Developing an Asset Management Research Roadmap

NCHRP Project 08-36 (134)

Wednesday, March 30, 2016

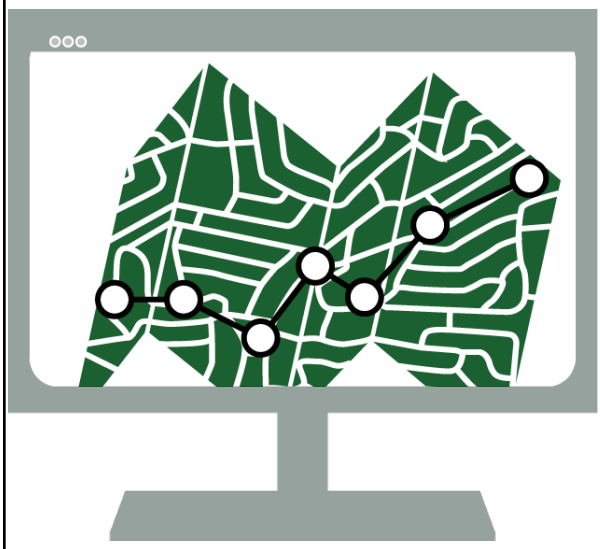
TAM ETG Meeting, Arlington, TX

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

2

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!

3

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.

5

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

6

TAM ETG Meeting – November 2015

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

8

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*

9

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, ect. (**2 votes**)

10

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 transportations system (**4 votes**)
  - If we don't maintain; turn to gravel

11

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

12

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 transportations system (**4 votes**)
- Tools available (**3 votes**)
- Common stats for comparing asset performance (**2 votes**)
- How do we develop a workforce to focus on analytics, ect. (**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**)

13

TRB Annual Meeting Workshop – January 2016

RESEARCH PRIORITIES

Current Context

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

15

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)

16

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)

17

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)

18

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)

19

Overall Ranking

- 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)
- Risk analysis/vulnerability: safety critical assets for transit, condition assessment (14)
- Life cycle model for assets, considering life of asset from design to disposal (12)
- Visualizing results (11)
- Determining what skills are needed for the agency employee of the future (as organizations transition from building to managing) (11)
- Connection between Performance, TAM and Risk (11)
- Reverse engineer decisions DOTs have to make (and then improve the modeling of them) (10)
- Target setting: relating high-level targets to factual data, expanding on NCHRP Report 666 (9)
- Keeping TAM relevant w/ the "flavor of the month" (8)
- Transferring knowledge and best practices among modes (7)
- Look at organizations that have been successful and identify success factors (7)
- Data fusion, interpretation and visualization (6)
- Collect once, used by many (6)
- Operational vs. Capital Goal, other types of tradeoffs (6)
- Cultural issues/looking outside of traditional engineering firms (6)
- Differing governing structures and how one model may be different from another (MBTA vs. RTD) (4)
- Scenario planning (3)
- Integrating AM and travel demand models (2)
- Best practice of other agencies such as DoD (1)
- Employee engagement (1)
- Fear factor of spending too much on software (1)

20

RESEARCH STATEMENTS

NCHRP 08-36 Research Statements

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.

22

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

23