure Condition - Pavements
  - Tier 1: IRI
  - Tier 2: Structural condition
National Initiatives

• New research/activities starting soon
  – Cross-asset optimization (NCHRP)
  – TAMP templates and pilots (FHWA/NCHRP)
  – Gap analysis tool development (NCHRP)
  – TAM workforce development & skill building (FHWA)
  – Short Brief on Risk-Based Asset Management (FHWA)
Future Efforts

• Risk assessment & mitigation
• Developing national performance measures
• Financial sustainability
Thank You!