Developing an Asset Management Research Roadmap

NCHRP Project 08-36 (134)

Wednesday, March 30, 2016

TAM ETG Meeting, Arlington, TX

Key Tasks

Task 1: Identify Research Gaps and Opportunities
Task 2: Collect Stakeholder Input
   – TAM ETG Meeting November 2015
   – TRB Annual Meeting January 2016
   – TAM ETG Meeting March 2016
   – TAM Webinar ~May 2016
Task 3: Develop Initial Roadmap
Task 4: Conduct Stakeholder Workshop
   – TRB TAM Conference in Minneapolis July 2015
Task 5: Final Report
TAM Research Roadmap

- Advance the state of the practice
- Identify, coordinate and prioritize TAM research needs
  - Do not duplicate existing efforts
  - What research will lead to the greatest impact?
- Develop research statements and funding levels
- Roadmap will have the following timeframes:
  - Immediate (fund this year)
  - Short Term (1 – 3 years)
  - Longer Term (beyond 3 years)
- We want your input today!

TAM ETG Meeting – November 2015

RESEARCH ROADMAP OUTCOMES
Outcomes

• One stop shop for TAM research
• Clear communication of what TAM is
• Prioritized TAM research needs
• Know #1 goal for TAM research
  – Get focused
• Define what’s research
• Manage identified research needs
  • Ownership of follow up activities
• Tie research activity with agency roles – maintenance, pavement, drainage, etc.

Outcomes (continued)

• Present strategic perspective
  – Organized by roles / disciplines
• Identify longer term needs – vision
• Define the delivery mechanism for research products
  – Steward research product to implementation
• Coordination across groups (AASHTO Committees, other organizations)
• Perfect measures for research products
• Address diverse audiences
• Identify skills needed to move TAM forward
BRAINSTORMING RESEARCH NEEDS

**Group**

**GROUP A**
- General / TAM Practice
- Maintenance and Preservation

**GROUP B**
- Inventory and Condition Assessment
- Data Management and Integration

**GROUP C**
- Resource Allocation and Program Development
- Life Cycle Costing / Economic Analysis

**GROUP D**
- Financial Management / Asset Valuation
- Risk Management
### Group A  General Asset Management + Maintenance and Preservation

- Organizational structure (4 votes)
- Tools available (3 votes)
- Asset management in relation to... (7 votes)
  - Economic development
  - Land use
  - Equity
  - Other public policy initiatives
  - *Note: Valuation is key*

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### Group B  Inventory & Condition Assessment + Data Management and Integration

- What data analysis is needed to manage assets for their whole life (1 vote)
- What data is needed for risk analysis (internal and external)
- Value of data – ROI (11 votes)
  - Decisions/investment
  - Managing data as an asset
- How do we source data (4 votes)
  - What do we have and who has it
- How do we develop a workforce to focus on analytics, etc. (2 votes)
### Group C  Resource Allocation & Program Dev.  Life Cycle Costing/Econ. Analysis

- Examples of cross-asset allocation *(2 votes)*
  - Follow-on to existing work
  - Implementation of
  - Pilots of the research
- Coordination across plans *(2 votes)* – Link to Group A #8
  - Help develop “programs”
  - Different $ pots
- Economic cost of disinvestment in the transportation system *(4 votes)*
  - If we don’t maintain; turn to gravel

### Group D  Risk Management  Financial Mgt/Asset Valuation

- How to prioritize risks / establish risk “tolerance” *(2 votes)*
- How to capture risk management at various levels *(9 votes)*
  - Planning
  - Program
  - Project
  - Maintenance
- System level asset valuation *(11 votes)*
  - Standardizing definitions/terms
  - To avoid accounting pitfalls
- Depreciation rates for asset classes *(1 vote)*
  - modes
## Overall Ranking

- Value of data – ROI (11 votes)
- System level asset valuation (11 votes)
- How to capture risk management at various levels (9 votes)
- Asset management in relation to... (7 votes)
- Organizational structure (4 votes)
- How do we source data (4 votes)
- Economic cost of disinvestment in the transportation system (4 votes)
- Tools available (3 votes)
- Common stats for comparing asset performance (2 votes)
- How do we develop workforce to focus on analytics, etc. (2 votes)
- Examples of cross-asset allocation (2 votes)
- Coordination across plans (2 votes)
- How to prioritize risks / establish risk “tolerance” (2 votes)
- What data analysis is needed to manage assets for their whole life (1 vote)
- Quantifying / categorizing risk registers to allow for modeling of risks (1 vote)
- Depreciation rates for asset classes (1 vote)
## Current Context

<table>
<thead>
<tr>
<th>Problems</th>
<th>Key Drivers</th>
<th>Gaps</th>
</tr>
</thead>
<tbody>
<tr>
<td>Where are we going in the future – Google, self-driving car, etc.</td>
<td>Lack of resources</td>
<td>Practical use/application/implementation</td>
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<tr>
<td>Risk, financial plans, investment strategies</td>
<td>Workforce issues: changing workforce, need for documenting institutional knowledge</td>
<td>Standards, e.g., for vulnerability assessment</td>
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<tr>
<td>Impact on decisions an organization makes</td>
<td>Expectations for increased transparency</td>
<td>Data governance – what, why, cost, etc.</td>
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<tr>
<td>Challenges from: age of infrastructures, technology, cost, increasing efficiency</td>
<td>How to do 3D design – collecting to generating data</td>
<td>PM used for decision making – support for different uses</td>
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<tr>
<td>Target setting</td>
<td>Increase demand, decreasing resources</td>
<td>Organizational/cultural challenges</td>
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<td>Cross-asset allocation: breaking down the silos</td>
<td>Identifying and following best practices</td>
<td>Reaching across the organization/stakeholder mapping</td>
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<td>Transparency</td>
<td>Accommodating leadership change</td>
<td>Data – archiving, using, understanding uses of data</td>
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<td>Data and “silos of excellence” leveraging these, finding ways to collect once, use multiple times</td>
<td>Standards: being able to share between agencies, benchmarking, opportunities for reducing costs of data collection</td>
<td>Long term prediction/modeling for non-pavement assets</td>
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<td>Law, money, right thing to do</td>
<td>Desire for data-driven decisions</td>
<td>Evaluating the impact/effectiveness of MAP-21</td>
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<td>Do something that is operationally practical</td>
<td>Address multimodal network/transportation system</td>
<td>Expectation of asset management between engineers and decision-makers</td>
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<td>Reduce risk, improve resiliency</td>
<td>Aging infrastructure and systems</td>
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### Data

- **Data governance guidebook (data needs, objectives/guidance, standards for TAM, quality plan template for other assets – learn from pavements, TAM and the Internet of Things – Big Data)** (16)
- Best practice of other agencies such as DoD (1)
- Data fusion, interpretation and visualization (6)
- Collect once, used by many (6)
Decision-Making

- Target setting: relating high-level targets to factual data, expanding on NCHRP Report 666 (9)
- Operational vs. Capital Goal, other types of tradeoffs (6)
- Project bundling, improved costs models to address bundling (0)
- *Life cycle model for assets, considering life of asset from design to disposal (12)*
- Integrating AM and travel demand models (2)
- Reverse engineer decisions DOTs have to make (and then improve the modeling of them) (10)
- Scenario planning (3)
- Visualizing results (11)

Multimodal

- Transferring knowledge and best practices among modes (7)
- *Risk analysis/vulnerability: safety critical assets for transit, condition assessment (14)*
- Differing governing structures and how one model may be different from another (MBTA vs. RTD) (4)
Organizational Challenges

- Look at organizations that have been successful and identify success factors (7)
- Cultural issues/looking outside of traditional engineering firms (6)
- Determining what skills are needed for the agency employee of the future (as organizations transition from building to managing) (11)
- Empowering the emerging TAM leader (0)
- Connection between Performance, TAM and Risk (11)
- Employee engagement (1)
- How do we coordinate consultants (0)
- Fear factor of spending too much on software (1)
- Keeping TAM relevant w/ the “flavor of the month” (8)

Overall Ranking

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- Employee engagement (1)
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Organizational Models for Successful Transportation Asset Management Programs

- This research will focus on understanding successful organizational models for TAM program so that guidance can be provided on how to improve organizational capacities. Two products are sought through this research:
  1. Understanding of current organizational models for TAM programs
  2. Catalog of possible organizational models for TAM programs that transportation agencies could consider for improving TAM capabilities

Transportation Asset Management and Overall Transportation Management

- This research will focus on understanding TAM’s relationship to other transportation goals such as economic development, safety, environmental sustainability, mobility, and liveability. Two products are sought through this research:
  1. Framework for understanding the relationships between TAM and broad transportation goals.
  2. Guidance on how to ensure TAM connectivity to broad transportation goals throughout the transportation decision-making cycle.
## Exercise: Develop Research Statements

- Use the research priorities from the last two input sessions to generate candidate research statements
- Break up into groups of two to three people
- Select research priority(ies)
- Generate the following:
  - Title
  - Description/Background
  - Research Objectives
  - Research Plan
  - Project Duration
  - Project Budget
  - Notes