

# **Integrating Asset Management into the Metropolitan Planning Process: A Peer Exchange**

Submitted to:

**Federal Highway  
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## Introduction

This report summarizes the proceedings of *Integrating Asset Management into the Metropolitan Planning Process*, a peer exchange organized by the Federal Highway Administration's (FHWA) Office of Asset Management and Office of Planning. It was held in Traverse City, Michigan on July 18-19, 2006.

The goal of the peer exchange was to bring representatives from state departments of transportation (DOTs) together with representatives of metropolitan planning organizations (MPOs) to discuss the use of Asset Management techniques in the metropolitan planning process. Participants were chosen to ensure a diverse group, with representatives for all parts of the country as well as from jurisdictions of various sizes. In addition, participants were chosen to bring together representatives with a range of experience in Asset Management.

David R. Geiger, Director of FHWA's Office of Asset Management, opened the Peer Exchange by welcoming the participants and explaining that the goal of the meeting was to gather information on best practices. He expressed concern that state DOTs and MPOs are not collaborating enough and there is a need to integrate the state transportation improvement programs (STIPs) with local-level transportation improvement programs (TIPs).

Mr. Geiger explained that some of the participants have many years of experience using Asset Management while some are just beginning to implement an Asset Management program. Those who have more experience in Asset Management were encouraged to share their knowledge and experience with those just starting the process. Finally, Mr. Geiger encouraged the participants to view the potential of Asset Management in areas beyond infrastructure and begin to find ways to apply its techniques to areas such as safety.

## Summary of Key Themes

While each organization differed in its experience, several key themes recurred in a number of presentations.

### 1. MPOs and Asset Management

**The Varying Role of MPOs in Asset Management:** The role of MPOs in Asset Management varies widely, largely depending on their role in system preservation. Some MPOs are primarily involved in capacity expansion and currently do not have much involvement in preservation and maintenance. Therefore, such MPOs are not generally involved in Asset Management at all. Others considered preservation and maintenance, but only at a program level, not including review of specific projects. Those MPOs who have the most developed Asset Management programs are those who take active roles in both preserving and maintaining existing assets and planning for new capacity.

Unlike state departments of transportation, most MPOs do not have direct ownership of assets and are therefore not involved in most maintenance decisions. Rather, they work with state and local governments who have sizable assets to coordinate planning for the overall transportation system. Many DOTs set funding category levels, including how much should be invested in system preservation and how much in new capacity, and the MPOs accept these program-level allocations. For these reasons, the state departments of transportation at the peer exchange typically had significantly more experience in Asset Management than the MPOs in attendance.

**Trends in MPO involvement in Asset Management:** MPOs are becoming more interested in implementing Asset Management programs. Most formal programs are in early stages of development; however, MPOs have been involved in related activities.

For the past number of years, MPOs have become more involved in collecting the type of data needed for Asset Management. Many are beginning to take advantage of data collected by the state DOTs. Several of the MPOs at the exchange, such as the Southeast Michigan Council of Governments (SEMCOG) and the Capital District Transportation Committee (CDTC), are using the data to determine the long-term funding needs of their assets. Depending on the level of involvement within an MPO, some are able to select specific projects at a program level.

In general, MPO Asset Management programs are considerably less extensive than those within state DOTs. The level of involvement in Asset Management largely depends on the role of the MPO in preservation, the level of resources the MPO has and the interest of the state in Asset Management.

**Possible Future Roles of MPOs in Asset Management:** MPOs could choose to take on roles in Asset Management ranging across a continuum from actively using Asset Management to simply implementing Asset Management strategies developed on the state or regional level. Those MPOs with a more active involvement may implement Asset Management in ways similar to DOTs. Other MPOs may choose to take on a role of Asset Management champion or facilitator, encouraging and supporting the use of Asset Management among the local governments in its jurisdiction. Each MPO could find its place along the continuum to best match its role in the community and relationship to its region's assets.

Open communication between the MPOs and their state DOT is essential for a successful Asset Management program on a regional level. DOTs generally have experience, data collection processes and management systems that can be of use to MPOs. By working together, the state DOTs and MPOs can improve asset management throughout their state resulting in improved system performance.

## 2. The Benefits of Asset Management

**Both MPOs and DOTs are finding significant benefits from their Asset Management programs:** The peer exchange participants who have been using Asset Management shared their experiences with the benefits that it brought their agencies and constituencies. The following are selected benefits that were mentioned throughout the Exchange.

- *Improvements in information technology systems have allowed investment decisions to be more data-driven than in the past:* Since transportation agencies are expanding their information technology infrastructures they are collecting more and better data. This data is being used to drive investment decisions and leads planning to be increasingly based on quantitative goals in addition to qualitative ones.
- *Asset Management can be effective at depoliticizing the allocation process and winning support:* Since investment decisions are made using carefully collected and analyzed data, there is less room for political pressures in the decision-making process. Transportation planning staff can provide decision-makers with detailed data to support their recommendations. By using these data, participating state DOTs and MPOs found that the program helped them convey the importance of operations and preservation to legislators and other stakeholders.
- *Organizations are setting and meeting performance targets and agency goals:* Agencies are using Asset Management principles to set quantifiable performance targets. These targets are directly related to the overall agency goals and objectives. Through the use of performance targets, state DOTs and MPOs can measure their success in meeting their larger-scale goals and demonstrate the effectiveness of their investment choices to stakeholders.
- *Longtime users of Asset Management programs are beginning to see measurable results:* Since Asset Management has been used for the past several years, early adopters are beginning to see measurable improvements from their programs. For example, Michigan

saw the percentage of pavements in “poor” condition go down to 9% from 36% ten years ago.

**Marketing the benefits of Asset Management can be a challenge:** Preservation must compete with capital projects for dollars. Asset Management efforts do not include “ribbon-cutting” ceremonies and therefore often are not as attractive to elected officials as are new capital projects. Nevertheless, some agencies have found creative methods to explain the benefits of such systems. For example, in Colorado, the Department of Transportation emphasized the value of Asset Management in snow and ice removal, which is a priority to the electorate.

### **3. Advances in Asset Management**

**Asset Management among state DOTs is most advanced in the areas of pavement and bridge management:** Pavement and bridge management have traditionally led the way in the development of Asset Management implementations. These areas are a natural fit for Asset Management due to their clear definition as assets and obvious need for preservation. Further, the majority of a DOT’s asset value is in these two classes. On the other hand, Asset Management programs are less well developed for other asset classes, such as traffic control devices, safety hardware, and drainage and ancillary structures.

**Most states use management systems for allocating funds and prioritizing projects within “silos” or “stovepipes”:** Most states have developed a set of asset classes for budgeting and investment decisions. Within these classes, investment decisions tend to be data-driven based on predictive models and similar tools. However, allocations across asset classes are often based on factors such as historical patterns, preset formulas, and judgment.

**Most states are emphasizing a “preservation first” approach:** Many states have documented shifting investment priorities to include a greater focus on preservation of existing assets at the expense of constructing new assets.

### **4. Types of Assets**

**There is a range of practice in the identification of asset classes:** While nearly all states include pavements and bridges as asset classes, the lists of other asset classes range significantly from state to state. For example, Maryland is implementing an Asset Management program for sidewalks to support Americans with Disabilities Act (ADA) compliance, while Washington State includes roadway slopes. Other asset classes in use are highway signs, traffic signals, rest areas, right-of-ways, culverts and overhead lights. Several states are realizing that they have significant assets in drainage facilities and wetlands and are using Asset Management principles for environmental management. The practice of Asset Management can continue to be improved and expanded by adding new asset categories that can benefit from this management method.

### **5. Performance Measures**

**Performance measures may vary between urban and rural areas:** Some states with large urban centers, such as Maryland and New York, noted that it is not practical to have uniform performance standards across urban and rural roads. This is because urban roads are subjected to considerably more stress than the rural roads. However, Michigan and Ohio said that while performance measures range based on type of road, they remain consistent across all areas of the state.

### **6. Common Challenges in Integrating Asset Management into the Planning Process**

One of the important roles of a peer exchange is to discuss common challenges and work together toward solutions. Many agencies found similar challenges in implementing Asset Management.

## ***Staffing***

**Many organizations are facing high staff turnover:** Since Asset Management requires significant training of staff, especially in areas of data collection and analysis, staff turnover is a common problem among organizations. Many are finding that long-time staffers with large amounts of agency knowledge are retiring.

## ***Data***

**Choosing which data to collect and how to manage is important:** Some agencies are collecting more data than they are using. Data collection is expensive and labor intensive. Some organizations are finding that they have more data than they can analyze and use. Agencies agreed that they should make an effort to collect only the data that are relevant to their operations and planning.

**There is a lack of uniformity among information technology systems:** Lack of uniformity of data systems is a challenge for DOTs and MPOs since they must coordinate data from a number of local and regional agencies. Some states have implemented uniform road referencing systems to begin to manage this challenge.

## ***Integrating Capacity Expansion and Safety***

**Asset Management programs do not integrate well with capacity expansion or safety projects:** The nature of Asset Management programs is to allocate investment choices among asset classes. However, the integration of Asset Management with planning for capacity expansion and safety requires a unified system. New York is endeavoring to adopt this approach; most other states have not yet done so. Allocating limited funds requires making tradeoffs. While the Asset Management programs assist in making tradeoffs within the program, states and MPOs are struggling to include other areas in these decisions as well.

## **Next Steps**

Following the presentations, the peer exchange participants discussed next steps that can be taken by the FHWA and other organizations to address some of the challenges in integrating Asset Management into the MPOs' planning and programming processes.

### **1. Research Ways to Involve MPOs in Asset Management**

**Conduct a Survey of MPOs:** Survey MPOs across the country to gauge:

- Awareness and interest in Asset Management
- Current and planned Asset Management activities
- Level of involvement in maintenance and operations activities
- Existing infrastructure for implementing an Asset Management program

This survey could be administered with the assistance of the Association of Metropolitan Planning Organizations (AMPO), which has approximately 200 members. Survey questions could include:

- What percentage of the work done at your MPO is for capacity expansion and what percentage is system preservation?
- Does your MPO engage in Asset Management techniques? If so, briefly describe the Asset Management program in place?
- Does your MPO take advantage of data collected by the state DOT for Asset Management?
- Would your MPO be interested in further engaging in Asset Management? If so, what type of assistance would you need?

**Define the role of MPOs in Asset Management:** Currently, the role of MPOs in Asset Management is not clearly defined. Many MPOs use some form of Asset Management but there is little consistency among them. Since MPOs do not own assets, their role in Asset Management programs will differ from that of state DOTs and local governments. Similarly, many are only minimally involved in maintenance and operations, while others are involved only at the program level. Therefore, research could evaluate alternative roles for MPOs in Asset Management. This could include a greater role in data collection or as facilitator of Asset Management among local governments.

**Promote Best Practices of MPOs in Asset Management:** Since there is wide variety in the use of Asset Management among MPOs, the FHWA or another national organization could take the lead in promoting best practices of MPOs that have successfully integrated Asset Management principles.

## **2. Document and publicize the benefits of Asset Management**

As discussed in key theme #2 above, there are numerous benefits to using Asset Management. In order to further take advantage of Asset Management, DOTs and MPOs around the country should be made aware of the benefits of a formal Asset Management program.

Many organizations have been using Asset Management long enough to have been able to collect data on its economic benefits. For example, Maryland DOT has determined that its pavement management system saves it approximately \$30 million a year. This data can be used to encourage transportation organizations to use Asset Management and to secure funding for the implementation and expansion of such systems.

The first step is to document the benefits of Asset Management. Currently, FHWA is working on a review of pavement management systems, and plans to expand this effort to other aspects of Asset Management as well. This and similar programs can begin to quantify the savings from these programs.

Once the benefits are documented, the FHWA and other organizations can proceed to publicize these benefits through publications, presentations at conferences and additional Peer Exchange programs.

## **3. Improve the Practice of Asset Management through Research**

**Refine methods for cross-asset analysis:** As noted above, many Departments of Transportation have strong silo-based asset planning systems. This allows for tradeoffs within silos, but less so across asset classes. Research can collect best practices in this area and determine methodologies for conducting analysis across asset silos.

**Integrate new capital and safety projects into Asset Management:** Asset Management programs focus on existing assets. However, investment decisions need to include new capacity expansion and safety projects as well. Research can further define how to integrate new capital projects into existing Asset Management programs.

**Include non-financial goals in Asset Management programs:** Asset Management programs are designed to optimize transportation investments based on financial constraints. Research can determine the feasibility of including non-financial elements such as social and environmental goals.

**Incorporate replacement needs into Asset Management:** Currently, most Asset Management programs address resurfacing and re-decking of highways and bridges, but do not take replacement needs into account. The need to replace concrete pavements, in particular, is a major pending requirement for most of the country. Research is required to define methodologies for incorporating these replacement needs into long-term investment planning.

**Refine performance measures:** Setting performance measures is an important element of any Asset Management program. Agencies use these performance measures to gauge the success of

their investment decisions. A research study can compare the performance metrics that are used around the country and determine which are best suited for the various asset classes. New metrics can also be developed that may more accurately assess conditions than those in use currently. This would build upon the work already completed in National Cooperative Highway Research Program Report 551 – Performance Measures and Targets for Transportation Asset Management, with particular reference to identifying performance measures that would be of interest to metropolitan planning organizations.

**Develop an economic justification for Asset Management:** In order to better demonstrate the benefits of Asset Management, an economic model can demonstrate how the use of this system translates into substantial dollar savings for public entities. Further research can explore the connections between Asset Management and reduced road congestion costs.



## Participant List

### State Departments of Transportation

#### Colorado Department of Transportation

Scott Young, *Investment Analysis Manager*

#### Maryland State Highway Administration

Neil J. Pedersen, *Administrator*  
Jeffrey H. Smith, *Deputy Director of Office of Planning and Preliminary Engineering*

#### Michigan Department of Transportation

Kirk T. Steudle, *Director*  
Ronald L. Vibbert, *Manager of Strategic System Operations and Maintenance*

#### New York State Department of Transportation

Tim Gilchrist, *Chief of Transportation Strategy*  
Louis H. Adams, *Head of Modeling and Forecasting Section*

#### Ohio Department of Transportation

Leonard Evans, *Administrator - System Analysis Planning*

#### Oregon Department of Transportation

Catherine Nelson, *Technical Services Manager/Chief Engineer*

#### Washington Department of Transportation

Aaron Butters, *Systems Analysis and Program Development Manager*

### Metropolitan Planning Organizations

#### Baltimore Metropolitan Council

Eileen Singleton, *Senior Transportation Engineer*

#### Capital District Transportation Committee

John Poorman, *Staff Director*

#### Houston-Galveston Area Council

Lily Elizabeth Wells, *Transportation Program Coordinator*

#### Lane Council of Governments

Paul Thompson, *Senior Planner*

#### Northeast Ohio Areawide Coordinating Agency

John Hosek, *Division Director*  
Gary Grano, *Senior Transportation Planner*

#### Pike's Peak Area Council of Governments

Craig Casper, *Transportation Director*

#### Southeast Michigan Council of Governments

Carmine Palombo, *Director of Transportation*

### Federal Highway Administration

David R. Geiger, *Director of Asset Management*  
Robert Ritter, *Planning Capacity Building Team Leader*  
Stephen Gaj, *System Management & Monitoring Team Leader*

### PB Consult

Wayne McDaniel, *Principal Consultant*  
Virginia Ramos, *Marketing Coordinator*  
Amy Zwas, *Consultant*

**Integrating Asset Management into the Metropolitan Planning Process  
A Peer Exchange**

**AGENDA  
Grand Traverse Resort  
Traverse City, Michigan  
July 18 – 19, 2006**

**Tuesday, July 18th 12:00 PM**

Welcome and introductions	David R. Geiger, FHWA
Review of peer exchange structure	Wayne McDaniel, PB Consult
Experience in Michigan	Kirk T. Steudle/Ron Vibbert, MiDOT Carmine Palombo, SEMCOG
Experience in Maryland MSHA	Neil Pedersen/Jeffrey H. Smith,  Eileen Singleton, BMC
Experience in Colorado	Scott Young, CDOT Craig Casper, PPACOG
Experience in Washington	Aaron Butters, WSDOT
Adjourn 5:00 PM	

**Wednesday, July 19th 8:00 Asset Management**

Experience in New York NYSDOT	Timothy Gilchrist/Louis Adams,  John Poorman, CDTC
Experience in Ohio	Leonard Evans, ODOT John Hosek, NACOA Gary Grano, NACOA
Experience in Oregon	Kathleen Nelson, ODOT Paul Thompson, LCOG
Experience in Texas	Lily Wells, H-GAC
Common themes/what we've learned	Robert Ritter, FHWA
Wrap up and next steps	David R. Geiger, FHWA
Adjourn 12:00 PM	

## Participant Responses

**Colorado Department of Transportation**  
Scott Young

1. **How is your organization using Asset Management in the following two broad topic areas:**
  - a. **Providing long-range guidance to agency resource allocation that is consistent with policy objectives.**

The Colorado Transportation Commission allocates funds according to investment categories, and programs within each investment category, consistent with its adopted investment level performance objectives. Tradeoffs are made between investment categories. Core service action plans are linked to the investment categories and performance objectives associated with each relevant investment strategy. Work programs for various organizational units should also be consistent with the core service action plans.

The policy decisions at the Colorado Department of Transportation (CDOT) are led by the Asset Management Task Force made up of executive-level staff, the State Transportation Advisory Committee and the Information Technology Management Team made up of CDOT division directors.

CDOT has set up an Investment Strategy Framework to ensure that investments are consistent with policy objectives. The framework includes investment categories and Core Services Action Plans. Each Region / Division creates a program plan that outlines activities that support Investment Level Goals and Objectives and Core Service Action Plans. The implementation of this services framework crystallized the importance of linking Asset Management needs to Department goals and objectives.

Investment Level Goals	Objectives and Core Service Action Plans
<ul style="list-style-type: none"> <li>• Safety</li> <li>• System Quality</li> <li>• Mobility</li> <li>• Program Delivery</li> </ul>	<ul style="list-style-type: none"> <li>• Roadway Management</li> <li>• Roadside Management</li> <li>• Snow &amp; Ice Management</li> <li>• System Operations</li> <li>• Project Delivery</li> </ul>

Goals and objectives are identified for each level of the framework (Investment Categories, Action Plans, and Work Plans) throughout CDOT to align efforts and assure the activities are linked to the policy-level policy and performance objectives. This helps manage financial, people and hard assets in a manner consistent with policy direction of the Transportation Commission. Regional plan investment priorities and tradeoffs are discussed and documented by transportation corridor in terminology consistent with the investment framework.

Asset Management is integrated into the long range plan by asking Transportation Planning Regions to indicate for each transportation corridor, what percentage of the project is safety, system quality, mobility or program delivery. The Colorado Transportation Commission considers cost and benefits of investing in each investment category and program derived from management systems in allocating limited resources in an optimal manner.

**b. Identifying and evaluating strategic investment choices and analyzing tradeoffs between them.**

Resource Allocation decisions are made based on the information from the CDOT Management Systems as well as the Performance Measures program. Resource Allocation discussions are held with CDOT Executive Management Team as well as MPOs, Transportation Planning Regions, and State Transportation Advisory Committee members. These discussions are largely based on information developed through the management systems for pavement, maintenance, bridge, safety, and congestion.

**2. Description of structure of Asset Management program**

**a. What systems and software are being used?**

- Cross functional teams can work together to see how key processes can meet stated goals and objectives. Organized by KEY PROCESS (Roadside Mgt., Roadway Mgt., Snow & Ice Mgt., System Operations, Project Delivery) , not organizational division.
- ERP / SAP software to bring together data from different software.
- New financial system within SAP will allow for better informed financial decisions based on more current information.
- Maintenance activities will be tracked in the ERP / SAP system to replace manual tracking. – overlaid with a geographic information system (GIS).

**b. Is information from the state's system shared with the MPO and, if so, how?**

Data is shared with MPOs. Management systems are open to public evaluation. MPOs and other planning partners formally advise the Transportation Commission on resource allocation decisions.

**3. In the three broad topic areas noted in Question #1, who are the primary users of Asset Management and how are they using it:**

**a. Staff level for resource allocation analysis?**

Executive Management and Policy Board

**b. Director level for decision-making?**

Yes

**c. Elected official level as information mechanism?**

Through the Governor-appointed policy board

**d. With the general public as an information mechanism?**

Minimal

**e. Is there a current education and training program for some or all of these users?**

Training is mainly provided to CDOT staff. Some information presentations have been given to planning partners (MPOs, the State Transportation Advisory Committee, Transportation Planning Regions, etc.)

- 4. Benefits to using Asset Management:**
- a. How has your team improved the planning and programming process through the use of Asset Management principles and data?**  
There is a clearer ability to better use assets to meet Department Goals and Objectives. Progress has resulted in developing performance objectives based on quantitative data.
  - b. Has the composition of the program changed as a result (e.g., increased emphasis on preservation)?**  
Policy priority is on preservation of the current system, based largely on information from the management systems.
- 5. Barriers to Asset Management**
- a. Problems with collection and integration of data?**  
Collecting data for performance measures and tradeoff analysis on a consistent and statewide basis is a huge undertaking.
  - b. Interagency cooperation?**  
Data sharing and policy consultation with planning partners on appropriate trade offs.
  - c. Understanding the benefits (especially with decision-makers and the public)?**  
Yes
- 6. Are you using Asset Management principles and data for non-highway modes? If so, how?**  
This is not applicable since in Colorado, other modes do not fall under the purview of the state DOT.
- 7. What improvements would you recommend in the implementation of Asset Management?**
- a. Aspects that require improvement?**
    - Better communication
    - Improved trade off analysis/optimization tools
    - Better global understanding of Asset Management by various levels of management
      - For example, topics could be covered with engineers at various American Association of State Highway and Transportation Officials (AASHTO) and Transportation Research Board (TRB), etc. conferences.
  - b. Topics for future research?**  
Improved trade off analysis/optimization tools

## **Pikes Peak Area Council of Governments**

Craig Casper

The Pikes Peak Area Council of Governments (PPACG) has recently modified the planning and programming process, making it similar to Asset Management. The goal of the program is to better communicate funding shortfalls and investment trade offs, with an aim of more proactive, not reactive, planning.

Pikes Peak faces unique challenges due to the nature of its population. There are five military bases within the region that are growing quickly. According to the Texas Transportation Institute (TTI), it is the most congested city in the country under 500,000 even with approximately seven percent of travel within the region on bicycle or foot. This prompts the need for smarter investments and requires significant public involvement. Preservation is a priority and 55% of the proceeds from a recently-enacted 1 cent sales tax is allocated to preservation.

PPACG collects data from various sources, and one major challenge is bringing together the data from the various formats. This includes Colorado DOT data, public health data, socioeconomic forecasts and much more.

The agency is implementing several sophisticated information technology systems:

- Recently updated travel demand modeling software
  - Includes signal locations and timing
- FHWA's HERS-ST
- FHWA's IDAS software
- FHWA's TELUM software
- StratBENCOST

By using better data and more advanced software, PPACG is able to evaluate various project scenarios given a number of variables. This allows it to highlight tradeoffs and make better recommendations for projects to include in the Plan and TIP within the region's financial constants.

PPACG hopes to integrate this system with a set of performance standards. It is currently using citizen and technical focus groups to set these performance standards.

Pikes Peak faces a number of issues in its planning and programming process:

- Staffing changes
- Data from CDOT
- Uncertainty of inputs (costs, pavement deterioration)
- Data from local governments
- Lengthy time intervals for feedback from various committees and from the public
- Neighborhood opposition to capacity expansion

## Maryland State Highway Administration

Neil Pederson  
Jeffrey H. Smith

### 1. How is your organization using Asset Management in the following two broad topic areas:

#### a. Providing long-range guidance to agency resource allocation that is consistent with policy objectives.

One of the guiding principles in the Maryland State Highway Administration's (MSHA) Asset Management program is to recognize the primacy of the goals and objectives outlined in the State Highway Administration's (SHA) Business Plan. SHA and the DOT lack a formal cross-class Asset Management program to assess the effects of tradeoffs in resource allocations and their impact on goals.

Maintaining designated service levels is a key feature of Maryland's Asset Management program. On an informal basis, most fund managers understand the effects of funding amounts on the service performance objective for their asset class. Within SHA the only really good predictive tool to assess service level performance in direct relation to a budget level is with the pavement management system. With the pavement management system staff can and do project network service levels based on various budget levels for pavement preservation. The goal is to get to the point where all of system preservation fund managers can tell us what effect a change in budget levels will have on service levels for the asset this year and at least 5 years into the future.

#### b. Identifying and evaluating strategic investment choices and analyzing tradeoffs between them.

The Maryland State Highway Administration (MSHA) wants to use Asset Management to evaluate tradeoffs between maintenance and capital investment decisions. Over the past twenty years, system preservation has grown dramatically at the expense of capital expansion.

### 2. Description of structure of Asset Management program

#### a. What systems and software are being used?

MSHA had the following systems in place:

- Very sophisticated pavement management system.
- Another system for bridges and retaining walls.
- Strict pollution and drainage Asset Management programs. Maryland has the most stringent runoff restrictions in the country due to the Chesapeake Bay and this has caused an increased emphasis on applying Asset Management principles to drainage structures.
- Maryland is now implementing an Asset Management program for sidewalks to support Americans with Disabilities Act (ADA) compliance.

In addition, MSHA formed an Asset Management steering committee with members from various disciplines. Their goal is to guide the expansion of Asset Management beyond pavement and bridges. Under the auspices of the steering committee, Maryland has significantly expanded its Asset Management program to include a variety of asset classes and is evaluating others to add.

**b. Is information from the state's system shared with the MPO and, if so, how?**

Information from management systems is not formally shared. The MPO TIPs contain area wide project category line items for system preservation activities like resurfacing, bridge rehabilitation, traffic control devices, etc., and the DOT selects specific projects to implement. The Baltimore and Washington MPOs do not seek to micro-manage the selection of preservation projects but want to have confidence in the prioritization process.

**3. In the two broad topic areas noted in Question #1, who are the primary users of Asset Management and how are they using it:**

**a. Staff level for resource allocation analysis?**

Staff level engineers and program managers use condition information, expected project benefits and management objectives to recommend the programming of specific infrastructure improvements.

**b. Director level for decision-making?**

At the Director level staff recommendations for specific improvement/remediation projects are reviewed in the context of performance objectives and available budgets, and concurrence is given on whether to proceed with the proposed project.

**c. Elected official level as information mechanism?**

MDOT uses Asset Management as a way to educate elected officials on the importance of asset preservation in order to secure additional funding.

**d. With the general public as an information mechanism?**

Our agency's business plan includes objectives for attaining desired performance standards for a number of our assets, e.g. 83% of pavements in acceptable condition, no weight-restricted structures on the National Highway System (NHS), 98% of signs functioning as intended, etc. These measures are reported on annually in the agency's and department's published annual attainment reports.

**e. Is there a current education and training program for some or all of these users?**

Currently no formal training programs are in place; training occurs on an ad hoc basis.

**4. Benefits to using Asset Management:**

**a. How has your team improved the planning and programming process through the use of Asset Management principles and data?**

MDOT's management systems for pavements and bridges (our first and second highest funded preservation categories by asset type) have existed for the longest period of time. As a consequence, management systems for these asset classes are more evolved than management systems for other asset classes. Efforts have been undertaken to improve these management tools and new management system tools have or are being developed for assets categories like drainage assets, lighting assets and sidewalks. The agency is pursuing a concerted effort to develop



management tools that provide information to make more data driven decisions for all asset classes.

**b. Has the composition of the program changed as a result (e.g., increased emphasis on preservation)?**

Over the past 20 years the mix of capital expansion projects compared to system preservation projects has shifted dramatically toward a system preservation first philosophy. In 1982, a transportation revenue program focused on preservation and the elected leadership of the state has accepted that priority ever since. Non capacity expansion projects now account for more than half our agency's capital program.

**5. Barriers to Asset Management**

**a. Problems with collection and integration of data?**

Given the volatile costs of materials such as steel, asphalt, etc., it is hard to do predictive analysis with costs.

One of the biggest hurdles in implementing Asset Management approaches is data collection. While it is important to collect data on asset attributes needed for decision-making, there is a tendency to collect unnecessary information as well. This leads to more expensive data collection and a feed the [data] machine mentality.

**b. Interagency cooperation?**

Many current initiatives are emphasizing the involvement of non-owner/operators in the management of transportation infrastructure. The management systems tools, e.g. pavements, require specialized expertise from working within a specific field to fully understand the consequences of decisions; this is not easily transferable to others who do not have direct ownership/operator responsibilities. The most appropriate area for interagency cooperation is in setting appropriate performance level standards for assets.

**c. Understanding the benefits (especially with decision-makers and the public)?**

Performance trend data in comparison to desired service level standards is often an effective way to communicate agency performance and resource needs. However, there is difficulty in convening the effort/resources needed to obtain better information for decision-making and lack of quantifiable examples illustrating how an Asset Management approach results in tangible savings.

**6. Are you using Asset Management principles and data for non-highway modes? If so, how?**

The State Highway Administration is the main highway modal agency of a multi-modal DOT (transit, ports, airports, Motor Vehicle Administration). At the department level, an Asset Management steering committee has recently been formed to push Asset Management approaches to managing the assets of all the modes.

**7. What improvements would you recommend in the implementation of Asset Management?**

**a. Aspects that require improvement?**

Broader definitions of asset categories

- Lighting, signs and traffic signals
- Facilities for the disabled – pedestrian facilities, etc.
- Environmental liabilities – underground storage tanks, drainage facilities, etc.
- Integrate capacity expansion with pavement management

**b. Topics for future research?**

- How to assess the tradeoffs of allocating resources across various asset classes.
- Quantifying the benefits of Asset Management approaches in terms of dollars saved.
- How to effectively incorporate user perspectives into setting asset class performance standards, e.g., what does an International Roughness Index (IRI) of 'x' really mean to a motorist?

**Baltimore Metropolitan Council**  
Eileen Singleton

**1. How is your organization using Asset Management in the following two broad topic areas:**

**a. Providing long-range guidance to agency resource allocation that is consistent with policy objectives.**

The Baltimore Metropolitan Council's Long Range Transportation Plan (LRTP) is financially constrained. Almost 75% of the funding in the LRTP is allocated to system preservation and maintenance, which is determined in coordination with Maryland DOT. Since needs are generally greater than funding, it is valuable to ensure funding choices are consistent with policy objectives.

**b. Identifying and evaluating strategic investment choices and analyzing tradeoffs between them.**

The Council is working to integrate operations into the planning process, as currently most of the planning process is devoted to capacity expansion. Asset Management can be useful in making prioritizations within the long range transportation plan, such as highway vs. transit tradeoffs.

Current activities relating to Asset Management include:

- Some "hot spot" analysis comparing highway versus transit solutions
- Developing and collecting performance measure data on a regional basis
- Looking at performance measures from a user perspective, including a recent user satisfaction survey

**2. Description of structure of Asset Management program**

**a. What systems and software are being used?**

The Baltimore Metropolitan Council doesn't have an Asset Management program per se, but has travel demand forecasting tools and a LRTP project prioritization process used to select projects.

**b. Is information from the state's system shared with the MPO and, if so, how?**

We are currently working with modal administrations to refine which types of data would be valuable to enhance our process. To date, the council has not asked for the state's Asset Management data.

**3. In the two broad topic areas noted in Question #1, who are the primary users of Asset Management and how are they using it:**

**a. Staff level for resource allocation analysis?**

Council staff uses the systems for LRTP project prioritization and for the TIP.

**b. Director level for decision-making?**

Not Applicable.

**c. Elected official level as information mechanism?**

The system can provide useful information.

**d. With the general public as an information mechanism?**

The system can provide useful information.

**e. Is there a current education and training program for some or all of these users?**

No.

**4. Benefits to using Asset Management:**

**a. How has your team improved the planning and programming process through the use of Asset Management principles and data?**

Transportation planning process has included more input from local and state operators (Department of Public Works, DOT). An Asset Management program could allow a focus on operations to enter the planning process.

**b. Has the composition of the program changed as a result (e.g., increased emphasis on preservation)?**

It is too early to tell.

**5. Barriers to Asset Management**

**a. Problems with collection and integration of data?**

We do not collect or integrate Asset Management data.

**b. Interagency cooperation?**

Since MPOs don't really own assets, interagency cooperation is a necessity.

**c. Understanding the benefits (especially with decision-makers and the public)?**

Since current process is based on capacity expansion, a focus on Asset Management would be a large shift.

**6. Are you using Asset Management principles and data for non-highway modes? If so, how?**

We are not using Asset Management for non-highway modes currently.

**7. What improvements would you recommend in the implementation of Asset Management?**

**a. Aspects that require improvement?**

The following aspects could facilitate the use of Asset Management:

- Coordination and information sharing between state/local and MPO, assets owned by state and local
- Delineating Asset Management or operations-related projects in the LRTP/TIP
- Since capital projects don't include O&M costs, it is hard to compare capital projects and operating improvements
- Asset Management could be better integrated into the planning projects with the following improvements:
  - Developing regional performance measures
  - By comparing anticipated operational improvements to capacity improvements
  - By drawing public works and transportation operators into the process to provide input to planners and enhance the consistency of investment decision-making.
  - Integrating Asset Management into corridor planning

- Developing analytic tools to assess cost/benefit, return on investment, performance measures

**b. Topics for future research?**

Future research could include additional options regarding private sector involvement in Asset Management and an Asset Management approach to safety.

**Michigan Department of Transportation**

Kirk T. Steudle  
Ronald L. Vibbert

**1. How is your organization using Asset Management in the following two broad topic areas:**

**a. Providing long-range guidance to agency resource allocation that is consistent with policy objectives.**

MDOT is using Asset Management for project selection in the context of overall program goals. It also uses Asset Management to improve cost efficiency in project execution. Projects are solicited to fulfill stated goals.

**b. Identifying and evaluating strategic investment choices and analyzing tradeoffs between them.**

Asset Management principles applied to individual projects and programs to achieve program outcomes and stretch scarce dollar resources.

Asset categories create silos, and Asset Management procedures are used to evaluate tradeoffs between silos. This is done in order to achieve several policy goals over time.

**2. Description of structure of Asset Management program**

**a. What systems and software are being used?**

Road Quality Forecasting System and Bridge Condition Forecasting System

**b. Is information from the state's system shared with the MPO and, if so, how?**

There have been few requests from MPOs to get access to the non-project information, except through any planning studies that may require it.

**3. In the two broad topic areas noted in Question #1, who are the primary users of Asset Management and how are they using it:**

**a. Staff level for resource allocation analysis?**

Asset Management program mostly by staff responsible for various "silos" in the organization. They collect and analyze data and then run various funding scenarios.

**b. Director level for decision-making?**

Upper management agrees on goals and funding levels for the overall Asset Management program.

**c. Elected official level as information mechanism?**

Asset Management information is used to support higher level policy documents and to prepare reports that are used by elected officials.

**d. With the general public as an information mechanism?**

The general public is aware of the results of the Asset Management process, but less involved in the process itself.

**e. Is there a current education and training program for some or all of these users?**

There are several training opportunities for staff level participants in the Asset Management programs. First, staff members are put on teams in their subject area where they are trained informally.

Some staff members participate in a formal Asset Management course offered by Michigan State University called Pavement Preservation Applied Asset Management.

Many staff members attended the National Highway Institutes training course in Asset Management. For smaller agencies within Michigan, the Asset Management Council rewrote the National Highway Institute course to gear it toward local governments and smaller agencies. Several Michigan counties and cities have been trained through this course.

**4. Benefits to using Asset Management:**

**a. How has your team improved the planning and programming process through the use of Asset Management principles and data?**

MDOT has noticed the following improvements through its Asset Management implementation:

- Gave some accountability.
- Solidified condition goals as policy
- Focused on 'Mix of Fixes' approach
- Pavements in "poor" condition down to 9% from 36% ten years ago

**b. Has the composition of the program changed as a result (e.g., increased emphasis on preservation)?**

Asset Management implementation caused a complete re-write/re-thinking of how transportation programs were developed and resulting projects were selected. Programs now explicitly include preservations strategies.

**5. Barriers to Asset Management**

**a. Problems with collection and integration of data?**

While data integration is not an issue for MDOT, data collection is always an issue. There are large costs to collect, analyze, process, forecast, and store the data. This takes financial and non-financial resources.

One specific challenge is capturing work as it's performed. Currently, financial information about work performed is captured but actual work details are not captured.

**b. Interagency cooperation?**

MDOT has not found barriers from interagency cooperation. It successfully cooperates with a large number of local agencies.

**c. Understanding the benefits (especially with decision-makers and the public)?**

In marketing the benefits of Asset Management, there is some ambiguity as to whether we sell the process of Asset Management, the products or the results.

**6. Are you using Asset Management principles and data for non-highway modes?  
If so, how?**

Within MDOT, there is a concerted effort to apply Asset Management processes to all modes. Within modes, optimal strategies are identified for various funding levels.

Currently, IT systems do not apply to all modes. However, MDOT is in the process of bringing Aeronautics and Public Transportation into the system as it migrates systems to the web.

However, MDOT has little influence over non-highway modes, as each mode has its own funding. Furthermore, legislation prevents movement across modal boundaries. Therefore integration has to be on the operational side along with an attempt to coordinate activities and facilities.

**7. What improvements would you recommend in the implementation of Asset Management?**

**a. Aspects that require improvement?**

MDOT recommends the following improvements:

- Develop an effective combination of process, software, and culture
- Deal with staff turnover
- How to alter reporting to capture details about maintenance work performed in addition to aspects necessary for financial reporting
- Minimize separate data collection issues and ease workflow
- Make data collection a part of a job, not an unpleasant add-on

**b. Topics for future research?**

Further research in the practical application of global positioning systems for Asset Management would be useful.



**Southeast Michigan Council of Governments**  
Carmine Palombo

**1. How is your organization using Asset Management in the following two broad topic areas:**

**a. Providing long-range guidance to agency resource allocation that is consistent with policy objectives.**

The Southeast Michigan Council of Governments (SEMCOG) encourages the allocations of agency resources to be consistent with regional transportation plans. Currently, regional processes are being revised to emphasize the use of Asset Management principles.

**b. Identifying and evaluating strategic investment choices and analyzing tradeoffs between them.**

Asset Management allows SEMCOG to analyze regional needs within and among each "stovepipe" of asset classes. Through increased use of Asset Management techniques, the region is shifting from qualitative to quantitative goals.

**2. Description of structure of Asset Management program**

**a. What systems and software are being used?**

SEMCOG is just starting the process of implementing an Asset Management program. We are following the lead of Michigan's statewide Asset Management Council.

As part of the state Asset Management Council, there is an internet reporting tool which transportation agencies are mandated to use. This allows for consistent data collection throughout the state.

SEMCOG uses Paser and Roadsoft systems for collecting and analyzing data. Paser is a system developed by the University of Wisconsin. It includes a windshield survey and rates roads on a 10 point scale. Ratings are based on the type and the extent of defects. The Paser system allows for different ratings for different surface types.

The Roadsoft system is SEMCOG's strategic analysis model. It analyzes current and forecasts conditions by functional class. Using this model, SEMCOG is able to identify trends within road conditions.

**b. Is information from the state's system shared with the MPO and, if so, how?**

Because Michigan's Asset Management program is centralized through the state's Asset Management council, the council is able to make information available to all of the MPOs and to the DOT.

**3. In the two broad topic areas noted in Question #1, who are the primary users of Asset Management and how are they using it:**

**a. Staff level for resource allocation analysis?**

On the staff level, Asset Management resources are used to organize collected data.

**b. Director level for decision-making?**

Within SEMCOG, staff at the director level uses the data for project selection in some limited situations.

**c. Elected official level as information mechanism?**

By using the Asset Management program, SEMCOG is able to provide elected officials with options and choices between needs.

**d. With the general public as an information mechanism?**

The Asset Management program will give SEMCOG tools with which it can better explain its decisions to the public.

**e. Is there a current education and training program for some or all of these users?**

The State Asset Management council provides the following training:

- Training on PASER and ROADSOFT
- Training on data collection
- Training on overall benefits of Asset Management
- Training on how to get started – biggest challenge

**4. Benefits to using Asset Management:**

**a. How has your team improved the planning and programming process through the use of Asset Management principles and data?**

SEMCOG has found the following benefits from its Asset Management implementation:

- Identified assets, as many communities don't know what they have
- Developed projects
- Created a uniform rating method
- Provided decision-makers with information
- Enhanced confidence with the public
- Reduced political influence on programs
- Secured additional funding

**b. Has the composition of the program changed as a result (e.g., increased emphasis on preservation)?**

The program was in the process of changing, and implementing Asset Management at the same time facilitated this transition.

**5. Barriers to Asset Management**

**a. Problems with collection and integration of data?**

Data collection on the federal-aid system is funded; off-system data collection is a problem yet to be addressed. Also, high staff turnover is a challenge on the data collection and integration side, given the high level of expertise that is necessary.

**b. Interagency cooperation?**

Since SEMCOG works with a number of local communities, it is a challenge to integrate their many different data systems and different processes.

**c. Understanding the benefits (especially with decision-makers and the public)?**

Since there is no ribbon-cutting ceremony within Asset Management programs, it is hard to get elected officials involved. Additionally, it is difficult to educate the public and communities on the benefits.

**6. Are you using Asset Management principles and data for non-highway modes? If so, how?**

Not at this time.

**7. What improvements would you recommend in the implementation of Asset Management?**

**a. Aspects that require improvement?**

More training courses aimed at smaller communities would be beneficial.

**b. Topics for future research?**

Further research on data collection would be useful. For example, how often data needs to be collected and the minimum amounts necessary.

**New York State Department of Transportation**

Tim Gilchrist  
Louis H. Adams

**1. How is your organization using Asset Management in the following two broad topic areas:**

**a. Providing long-range guidance to agency resource allocation that is consistent with policy objectives.**

Federal aid is distributed to regions based on the extent and the condition of their systems. Regions then allocate those funds to the MPO or MPOs in that region. State highway funds are distributed based on extent of the system

Use of performance measures is an important element for the NYSDOT system. Network-level, corridor-level and project-level data collection and analysis tools are kept separate. Only data that is needed to support decisions is collected.

NYSDOT is careful to incrementally change existing tools rather than create new tools from scratch, unless a major change in technology occurs. Even when transitioning to new performance measures, NYSDOT continues to report on old measures until decision-makers become accustomed to and comfortable with the new measures.

**b. Identifying and evaluating strategic investment choices and analyzing tradeoffs between them.**

A panel of regional technical experts conducts qualitative multi-objective trade-off analysis. NYSDOT assets are divided into asset classes, with safety and mobility as additional categories. Tradeoffs are analyzed across asset classes – pavements, bridges, safety, and mobility - and within them. Each investment candidate follows a similar process and is analyzed according to the quantitative trade-off model as described in Transportation Research Record #1848. (This model is still considered a prototype.)

**2. Description of structure of Asset Management program**

**a. What systems and software are being used?**

The NYSDOT has the following systems in place:

- Bridge inspection, program worksheet and forecasting model
- Pavement visual rating (includes selected dominant distresses), quantitative profilometer ratings (IRI, rutting) and forecasting model
- Safety data is collected for performance measurement; crash reduction factors are estimated for candidate investment evaluation purposes; system-level performance is not yet forecast
- Mobility and reliability analyses are by the MPOs, and, therefore, vary
- Recurring and non-recurring excess delay for vehicles, persons and trucks and the economic losses attributable to congestion are calculated statewide using a technical tool

**b. Is information from the state's systems shared with the MPO and, if so, how?**

Information is shared with the MPOs and is generally transferred by CD-ROM or FTP transfer. Next generation data systems currently being

migrated into production are web-based and, therefore, capable of providing remote secure access for MPO direct use.

**3. In the two broad topic areas noted in Question #1, who are the primary users of Asset Management and how are they using it:**

**a. Staff level for resource allocation analysis?**

Staff at the NYSDOT uses the Asset Management programs to provide transportation management systems, for program development, condition & performance assessments and longer-term needs studies.

**b. Director level for decision-making?**

Those at the director level use the Asset Management programs for goals, policies, budgets & allocations, program review and approval and performance monitoring.

**c. Elected official level as information mechanism?**

Elected officials can use Asset Management programs for authorization of resources and to ensure agency accountability.

**d. With the general public as an information mechanism?**

The general public would use the Asset Management program primarily for bond authorization.

**e. Is there a current education and training program for some or all of these users?**

Not currently. Each region has a part time Asset Management leader who may require future training.

**4. Benefits to using Asset Management:**

**a. How has your team improved the planning and programming process through the use of Asset Management principles and data?**

The NYSDOT has noticed the following improvements:

- Use limited resources more efficiently
- Continuously improve performance
- Set performance targets
- Improve customer satisfaction
- Demonstrate needs for increased funding
- Quantitatively evaluate alternative scenarios and program tradeoffs
- Provide financial valuation of assets

**b. Has the composition of the program changed as a result (e.g., increased emphasis on preservation)?**

The following program changes indicate the effects of the NYSDOT Asset Management program:

- The MPO for the New York City Metropolitan area, which includes 65 percent of the state's population, has reduced the share of their allocation used for mobility to increase the shares for preservation, maintenance, safety and other investment purposes.
- The other four transportation management area (TMA) MPOs have decreased preservation from 67% to 51% to emphasize safety, maintenance, mobility and other investment purposes.

- The eight non-TMA MPOs have made dramatic changes in their allocation of funds, increasing maintenance, safety and mobility by decreasing preservation.

**5. Barriers to Asset Management**

**a. Problems with collection and integration of data?**

The risks and complexities of the data systems and technology projects are numerous. The databases and programs are large and complex, bringing risks and schedule overruns. Furthermore, programs are expensive due to limited market.

Electronic data collection for safety is a work in progress with the potential for next-day reporting of incidents an objective. Currently, much of the reporting is still paper-based.

**b. Interagency cooperation?**

Barriers due to interagency cooperation include former delays in enactment of SAFETEA-LU, federal obligation authority caps and legislative project selection. In addition, local fund sources may become less feasible in the future.

**c. Understanding the benefits (especially with decision-makers and the public)?**

Minimum life-cycle investment scenarios at the program level generally require extremely large investments early in the program (to address backlog of needs and invest in more costly but longer lasting materials) to achieve savings later in the life-cycle of assets. Thus far, elected leaders have not been willing appropriate enough funds soon enough to quickly achieve the long-term efficiencies attributable to implementation of Asset Management principles.

**6. Are you using Asset Management principles and data for non-highway modes? If so, how?**

At the Port Authority of New York and New Jersey and New York's Metropolitan Transportation Authority (MTA) Asset Management is used across modes including highways, tunnels, bridges, bus transit, subway transit, commuter rail, ports, port terminals, airports and aviation terminals. A uniform four-point condition rating scale is used across MTA agencies for all asset classes. Investment candidates are analyzed according to uniform standards across MTA agencies and asset classes.

**7. What improvements would you recommend in the implementation of Asset Management?**

**a. Aspects that require improvement?**

- NYSDOT recommends the following improvements:
  - Review the recommendations of the AASHTO Asset Management Guide
  - Review the recommendations of National Cooperative Highway Research Program (NCHRP) Report 545 "Asset Management Tools"
  - Implement the AASHTO Strategic Plan

**b. Topics for future research?**

Continue FHWA research, technical guidance, and training.

## Capital District Transportation Committee

John Poorman

### 1. How is your organization using Asset Management in the following two broad topic areas:

#### a. Providing long-range guidance to agency resource allocation that is consistent with policy objectives.

The Capital District Transportation Committee (CDTC) takes a holistic view of transportation in its broader context. This ensures the integration of transportation, land use, economic development and environmental plans. CDTC makes a strong connection between plans and implementation programs, which is continually refined. Asset management is integrated into CDTC's activities; system preservation, operation and management are a priority over expansion and other improvements. CDTC's long-range plan includes a comprehensive budget for system preservation, operations, maintenance, rehab and reconstruction / replacement for all public roads, transit systems and intermodal facilities.

#### b. Identifying and evaluating strategic investment choices and analyzing tradeoffs between them.

CDTC has adopted planning & investment principles which maintain integrity, equity and objectivity while building credibility. TIP programming choices are guided by Plan budgets for 17 project categories, allowing the program to reflect the balance (and Asset Management emphasis) of the Plan. Additionally, CDTC is active in "big picture" explorations that relate to stewardship and visit. For example, the Committee is engaged in a cooperative effort with the regional business group, the regional planning commission and the state university in a fiscal analysis of the impacts of alternative growth (amount) and development (location and form) futures. The analysis covers both costs for system preservation and reconstruction and system expansion for road, transit, school, sewer, water, utilities, etc.

### 2. Description of structure of Asset Management program

#### a. What systems and software are being used?

CDTC has the following data systems in place:

- NYSDOT annual bridge inventory (850 bridges)
- NYSDOT annual scoring of touring route system (2500 lane miles)
- CDTC biennial scoring of non-state FA system (1400 lane miles) since 1983
- CDTC quadrennial sample scoring of local roads (9400 lane miles) since 1984
- CDTC supplemental 100% scoring of Albany county roads
- CDTC supplemental 100% scoring of Albany city roads
- Transit system infrastructure age, rehab/replacement plans
  - Vehicles, stations
  - Facilities
  - ITS
- Signal system, ITS capital needs estimates
- Sidewalk inventories, "ped friendliness"
- Operations and maintenance
  - State
  - Non-state



- o Thruway
- o Transit

Regarding software, CDTC uses a highway condition prediction model developed as an extension of NYSDOT's model. CDTC's model is run separately for state and non-state federal aid roads, and for local system roads, using differing repair strategies, costs, budgets and deterioration rates to determine the long-range budget needs of the road system.

For other systems, spreadsheet software is used to evaluate alternative transit system rehab / replacement strategies and to approximate long-term annualized costs for capital replacement on rail and air intermodal facilities.

**b. Is information from the state's system shared with the MPO and, if so, how?**

NYSDOT has a "high view" of MPOs, so it does not interfere with programs and celebrates CDTC's success. To date, the state's systems have concentrated on its own highways, allowing CDTC to fill in the gaps with comparable analysis of non-state highways, local roads and streets and transit and intermodal system needs.

**3. In the two broad topic areas noted in Question #1, who are the primary users of Asset Management and how are they using it:**

**a. Staff level for resource allocation analysis?**

Staff uses the system for highway infrastructure 20-year modeling. They use this for state and non-state highways as well as other types of streets. The Asset Management program is also used in transit system replacement planning. This includes life-cycle analysis for selection of vendor, smoothing out replacement cycles and flex funding.

**b. Director level for decision-making?**

Director is integral with staff in using the data to offer policy issues and choices to decision-makers.

**c. Elected official level as information mechanism?**

Information is critical element to both long-range planning and short-ranged programming. The central most important issue in the current long-range plan update is the emerging information on budgetary needs for long-term pavement and bridge rehab and reconstruction; escalating costs and the emerging need for Interstate reconstruction will dominate the budget discussions in the plan update.

**d. With the general public as an information mechanism?**

Asset management is directly related to some prominent public concerns such as sustainability. System preservation and revitalization of older urban areas is accepted across the region as a higher priority than system expansion.

**e. Is there a current education and training program for some or all of these users?**

Staff is trained in the related software. The general public is informed of how Asset Management works through outreach activities. These activities always reinforce the priority of Asset Management.

**4. Benefits to using Asset Management:**

**a. How has your team improved the planning and programming process through the use of Asset Management principles and data?**

CDTC has noticed the following improvements through its implementation of Asset Management:

- Direct implementation funds to implement plan
- Address budget priorities at plan level
- Select projects at program level
- Review plan's budget priorities against program's spending priorities
- Steer funds to project categories that help program reflect the plan

**b. Has the composition of the program changed as a result (e.g., increased emphasis on preservation)?**

The composition of the program has changed. The complete articulation of Asset Management budgetary requirements and the use of Plan budgets in TIP development have excluded capacity projects from consideration in TIP development for nearly a decade. Preservation and renewal projects get significant attention, both on and off the state system.

**5. Barriers to Asset Management**

**a. Problems with collection and integration of data?**

None of any particular concern.

**b. Interagency cooperation?**

Only in the reluctance of NYSDOT to incorporate the results of our non-state analyses into official NYSDOT estimates of statewide transportation needs.

**c. Understanding the benefits (especially with decision-makers and the public)?**

Resources: There is a shortage of resources for maintaining the existing systems, including a \$50-\$80 M annual gap for pavement rehabilitation on all systems and in all jurisdictions.

Labor: Succession planning is a challenge for CDTC, as is recruitment and retention, especially within the transit realm.

Other issues include stability and global issues such as fuel consumption and sustainability.

The organization is constrained in terms of resources for system preservation and maintenance, but also limited in the resources available to even do the planning and policy development to support such an integrated approach. Projects to build new facilities and services often obtain political and financial commitment at the expense of basic system preservation work since they are more visible to the electorate.

**6. Are you using Asset Management principles and data for non-highway modes?  
If so, how?**

CDTA (the transit authority) recently selected a vendor for fleet replacement based on lifecycle costs. Port, rail station and airport infrastructure have need estimates incorporated into the long-range plan.

**7. What improvements would you recommend in the implementation of Asset Management?**

**a. Aspects that require improvement?**

Support for serious transportation Asset Management is hampered at the federal level because of the absence of a vision comparable to that which led to construction of the Interstate system. Our governance structure is fragmented, leaving many gaps in the cracks. For example, funding for locally-owned streets and highways is often overlooked by State DOTs.

**b. Topics for future research?**

TIP/STIP relationships between State DOTs and MPOs; the degree of integration of non-state Asset Management into MPO and statewide plans.

**Ohio Department of Transportation**  
Leonard Evans

**1. How is your organization using Asset Management in the following two broad topic areas:**

**a. Providing long-range guidance to agency resource allocation that is consistent with policy objectives.**

The Ohio Department of Transportation (ODOT) has a number of written documents that provide policy guidance. The Asset Management philosophies are congruent with the strategic plan and top-level goals. The biennial business plan filed with the State Legislature also helps to keep agency career professionals focused on key goals. In addition, the long range Access Ohio plan supports Asset Management practices.

**b. Identifying and evaluating strategic investment choices and analyzing tradeoffs between them.**

The Transportation Review Council, a multidisciplinary group of people from the DOT, businesses, and other areas of government to ensure large scale capacity and economic development projects get completed. This process insulates system preservation activities from controversial projects.

The department relies on an enterprise project delivery information system called "Ellis" to track the progress of all capital improvement projects, their cost as well as impact on pavement and bridge asset conditions. Monthly performance reports are managed through the organizational performance index, alerting managers of current progress and performance trends.

**2. Description of structure of Asset Management program**

**a. What systems and software are being used?**

ODOT has the following Asset Management programs in place:

- Pavement Condition Rating System
- Bridge Management System
- Safety and Congestion tracking systems
- Maintenance and Equipment management systems

**b. Is information from the state's system shared with the MPO and, if so, how?**

ODOT shares local pavement condition data with MPOs through written reports, asset datasets and GIS products including road inventory attributes.

**3. In the two broad topic areas noted in Question #1, who are the primary users of Asset Management and how are they using it:**

**a. Staff level for resource allocation analysis?**

Program managers – primary users

**b. Director level for decision-making?**

Deputy Directors and executive leadership

**c. Elected official level as information mechanism?**

Biennial budgeting process before the state legislature

- d. **With the general public as an information mechanism?**  
State of the transportation system reporting and long range planning.  
Decision criteria for project selection
- e. **Is there a current education and training program for some or all of these users?**  
Internal training for managers and users of various decision support systems. External communication strategy to inform transportation constituents and general public.

**4. Benefits to using Asset Management:**

- a. **How has your team improved the planning and programming process through the use of Asset Management principles and data?**

ODOT has had a number of successes using Asset Management, including:

- Reduced pavement deficiencies
- Reduced bridge deficiencies
- Normalization of system conditions between districts and counties
- Identifying and achieving sustainable conditions levels

- b. **Has the composition of the program changed as a result (e.g., increased emphasis on preservation)?**

ODOT has set a goal of achieving a steady state in asset conditions to preserve existing infrastructure and achieve consistent levels of service across the state. This includes keeping up with rate of degradation. To make this happen, ODOT has allocated investment dollars. In addition, there has been a focus on safety and congestion improvements for major investment projects.

**5. Barriers to Asset Management**

- a. **Problems with collection and integration of data?**

- Data integration – data from different sources may not line up in a GIS system
- Data maintenance
- Temporal data challenges
- 

- b. **Interagency cooperation?**

Ohio Geographically Referenced Information Program provides statewide leadership for facilitating local government implementation of GIS. Location Based Referencing System project identifies local assets to facilitate emergency response. Statewide program to provide updated imagery to all counties.

- c. **Understanding the benefits (especially with decision-makers and the public)?**

Through Asset Management, ODOT has seen improved management of assets by local governments and improved operation of transportation systems.

- 6. **Are you using Asset Management principles and data for non-highway modes? If so, how?**

Asset management principles have been applied to aviation, building and rest area planning.

- 7. What improvements would you recommend in the implementation of Asset Management?**
- a. Aspects that require improvement?**
- Improve integration of asset data collected from various sources, including local governments and private entities.
  - Deal effectively with a changing system. This will require handling of spatial and temporal changes.
  - Communicate effectively about all aspects of transportation Asset Management such as funding needs, customers and best practices.
- b. Topics for future research?**
- Simple tools for dynamically segmenting asset data collected at different locations.
  - Processes for extracting transportation Asset Management features from remote sensing information such as high resolution photography, Lidar or data collection vehicles.
  - Integration and maintenance of state transportation asset data with local government data for comprehensive network coverage.
  - Communicating Asset Management needs and benefits to local governments and legislators.
  - Identifying effective transportation Asset Management practices.

## Northeast Ohio Areawide Coordinating Agency

John Hosek

Gary Grano

### 1. How is your organization using Asset Management in the following two broad topic areas:

#### a. Providing long-range guidance to agency resource allocation that is consistent with policy objectives.

Northeast Ohio Areawide Coordinating Agency's (NOACA) Asset Management program is based in its Regional Transportation Investment Policy. As a rule, preservation is a board priority per the following guiding principle: "Prioritize funding for projects based on replacing and maintaining existing facilities in preference to building new ones".

#### b. Identifying and evaluating strategic investment choices and analyzing tradeoffs between them.

The Regional Pavement Management system is being used to allocate resources. The system identifies current and future Pavement Condition Ratings "PCRs", on a scale of 0-100. This applies to various types of pavement and identifies the severity and extent of different distress types.

By using this system, NOACA can identify the greatest need on a region-wide basis for eligible pavements. It allows staff to provide NOACA's Governing Board with information showing greatest needs, best use of funds, etc. The staff can evaluate different scenario analyses and examine the results.

### 2. Description of structure of Asset Management program

#### a. What systems and software are being used?

- ESRI – ArcMap 9.1
- ESRI – ArcIMS
- VHB's Proprietary "RoadManager" software to analyze data
- Web component to Pavement Management System

#### b. Is information from the state's system shared with the MPO and, if so, how?

Ohio DOT's Division of Planning, Office of Pavement Engineering collects pavement data by visible inspection. Data is collected yearly on Interstate, U.S. and State Highways and every other year on non-state roads, with a federal functional classification higher than a local road on both the urban and rural systems.

Data is transferred to NOACA either via e-mail (\*.zip file) or copied onto a CD. The format of the data so far has been either a Microsoft Access Database or geographic shape files.

NOACA manages the data and outputs in the Regional Pavement Management System. The input "raw" data is received from the Ohio DOT. This data is not available to NOACA staff; it is maintained by the Ohio DOT and is only available to ODOT employees. However, ODOT furnishes data to NOACA upon request in a timely manner.

NOACA also collects data from ODOT on area bridges and uses it in short and long range planning. In the short run, when bridge projects go through the project selection and prioritization process, NOACA provides the data to the relevant committees and to the board to help them prioritize the projects. From the long range perspective, NOACA uses the bridge data to provide an overall assessment of the system in the 20-year Transportation Plan.

**3. In the two broad topic areas noted in Question #1, who are the primary users of Asset Management and how are they using it:**

**a. Staff level for resource allocation analysis?**

To analyze and make recommendations.

**b. Director level for decision-making?**

Data is used for decision-making.

**c. Elected official level as information mechanism?**

Both appointed and elected officials can use the data.

**d. With the general public as an information mechanism?**

Communities use the data for their own needs. Limited information is available on the website.

**e. Is there a current education and training program for some or all of these users?**

Education and training is for key users.

**4. Benefits to using Asset Management:**

**a. How has your team improved the planning and programming process through the use of Asset Management principles and data?**

By using Asset Management, the investment process is based more on data and policies. This caused a shift in perceptions by local governments, which is very beneficial to NOACA. Since NOACA can't mandate a local government to make improvements, the system helps with communication and understanding.

**b. Has the composition of the program changed as a result (e.g., increased emphasis on preservation)?**

While there has always been an emphasis on preservation at NOACA, the Asset Management program helps deal with political issues.

**5. Barriers to Asset Management**

**a. Problems with collection and integration of data?**

So far, there have been no major roadblocks from data collection/integration. Data is collected yearly on the state system and every other year on the non-state system by Ohio DOT's office of pavement engineering. Currently, plans call for transfer of data by MS Access table format.

NOACA's, consultant, VHB, is planning to have data import routines to automatically import data into the RPM system. The mapping base for the NOACA RPMS is the Ohio DOT linear referencing system (LRS). Importing data into this system from other data sources has been difficult.



NOACA's RPM system currently covers all roadways with a federal functional classification higher than a local road. Approximately 3,150 centerline miles or about 30% of all roadways are currently included in the RPM system. The system is designed to be flexible; in the future jurisdictions may include their local roadway network.

**b. Interagency cooperation?**

Overall, cooperation has been good. The NOACA Governing Board is comprised of locally elected officials from the NOACA Region. The Board has appointed a RPM Taskforce comprised of representatives from many public agencies to guide the development of this project.

NOACA staff and staff from Ohio DOT's central office and District 3 and 12 offices have been working closely on the day-to-day development of the pavement management system.

**c. Understanding the benefits (especially with decision-makers and the public)?**

There is an educational process, which is repeated often due to turnover of elected officials. In addition, the public also requires education.

**6. Are you using Asset Management principles and data for non-highway modes? If so, how?**

Somewhat. NOACA is encouraging use of Asset Management in other modes. The Project Planning Review (PPR) process used in all modes and involves staff, committee, public and intergovernmental consultation. Bigger agencies, like the transit agency, have developed systems to encourage this type of approach.

**7. What improvements would you recommend in the implementation of Asset Management?**

**a. Aspects that require improvement?**

The process took much longer to set up than anticipated. Technical, process and institutional complexities arose due to large number of players and high rates of staff turnover. At the next Asset Management peer review we may have a better idea of specific improvements.

**b. Topics for future research?**

None at the moment.

**Oregon Department of Transportation**  
Catherine Nelson

The Oregon DOT is in the early phases of putting together an Asset Management program. It currently has a pavement management system and a bridge management system, as well as approximately 92,000 individual databases. ODOT would like to integrate these stand-alone systems into a unified Asset Management program.

The current systems in place are used for operations and maintenance purposes, but ODOT would like to be able to include Asset Management in the planning and development processes as well.

**ODOT's Asset Management Vision is as follows:**

ODOT's assets are managed strategically by utilizing integrated and systematic data collection, storage, analysis and reporting standards on a broad range of transportation system assets, optimizing funding and life cycle decisions for operations, maintenance and construction business functions.

Recognizing that Asset Management is a process or methodology that ODOT can use to cost-effectively deliver an efficient, effective, reliable and safe transportation service, the mission of ODOT Asset Management is:

- To put in place the plans, people, processes and products that enable ODOT to implement accepted Asset Management practices in a timely and cost-effective manner.
- To continually monitor and improve Asset Management implementation over time.

ODOT has begun this process with a data collection pilot effort and gatherings of key individuals within the organization to plan the Asset Management implementation process. ODOT plans to implement Asset Management using the following principles:

- Use national and international best practices
- Build on existing ODOT management system work
- Incorporate lessons learned from pilot efforts
- Include a high-level assessment of all ODOT assets
- Be a staged approach drilling in on a prioritized list of assets
- Incorporate Asset Management principles and practices into ODOT daily work function
- Be implemented within a five-year timeline

The goals for the Asset Management program include cleaning up and organizing the numerous data collection systems within ODOT. For the Asset Management program, ODOT plans to use a silo approach but plans to integrate the ability to do cross-asset analyses. This system should be applicable to a lifecycle management decision process, as a governor-appointed committee wants to know and understand the trade-offs being made within the organization.

ODOT recognizes the importance of using the Asset Management program in planning. It plans to look to the Oregon Transportation Plan for general policy direction and use each statewide mode plan when developing investment priorities. Similarly, ODOT plans to take the MPO plans into account as well. By using these plans as guidance, the Asset Management program will have a unified set of goals and priorities that will filter down into the STIP.

## Lane Council of Governments

Paul Thompson

The Lane Council of Government (LCOG) currently does not perform Asset Management. However, since the Oregon Department of Transportation has developed a plan for implementing Asset Management and the Federal Highway Administration is encouraging it, the Lane Council of Governments is also considering where it can play a role in Asset Management.

The Lane area is unique for several reasons. Currently, 14.5% of trips in the area are not made by automobile. Bicycle use and walking are increasingly popular modes of travel. The Regional Transportation Plan (RTP) predicts an increase to 17% in the share of non-automobile trips. The plan also predicts a .9% decrease in VMT per capita. The plan also calls for 74 miles of new bikeways. Furthermore, state and local requirements have the MPO prioritize programs that will reduce the dependence on the automobile. Like with an Asset Management program, the MPO is required to set performance targets that demonstrate their progress to stated goals. These characteristics will require the LCOG to adopt a unique approach to Asset Management.

The current activities of the LCOG will likely lead to a smooth transition into Asset Management. For example:

- It is currently working to develop an integrated database system. In the past, it produced an interactive mile-by-mile report on deficiencies in Oregon's Highway 126.
- Current funding targets designate 50% of funds to preservation.
- Its GIS and Transportation System model are very sophisticated.
- It has a project called eMPO, or Electronic MPO, which is the public front end to the council of governments.
- It has a popular website with frequently-updated road construction information for public use called Keep Us Moving.
- It is using funding scenarios and project mixes to see how environmental and growth conditions are affected.
- It is currently working on a TravelSmart Individualized Marketing Campaign that is utilizing the German firm Social Data to work with individual volunteers to change travel patterns.

LCOG works within relatively stringent state requirements. For example, it has mandated requirements to develop mixed-use, high density areas. It is also required to integrate its transportation and land use plans. Some elements of the regional transportation plan, such as the performance measures, require approval by the Oregon Land Conservation and Development Commission.

## Houston-Galveston Area Council

Lily Wells, AICP

The Houston-Galveston Area Council (H-GAC) currently does not have a formal Asset Management program. However, the 2025 plan includes a substantial allocation for maintenance and preservation, beyond that provided in previous plans. The H-GAC budget includes 45% more funding than previous budgets for rebuilding of existing roadways. This was a direct result of information from the Texas Department of Transportation on the condition of existing roadways in the region.

The H-GAC region houses two of the fastest growing counties in the country, Ft. Bend and Montgomery Counties. The region also houses four ports, so there is a large amount of freight traffic. It has a \$77 billion plan for the 2025 Regional Transportation Plan (RTP).

The state (TxDOT) uses a transportation congestion index (TCI) as a tool for assessing unmet needs and quantifies lane-mile equivalents and a dollar amount for additional capacity. TxDOT then combines all the state's MPO data together to evaluate scenarios and identify funding needs. It processes tests, (travel demand modeling), ranking what the level of service (LOS) would be under the following conditions:

- No build
- RTP with no toll roads
- RTP with toll roads
- Under the Texas Metropolitan Mobility Plan

The area uses tolling as an important revenue generator. In Texas, counties have the ability to create their own tolling entities. Areas of the region have implemented sophisticated tolling systems, like High Occupancy Toll (HOT) lanes, where tolls vary with the level of congestion and number of occupants. This way, the state is able to avoid raising the motor fuel tax.

H-GAC has begun working to quantify its transportation and land use planning. It recently conducted a visioning project, Envision Houston Region with over 1500 participants. The process allowed the public to participate in discussions regarding new growth and development particularly in relation to the 2035 RTP. H-GAC is also conscious of taking into account its environmental assets, such as watersheds, floodplains, and wetlands.

**Washington State Department of Transportation**  
Aaron Butters

1. **How is your organization using Asset Management in the following two broad topic areas:**
  - a. **Providing long-range guidance to agency resource allocation that is consistent with policy objectives.**

In Washington, the state transportation plan dictates policies, priorities and long term goals. Individual system plans are then based on this. In addition, state law and the transportation commission also provide guidance.
  - b. **Identifying and evaluating strategic investment choices and analyzing tradeoffs between them.**

Existing conditions and future conditions based on various investment levels analyzed and decision for investment are determined by selecting an alternative that provides a future condition consistent with statewide plan goals.
2. **Description of structure of Asset Management program**
  - a. **What systems and software are being used?**

The Washington State Department of Transportation (WSDOT) has separate management systems for each asset class. Many of these applications are custom-built using various software such as Microsoft Sequel, Power Builder, Access, and Cold Fusion.
  - b. **Is information from the state's system shared with the MPO and, if so, how?**

Information is shared at the summary level in WSDOT planning documents; MPOs do not have access to WSDOT management systems.
3. **In the two broad topic areas noted in Question #1, who are the primary users of Asset Management and how are they using it:**
  - a. **Staff level for resource allocation analysis?**

Staff in headquarters planning and programming working with technical experts uses the information from the management systems to develop proposed long range and short range plans and investment alternatives for presentation to agency executives.
  - b. **Director level for decision-making?**

Summary level data prepared by staff for decision making, as well as summary level data for performance measurement on program effectiveness, are used by the director.
  - c. **Elected official level as information mechanism?**

Summary level data from reports and presentations prepared by agency staff are used to support decision making and communication with the public.
  - d. **With the general public as an information mechanism?**

Summary data is presented in the agency public reports for accountability and information sharing.

**e. Is there a current education and training program for some or all of these users?**

Staff training is done on an informal basis as assignments require. Senior management is provided with overviews of asset condition and forecasted future conditions. Legislative staff provide overviews to legislative members as needed.

**4. Benefits to using Asset Management:**

**a. How has your team improved the planning and programming process through the use of Asset Management principles and data?**

Improvements to projects selection and projects cost effectiveness have improved as a result of taking a management approach to the system. Overall system conditions have improved as a result of these processes.

**b. Has the composition of the program changed as a result (e.g., increased emphasis on preservation)?**

The current transportation plan is significantly more data-intensive than previous plans. Therefore, it is more realistic and feasible. For example, with seismic strengthening for bridges WSDOT initially had a poor strategy – replace hinges, then single columns, then multi-columns regardless of risk or population densities. Now we invest based on highest risk zones (which also have highest population densities). Based on this improved strategy, WSDOT was able to obtain an additional \$80 million for this project.

**5. Barriers to Asset Management**

**a. Problems with collection and integration of data?**

- Technical experts being protective of data
- Lack of predictive modal for timing of concrete pavement failure

**b. Interagency cooperation?**

Border bridges with Oregon cause budget surprises for both states.

**c. Understanding the benefits (especially with decision-makers and the public)?**

- Identified needs were for short planning horizons leading to inefficient projects and higher costs
- Plan was developed from an investment target
- Incorporation of system preservation work into capacity projects needs additional emphasis (but improving)
- Prioritization processes that include benefit/cost or other data driven approach including non-preservation benefits
- Lowest Life Cycle Approach not well understood by staff
- Resource allocation methods were not strategic
- Approach initially not well supported by leadership
- Design standards and resulting environmental mitigation driving up cost of preservation
- Resistance to change
- Ensuring that most cost-effective pavement type is selected

**6. Are you using Asset Management principles and data for non-highway modes?  
If so, how?**

The Washington State Ferry System has an extensive management approach driven by lifecycle costing that has proven to be very effective. Other modes are just beginning to produce management plans at the direction of the Washington state legislature, which requires review by the Washington State Transportation Commission.

**7. What improvements would you recommend in the implementation of Asset Management?**

**a. Aspects that require improvement?**

Additional asset classes can be integrated, such as rental property, right-of-ways, utility permits.

**b. Topics for future research?**

- Development of improved trade-off approaches
- Development of user cost impacts of poor system management that are easily understood by non-economists.

## Summary of Responses to Questions on Use of Asset Management

<p><b>1. How is your organization using Asset Management in the following two broad topic areas:</b></p> <p><b>a. Providing long-range guidance to agency resource allocation that is consistent with policy objectives.</b></p>	
<i>NAME OF DOT/MPO</i>	<i>ANSWER</i>
Colorado Department of Transportation	<ul style="list-style-type: none"> <li>• The Colorado Transportation Commission allocates funds according to investment categories, and programs, consistent with its adopted investment level performance objectives.</li> <li>• The policy decisions are led by the Asset Management Task Force</li> <li>• CDOT has set up an Investment Strategy Framework to ensure that investments are consistent with policy objectives.</li> </ul>
Maryland State Highway Administration	<p>One of the guiding principles in the Maryland State Highway Administration's (MSHA) Asset Management program is to recognize the primacy of the goals and objectives outlined in the State Highway Administration's (SHA) Business Plan. SHA and the DOT lack a formal cross-class Asset Management program to assess the effects of tradeoffs in resource allocations and their impact on goals.</p> <p>Maintaining designated service levels is a key feature of Maryland's Asset Management program. The goal is to get to the point where all of system preservation fund managers can tell us what effect a change in budget levels will have on service levels for the asset this year and at least 5 years into the future.</p>
Baltimore Metropolitan Council	<p>The Baltimore Metropolitan Council's Long Range Transportation Plan (LRTP) is financially constrained. Almost 75% of the funding in the LRTP is allocated to system preservation and maintenance, which is determined in coordination with Maryland DOT. Since needs are generally greater than funding, it is valuable to ensure funding choices are consistent with policy objectives.</p>
Michigan Department of Transportation	<p>MDOT is using Asset Management for project selection in the context of overall program goals. It also uses Asset Management to improve cost efficiency in project execution. Projects are solicited to fulfill stated goals.</p>
Southeast Michigan Council of Governments	<p>The Southeast Michigan Council of Governments (SEMCOG) encourages the allocations of agency resources to be consistent with regional transportation plans. Currently, regional processes are being revised to emphasize the use of Asset Management principles.</p>



<p>New York State Department of Transportation</p>	<p>Federal aid is distributed to regions based on the extent and the condition of their systems. Regions then allocate those funds to the MPO or MPOs in that region. State highway funds are distributed based on extent of the system</p> <p>Use of performance measures is an important element for the NYSDOT system. Network-level, corridor-level and project-level data collection and analysis tools are kept separate. Only data that is needed to support decisions is collected.</p> <p>NYSDOT is careful to incrementally change existing tools rather than create new tools from scratch, unless a major change in technology occurs. Even when transitioning to new performance measures, NYSDOT continues to report on old measures until decision-makers become accustomed to and comfortable with the new measures.</p>
<p>Capital District Transportation Committee</p>	<p>The Capital District Transportation Committee (CDTC) takes a holistic view of transportation in its broader context. This ensures the integration of transportation, land use, economic development and environmental plans. CDTC makes a strong connection between plans and implementation programs, which is continually refined. Asset management is integrated into CDTC's activities; system preservation, operation and management are a priority over expansion and other improvements. CDTC's long-range plan includes a comprehensive budget for system preservation, operations, maintenance, rehab and reconstruction / replacement for all public roads, transit systems and intermodal facilities.</p>
<p>Ohio Department of Transportation</p>	<p>The Ohio Department of Transportation (ODOT) has a number of written documents that provide policy guidance. The Asset Management philosophies are congruent with the strategic plan and top-level goals. The biennial business plan filed with the State Legislature also helps to keep agency career professionals focused on key goals. In addition, the long range Access Ohio plan supports Asset Management practices.</p>
<p>Northeast Ohio Areawide Coordinating Agency</p>	<p>Northeast Ohio Areawide Coordinating Agency's (NOACA) Asset Management program is based in its Regional Transportation Investment Policy. As a rule, preservation is a board priority per the following guiding principle: "Prioritize funding for projects based on replacing and maintaining existing facilities in preference to building new ones".</p>
<p>Washington State DOT</p>	<p>In Washington, the state transportation plan dictates policies, priorities and long term goals. Individual system plans are then based on this. In addition, state law and the transportation commission also provide guidance.</p>

	<b>b. Identifying and evaluating strategic investment choices and analyzing tradeoffs between them.</b>
Colorado Department of Transportation	Resource Allocation decisions are made based on the information from the CDOT Management Systems as well as the Performance Measures program. Discussions are largely based on information developed through the management systems for pavement, maintenance, bridge, safety, and congestion.
Maryland State Highway Administration	The Maryland State Highway Administration (MSHA) wants to use Asset Management to evaluate tradeoffs between maintenance and capital investment decisions. Over the past twenty years, system preservation has grown dramatically at the expense of capital expansion.
Baltimore Metropolitan Council	<p>The Council is working to integrate operations into the planning process, as currently most of the planning process is devoted to capacity expansion. Asset Management can be useful in making prioritizations within the long range transportation plan, such as highway vs. transit tradeoffs.</p> <p>Current activities relating to Asset Management include:</p> <ul style="list-style-type: none"> <li>• Some “hot spot” analysis comparing highway versus transit solutions</li> <li>• Developing and collecting performance measure data on a regional basis</li> <li>• Looking at performance measures from a user perspective, including a recent user satisfaction survey</li> </ul>
Michigan Department of Transportation	<p>Asset Management principles applied to individual projects and programs to achieve program outcomes and stretch scarce dollar resources.</p> <p>Asset categories create silos, and Asset Management procedures are used to evaluate tradeoffs between silos. This is done in order to achieve several policy goals over time.</p>
Southeast Michigan Council of Governments	Asset Management allows SEMCOG to analyze regional needs within and among each “stovepipe” of asset classes. Through increased use of Asset Management techniques, the region is shifting from qualitative to quantitative goals.
New York State Department of Transportation	A panel of regional technical experts conducts qualitative multi-objective trade-off analysis. NYSDOT assets are divided into asset classes, with safety and mobility as additional categories. Tradeoffs are analyzed across asset classes – pavements, bridges, safety, and mobility - and within them. Each investment candidate follows a similar process and is analyzed according to the quantitative trade-off model as described in Transportation Research Record #1848. (This model is still considered a prototype.)

<p>Capital District Transportation Committee</p>	<p>CDTC has adopted planning &amp; investment principles which maintain integrity, equity and objectivity while building credibility. TIP programming choices are guided by Plan budgets for 17 project categories, allowing the program to reflect the balance (and Asset Management emphasis) of the Plan. Additionally, CDTC is active in “big picture” explorations that relate to stewardship and visit. For example, the Committee is engaged in a cooperative effort with the regional business group, the regional planning commission and the state university in a fiscal analysis of the impacts of alternative growth (amount) and development (location and form) futures. The analysis covers both costs for system preservation and reconstruction and system expansion for road, transit, school, sewer, water, utilities, etc.</p>
<p>Ohio Department of Transportation</p>	<p>The Transportation Review Council, a multidisciplinary group of people from the DOT, businesses, and other areas of government to ensure large scale capacity and economic development projects get completed. This process insulates system preservation activities from controversial projects.</p> <p>The department relies on an enterprise project delivery information system called “Ellis” to track the progress of all capital improvement projects, their cost as well as impact on pavement and bridge asset conditions. Monthly performance reports are managed through the organizational performance index, alerting managers of current progress and performance trends.</p>
<p>Northeast Ohio Areawide Coordinating Agency</p>	<p>The Regional Pavement Management system is being used to allocate resources. The system identifies current and future Pavement Condition Ratings “PCRs”, on a scale of 0-100. This applies to various types of pavement and identifies the severity and extent of different distress types.</p> <p>By using this system, NOACA can identify the greatest need on a region-wide basis for eligible pavements. It allows staff to provide NOACA’s Governing Board with information showing greatest needs, best use of funds, etc. The staff can evaluate different scenario analyses and examine the results.</p>
<p>Washington State DOT</p>	<p>Existing conditions and future conditions based on various investment levels analyzed and decision for investment are determined by selecting an alternative that provides a future condition consistent with statewide plan goals.</p>

<b>2. Description of structure of Asset Management program</b>	
<b>a. What systems and software are being used?</b>	
Colorado Department of Transportation	<ul style="list-style-type: none"> <li>• Cross functional teams can work together to see how key processes can meet stated goals and objectives. Organized by KEY PROCESS (Roadside Mgt., Roadway Mgt., Snow &amp; Ice Mgt., System Operations, Project Delivery) , not organizational division.</li> <li>• ERP / SAP software to bring together data from different software.</li> </ul>
Maryland State Highway Administration	<p>MSHA had the following systems in place:</p> <ul style="list-style-type: none"> <li>• Very sophisticated pavement management system.</li> <li>• Another system for bridges and retaining walls.</li> <li>• Strict pollution and drainage Asset Management programs. Maryland has the most stringent runoff restrictions in the country due to the Chesapeake Bay and this has caused an increased emphasis on applying Asset Management principles to drainage structures.</li> <li>• Maryland is now implementing an Asset Management program for sidewalks to support Americans with Disabilities Act (ADA) compliance.</li> </ul> <p>In addition, MSHA formed an Asset Management steering committee with members from various disciplines. Their goal is to guide the expansion of Asset Management beyond pavement and bridges. Under the auspices of the steering committee, Maryland has significantly expanded its Asset Management program to include a variety of asset classes and is evaluating others to add.</p>
Baltimore Metropolitan Council	The Baltimore Metropolitan Council doesn't have an Asset Management program per se, but has travel demand forecasting tools and a LRTP project prioritization process used to select projects.
Michigan Department of Transportation	Road Quality Forecasting System and Bridge Condition Forecasting System
Southeast Michigan Council of Governments	<p>SEMCOG is just starting the process of implementing an Asset Management program. We are following the lead of Michigan's statewide Asset Management Council.</p> <p>As part of the state Asset Management Council, there is an internet reporting tool which transportation agencies are mandated to use. This allows for consistent data collection throughout the state.</p> <p>SEMCOG uses Paser and Roadsoft systems for collecting and analyzing data. Paser is a system developed by the University of Wisconsin. It includes a windshield survey and rates roads on a 10 point scale. Ratings are based on the type and the extent of defects. The Paser system allows for different ratings for different surface types.</p> <p>The Roadsoft system is SEMCOG's strategic analysis model. It analyzes current and forecasts conditions by functional class. Using this model, SEMCOG is able to identify trends within road conditions.</p>
New York State	The NYSDOT has the following systems in place:

<p>Department of Transportation</p>	<ul style="list-style-type: none"> <li>• Bridge inspection, program worksheet and forecasting model</li> <li>• Pavement visual rating (includes selected dominant distresses), quantitative profilometer ratings (IRI, rutting) and forecasting model</li> <li>• Safety data is collected for performance measurement; crash reduction factors are estimated for candidate investment evaluation purposes; system-level performance is not yet forecast</li> <li>• Mobility and reliability analyses are by the MPOs, and, therefore, vary</li> <li>• Recurring and non-recurring excess delay for vehicles, persons and trucks and the economic losses attributable to congestion are calculated statewide using a technical tool</li> </ul>
<p>Capital District Transportation Committee</p>	<p>CDTC has the following data systems in place:</p> <ul style="list-style-type: none"> <li>• NYSDOT annual bridge inventory (850 bridges)</li> <li>• NYSDOT annual scoring of touring route system (2500 lane miles)</li> <li>• CDTC biennial scoring of non-state FA system (1400 lane miles) since 1983</li> <li>• CDTC quadrennial sample scoring of local roads (9400 lane miles) since 1984</li> <li>• CDTC supplemental 100% scoring of Albany county roads</li> <li>• CDTC supplemental 100% scoring of Albany city roads</li> <li>• Transit system infrastructure age, rehab/replacement plans <ul style="list-style-type: none"> <li>• Vehicles, stations</li> <li>• Facilities</li> <li>• ITS</li> </ul> </li> <li>• Signal system, ITS capital needs estimates</li> <li>• Sidewalk inventories, "ped friendliness"</li> <li>• Operations and maintenance <ul style="list-style-type: none"> <li>• State</li> <li>• Non-state</li> <li>• Thruway</li> <li>• Transit</li> </ul> </li> </ul> <p>Regarding software, CDTC uses a highway condition prediction model developed as an extension of NYSDOT's model. CDTC's model is run separately for state and non-state federal aid roads, and for local system roads, using differing repair strategies, costs, budgets and deterioration rates to determine the long-range budget needs of the road system.</p> <p>For other systems, spreadsheet software is used to evaluate alternative transit system rehab / replacement strategies and to approximate long-term annualized costs for capital replacement on rail and air intermodal facilities.</p>
<p>Ohio Department of Transportation</p>	<p>ODOT has the following Asset Management programs in place:</p> <ul style="list-style-type: none"> <li>• Pavement Condition Rating System</li> <li>• Bridge Management System</li> <li>• Safety and Congestion tracking systems</li> <li>• Maintenance and Equipment management systems</li> </ul>

<p>Northeast Ohio Areawide Coordinating Agency</p>	<ul style="list-style-type: none"> <li>• ESRI – ArcMap 9.1</li> <li>• ESRI – ArcIMS</li> <li>• VHB's Proprietary "RoadManager" software to analyze data</li> <li>• Web component to Pavement Management System</li> </ul>
<p>Washington State DOT</p>	<p>The Washington State Department of Transportation (WSDOT) has separate management systems for each asset class. Many of these applications are custom-built using various software such as Microsoft Sequel, Power Builder, Access, and Cold Fusion.</p>

	<b>b. Is information from the state's system shared with the MPO and, if so, how?</b>
Colorado Department of Transportation	Data is shared with MPOs. Management systems are open to public evaluation. MPOs and other planning partners formally advise the Transportation Commission on resource allocation decisions.
Maryland State Highway Administration	Information from management systems is not formally shared. The MPO TIPs contain area wide project category line items for system preservation activities like resurfacing, bridge rehabilitation, traffic control devices, etc., and the DOT selects specific projects to implement. The Baltimore and Washington MPOs do not seek to micro-manage the selection of preservation projects but want to have confidence in the prioritization process.
Baltimore Metropolitan Council	We are currently working with modal administrations to refine which types of data would be valuable to enhance our process. To date, the council has not asked for the state's Asset Management data.
Michigan Department of Transportation	There have been few requests from MPOs to get access to the non-project information, except through any planning studies that may require it.
Southeast Michigan Council of Governments	Because Michigan's Asset Management program is centralized through the state's Asset Management council, the council is able to make information available to all of the MPOs and to the DOT.
New York State Department of Transportation	Information is shared with the MPOs and is generally transferred by CD-ROM or FTP transfer. Next generation data systems currently being migrated into production are web-based and, therefore, capable of providing remote secure access for MPO direct use.
Capital District Transportation Committee	NYSDOT has a "high view" of MPOs, so it does not interfere with programs and celebrates CDTC's success. To date, the state's systems have concentrated on its own highways, allowing CDTC to fill in the gaps with comparable analysis of non-state highways, local roads and str
Ohio Department of Transportation	ODOT shares local pavement condition data with MPOs through written reports, asset datasets and GIS products including road inventory attributes.

<p>Northeast Ohio Areawide Coordinating Agency</p>	<p>Ohio DOT's Division of Planning, Office of Pavement Engineering collects pavement data by visible inspection. Data is collected yearly on Interstate, U.S. and State Highways and every other year on non-state roads, with a federal functional classification higher than a local road on both the urban and rural systems.</p> <p>Data is transferred to NOACA either via e-mail (*.zip file) or copied onto a CD. The format of the data so far has been either a Microsoft Access Database or geographic shape files.</p> <p>NOACA manages the data and outputs in the Regional Pavement Management System. The input "raw" data is received from the Ohio DOT. This data is not available to NOACA staff; it is maintained by the Ohio DOT and is only available to ODOT employees. However, ODOT furnishes data to NOACA upon request in a timely manner.</p> <p>NOACA also collects data from ODOT on area bridges and uses it in short and long range planning. In the short run, when bridge projects go through the project selection and prioritization process, NOACA provides the data to the relevant committees and to the board to help them prioritize the projects. From the long range perspective, NOACA uses the bridge data to provide an overall assessment of the system in the 20-year Transportation Plan.</p>
<p>Washington State DOT</p>	<p>Information is shared at the summary level in WSDOT planning documents; MPOs do not have access to WSDOT management systems.</p>



<b>3. In the two broad topic areas noted in Question #1, who are the primary users of Asset Management and how are they using it</b>				
	<b>Staff level for resource allocation analysis?</b>	<b>Director level for decision-making?</b>	<b>Elected official level as information mechanism ?</b>	<b>With the general public as an information mechanism?</b>
Colorado Department of Transportation	Executive Management and Policy Board	Yes	Through the Governor-appointed policy board	Minimal
Maryland State Highway Administration	Staff level engineers and program managers use condition information, expected project benefits and management objectives to recommend the programming of specific infrastructure improvements	At the Director level staff recommendations for specific improvement / remediation projects are reviewed in the context of performance objectives and available budgets, and concurrence is given on whether to proceed with the proposed project.	MDOT uses Asset Management as a way to educate elected officials on the importance of asset preservation in order to secure additional funding.	Our agency's business plan includes objectives for attaining desired performance standards for a number of our assets, e.g. 83% of pavements in acceptable condition, no weight-restricted structures on the National Highway System (NHS), 98% of signs functioning as intended, etc.
Baltimore Metropolitan Council	Council staff uses the systems for LRTP project prioritization and for the TIP.	Not Applicable.	The system can provide useful information	The system can provide useful information.

Michigan Department of Transportation	Asset Management program mostly by staff responsible for various "silos" in the organization. They collect and analyze data and then run various funding scenarios.	Upper management agrees on goals and funding levels for the overall Asset Management program.	Asset Management information is used to support higher level policy documents and to prepare reports that are used by elected officials.	The general public is aware of the results of the Asset Management process, but less involved in the process itself.
Southeast Michigan Council of Governments	On the staff level, Asset Management resources are used to organize collected data	Within SEMCOG, staff at the director level uses the data for project selection in some limited situations.	By using the Asset Management program, SEMCOG is able to provide elected officials with options and choices between needs.	The Asset Management program will give SEMCOG tools with which it can better explain its decisions to the public.
New York State Department of Transportation	Staff at the NYSDOT uses the Asset Management programs to provide transportation management systems, for program development, condition & performance assessments and longer-term needs studies.	Those at the director level use the Asset Management programs for goals, policies, budgets & allocations, program review and approval and performance monitoring.	Elected officials can use Asset Management programs for authorization of resources and to ensure agency accountability.	The general public would use the Asset Management program primarily for bond authorization.

Capital District Transportation Committee	Staff uses the system for highway infrastructure 20-year modeling. They use this for state and non-state highways as well as other types of streets. The Asset Management program is also used in transit system replacement planning. This includes life-cycle analysis for selection of vendor, smoothing out replacement cycles and flex funding.	Director is integral with staff in using the data to offer policy issues and choices to decision-makers.	Information is critical element to both long-range planning and short-ranged programming. The central most important issue in the current long-range plan update is the emerging information on budgetary needs for long-term pavement and bridge rehab and reconstruction; escalating costs and the emerging need for Interstate reconstruction will dominate the budget discussions in the plan update.	Asset management is directly related to some prominent public concerns such as sustainability. System preservation and revitalization of older urban areas is accepted across the region as a higher priority than system expansion.
Ohio Department of Transportation	Program managers – primary users	Deputy Directors and executive leadership	Biennial budgeting process before the state legislature	State of the transportation system reporting and long range planning. Decision criteria for project selection
Northeast Ohio Areawide Coordinating Agency	To analyze and make recommendations.	Data is used for decision-making.	Both appointed and elected officials can use the data.	Communities use the data for their own needs. Limited information is available on the website.

<p>Washington State DOT</p>	<p>Staff in headquarters planning and programming working with technical experts uses the information from the management systems to develop proposed long range and short range plans and investment alternatives for presentation to agency executives.</p>	<p>Summary level data prepared by staff for decision making, as well as summary level data for performance measurement on program effectiveness, are used by the director.</p>	<p>Summary level data from reports and presentations prepared by agency staff are used to support decision making and communication with the public.</p>	<p>Summary data is presented in the agency public reports for accountability and information sharing.</p>
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<b>e. Is there a current education and training program for some or all of these users?</b>	
Colorado Department of Transportation	Training is mainly provided to CDOT staff. Some information presentations have been given to planning partners (MPOs, the State Transportation Advisory Committee, Transportation Planning Regions, etc.)
Maryland State Highway Administration	Currently no formal training programs are in place; training occurs on an ad hoc basis.
Baltimore Metropolitan Council	No.
Michigan Department of Transportation	<p>There are several training opportunities for staff level participators in the Asset Management programs. First, staff members are put on teams in their subject area where they are trained informally.</p> <p>Some staff members participate in a formal Asset Management course offered by Michigan State University called Pavement Preservation Applied Asset Management.</p> <p>Many staff members attended the National Highway Institutes training course in Asset Management. For smaller agencies within Michigan, the Asset Management Council rewrote the National Highway Institute course to gear it toward local governments and smaller agencies. Several Michigan counties and cities have been trained through this course.</p>
Southeast Michigan Council of Governments	<p>The State Asset Management council provides the following training:</p> <ul style="list-style-type: none"> <li>• Training on PASER and ROADSOFT</li> <li>• Training on data collection</li> <li>• Training on overall benefits of Asset Management</li> <li>• Training on how to get started – biggest challenge</li> </ul>
New York State Department of Transportation	Not currently. Each region has a part time Asset Management leader who may require future training.
Capital District Transportation Committee	Staff is trained in the related software. The general public is informed of how Asset Management works through outreach activities. These activities always reinforce the priority of Asset Management.
Ohio Department of Transportation	Internal training for managers and users of various decision support systems. External communication strategy to inform transportation constituents and general public.
Northeast Ohio Areawide Coordinating Agency	Education and training is for key users.

Washington State DOT	Staff training is done on an informal basis as assignments require. Senior management is provided with overviews of asset condition and forecasted future conditions. Legislative staff provide overviews to legislative members as needed.
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<b>4. Benefits to using Asset Management:</b>		
	<b>a. How has your team improved the planning and programming process through the use of Asset Management principles and data?</b>	<b>b. Has the composition of the program changed as a result (e.g., increased emphasis on preservation)?</b>
Colorado Department of Transportation	There is a clearer ability to better use assets to meet Department Goals and Objectives. Progress has resulted in developing performance objectives based on quantitative data.	Policy priority is on preservation of the current system, based largely on information from the management systems.
Maryland State Highway Administration	MDOT's management systems for pavements and bridges (our first and second highest funded preservation categories by asset type) have existed for the longest period of time. As a consequence, management systems for these asset classes are more evolved than management systems for other asset classes. Efforts have been undertaken to improve these management tools and new management system tools have or are being developed for assets categories like drainage assets, lighting assets and sidewalks. The agency is pursuing a concerted effort to develop management tools that provide information to make more data driven decisions for all asset classes.	Over the past 20 years the mix of capital expansion projects compared to system preservation projects has shifted dramatically toward a system preservation first philosophy. In 1982, a transportation revenue program focused on preservation and the elected leadership of the state has accepted that priority ever since. Non capacity expansion projects now account for more than half our agency's capital program.
Baltimore Metropolitan Council	Transportation planning process has included more input from local and state operators (Department of Public Works, DOT). An Asset Management program could allow a focus on operations to enter the planning process.	It is too early to tell.
Michigan Department of Transportation	MDOT has noticed the following improvements through its Asset Management implementation: <ul style="list-style-type: none"> <li>• Gave some accountability.</li> <li>• Solidified condition goals as policy</li> <li>• Focused on 'Mix of Fixes' approach</li> <li>• Pavements in "poor" condition down to 9% from 36% ten years ago</li> </ul>	Asset Management implementation caused a complete re-write/re-thinking of how transportation programs were developed and resulting projects were selected. Programs now explicitly include preservations strategies.

<p>Southeast Michigan Council of Governments</p>	<p>SEMCOG has found the following benefits from its Asset Management implementation:</p> <ul style="list-style-type: none"> <li>• Identified assets, as many communities don't know what they have.</li> <li>• Developed projects</li> <li>• Created a uniform rating method</li> <li>• Provided decision-makers with information</li> <li>• Enhanced confidence with the public</li> <li>• Reduced political influence on programs</li> <li>• Secured additional funding</li> </ul>	<p>The program was in the process of changing, and implementing Asset Management at the same time facilitated this transition.</p>
<p>New York State Department of Transportation</p>	<p>The NYSDOT has noticed the following improvements:</p> <ul style="list-style-type: none"> <li>• Use limited resources more efficiently</li> <li>• Continuously improve performance</li> <li>• Set performance targets</li> <li>• Improve customer satisfaction</li> <li>• Demonstrate needs for increased funding</li> <li>• Quantitatively evaluate alternative scenarios and program tradeoffs</li> <li>• Provide financial valuation of assets</li> </ul>	<p>The following program changes indicate the effects of the NYSDOT Asset Management program:</p> <ul style="list-style-type: none"> <li>• The MPO for the New York City Metropolitan area, which includes 65 percent of the state's population, has reduced the share of their allocation used for mobility to increase the shares for preservation, maintenance, safety and other investment purposes.</li> <li>• The other four transportation management area (TMA) MPOs have decreased preservation from 67% to 51% to emphasize safety, maintenance, mobility and other investment purposes.</li> <li>• The eight non-TMA MPOs have made dramatic changes in their allocation of funds, increasing maintenance, safety and mobility by decreasing preservation.</li> </ul>



<p>Capital District Transportation Committee</p>	<p>CDTC has noticed the following improvements through its implementation of Asset Management:</p> <ul style="list-style-type: none"> <li>• Direct implementation funds to implement plan</li> <li>• Address budget priorities at plan level</li> <li>• Select projects at program level</li> <li>• Review plan's budget priorities against program's spending priorities</li> <li>• Steer funds to project categories that help program reflect the plan</li> </ul>	<p>The composition of the program has changed. The complete articulation of Asset Management budgetary requirements and the use of Plan budgets in TIP development have excluded capacity projects from consideration in TIP development for nearly a decade. Preservation and renewal projects get significant attention, both on and off the state system.</p>
<p>Ohio Department of Transportation</p>	<p>ODOT has had a number of successes using Asset Management, including:</p> <ul style="list-style-type: none"> <li>• Reduced pavement deficiencies</li> <li>• Reduced bridge deficiencies</li> <li>• Normalization of system conditions between districts and counties</li> <li>• Identifying and achieving sustainable conditions levels</li> </ul>	<p>ODOT has set a goal of achieving a steady state in asset conditions to preserve existing infrastructure and achieve consistent levels of service across the state. This includes keeping up with rate of degradation. To make this happen, ODOT has allocated investment dollars. In addition, there has been a focus on safety and congestion improvements for major investment projects.</p>
<p>Northeast Ohio Areawide Coordinating Agency</p>	<p>By using Asset Management, the investment process is based more on data and policies. This caused a shift in perceptions by local governments, which is very beneficial to NOACA. Since NOACA can't mandate a local government to make improvements, the system helps with communication and understanding.</p>	<p>While there has always been an emphasis on preservation at NOACA, the Asset Management program helps deal with political issues.</p>

<p>Washington State DOT</p>	<p>Improvements to projects selection and projects cost effectiveness have improved as a result of taking a management approach to the system. Overall system conditions have improved as a result of these processes.</p>	<p>The current plan is significantly more data-intensive than previous plans. Therefore, it is more realistic and feasible. For example, with seismic strengthening for bridges WSDOT initially had a poor strategy – replace hinges, then single columns, then multi-columns regardless of risk or population densities. Now we invest based on highest risk zones (which also have highest population densities). Based on this improved strategy, WSDOT was able to obtain an additional \$80 million for this project.</p>
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<b>5. Barriers to Asset Management</b>			
	<b>a. Problems with collection and integration of data?</b>	<b>b. Interagency cooperation?</b>	<b>c. Understanding the benefits (especially with decision-makers and the public)?</b>
Colorado Department of Transportation	Collecting data for performance measures and tradeoff analysis on a consistent and statewide basis is a huge undertaking.	Data sharing and policy consultation with planning partners on appropriate trade offs.	Yes
Maryland State Highway Administration	<p>Given the volatile costs of materials such as steel, asphalt, etc., it is hard to do predictive analysis with costs.</p> <p>One of the biggest hurdles in implementing Asset Management approaches is data collection. While it is important to collect data on asset attributes needed for decision-making, there is a tendency to collect unnecessary information as well. This leads to more expensive data collection and a feed the [data] machine mentality.</p>	<p>Many current initiatives are emphasizing the involvement of non-owner/operators in the management of transportation infrastructure. The management systems tools, e.g. pavements, require specialized expertise from working within a specific field to fully understand the consequences of decisions; this is not easily transferable to others who do not have direct ownership/operator responsibilities. The most appropriate area for interagency cooperation is in setting appropriate performance level standards for assets.</p>	<p>Performance trend data in comparison to desired service level standards is often an effective way to communicate agency performance and resource needs. However, there is difficulty in convening the effort/resources needed to obtain better information for decision-making and lack of quantifiable examples illustrating how an Asset Management approach results in tangible savings.</p>
Baltimore Metropolitan Council	We do not collect or integrate Asset Management data.	Since MPOs don't really own assets, interagency cooperation is a necessity.	Since current process is based on capacity expansion, a focus on Asset Management would be a large shift.

Michigan Department of Transportation	<p>While data integration is not an issue for MDOT, data collection is always an issue. There are large costs to collect, analyze, process, forecast, and store the data. This takes financial and non-financial resources.</p> <p>One specific challenge is capturing work as it's performed. Currently, financial information about work performed is captured but actual work details are not captured.</p>	MDOT has not found barriers from interagency cooperation. It successfully cooperates with a large number of local agencies.	In marketing the benefits of Asset Management, there is some ambiguity as to whether we sell the process of Asset Management, the products or the results.
Southeast Michigan Council of Governments	Data collection on the federal-aid system is funded; off-system data collection is a problem yet to be addressed. Also, high staff turnover is a challenge on the data collection and integration side, given the high level of expertise that is necessary.	Since SEMCOG works with a number of local communities, it is a challenge to integrate their many different data systems and different processes.	Since there is no ribbon-cutting ceremony within Asset Management programs, it is hard to get elected officials involved. Additionally, it is difficult to educate the public and communities on the benefits.
New York State Department of Transportation	<p>The risks and complexities of the data systems and technology projects are numerous. The databases and programs are large and complex, bringing risks and schedule overruns. Furthermore, programs are expensive due to limited market.</p> <p>Electronic data collection for safety is a work in progress with the potential for next-day reporting of incidents an objective. Currently, much of the reporting is still paper-based.</p>	Barriers due to interagency cooperation include former delays in enactment of SAFETEA-LU, federal obligation authority caps and legislative project selection. In addition, local fund sources may become less feasible in the future.	Minimum life-cycle investment scenarios at the program level generally require extremely large investments early in the program (to address backlog of needs and invest in more costly but longer lasting materials) to achieve savings later in the life-cycle of assets. Thus far, elected leaders have not been willing appropriate enough funds soon enough to quickly achieve the long-term efficiencies attributable to implementation of Asset Management principles.

<p>Capital District Transportation Committee</p>	<p>None of any particular concern.</p>	<p>Only in the reluctance of NYSDOT to incorporate the results of our non-state analyses into official NYSDOT estimates of statewide transportation needs.</p>	<p>Resources: There is a shortage of resources for maintaining the existing systems, including a \$50-\$80 M annual gap for pavement rehabilitation on all systems and in all jurisdictions.</p> <p>Labor: Succession planning is a challenge for CDTC, as is recruitment and retention, especially within the transit realm.</p> <p>Other issues include stability and global issues such as fuel consumption and sustainability.</p> <p>The organization is constrained in terms of resources for system preservation and maintenance, but also limited in the resources available to even do the planning and policy development to support such an integrated approach. Projects to build new facilities and services often obtain political and financial commitment at the expense of basic system preservation work since they are more visible to the electorate.</p>
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Ohio Department of Transportation	<ul style="list-style-type: none"> <li>• Data integration – data from different sources may not line up in a GIS system</li> <li>• Data maintenance</li> <li>• Temporal data challenges</li> </ul>	Ohio Geographically Referenced Information Program provides statewide leadership for facilitating local government implementation of GIS. Location Based Referencing System project identifies local assets to facilitate emergency response. Statewide program to provide updated imagery to all counties.	Through Asset Management, ODOT has seen improved management of assets by local governments and improved operation of transportation systems.
Northeast Ohio Areawide Coordinating Agency	<p>So far, there have been no major roadblocks from data collection/integration. Data is collected yearly on the state system and every other year on the non-state system by Ohio DOT's office of pavement engineering. Currently, plans call for transfer of data by MS Access table format.</p> <p>NOACA's, consultant, VHB, is planning to have data import routines to automatically import data into the RPM system. The mapping base for the NOACA RPMS is the Ohio DOT linear referencing system (LRS). Importing data into this system from other data sources has been difficult.</p>	<p>Overall, cooperation has been good. The NOACA Governing Board is comprised of locally elected officials from the NOACA Region. The Board has appointed a RPM Taskforce comprised of representatives from many public agencies to guide the development of this project.</p> <p>NOACA staff and staff from Ohio DOT's central office and District 3 and 12 offices have been working closely on the day-to-day development of the pavement management system.</p>	There is an educational process, which is repeated often due to turnover of elected officials. In addition, the public also requires education.

<p>Washington State DOT</p>	<ul style="list-style-type: none"> <li>• Technical experts being protective of data</li> <li>• Lack of predictive modal for timing of concrete pavement failure</li> </ul>	<p>Border bridges with Oregon cause budget surprises for both states.</p>	<ul style="list-style-type: none"> <li>• Identified needs were for short planning horizons leading to inefficient projects and higher costs</li> <li>• Plan was developed from a investment target</li> <li>• Incorporation of system preservation work into capacity projects needs additional emphasis (but improving)</li> <li>• Prioritization processes that include benefit/cost or other data driven approach including non-preservation benefits</li> <li>• Lowest Life Cycle Approach not well understood by staff</li> <li>• Resource allocation methods were not strategic</li> <li>• Approach initially not well supported by leadership</li> <li>• Design standards and resulting environmental mitigation driving up cost of preservation</li> <li>• Resistance to change</li> <li>• Ensuring that most cost-effective pavement type is selected</li> </ul>
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<b>6. Are you using Asset Management principles and data for non-highway modes? If so, how?</b>	
Colorado Department of Transportation	This is not applicable since in Colorado, other modes do not fall under the purview of the state DOT.
Maryland State Highway Administration	The State Highway Administration is the main highway modal agency of a multi-modal DOT (transit, ports, airports, Motor Vehicle Administration). At the department level, an Asset Management steering committee has recently been formed to push Asset Management approaches to managing the assets of all the modes.
Baltimore Metropolitan Council	We are not using Asset Management for non-highway modes currently.
Michigan Department of Transportation	<p>Within MDOT, there is a concerted effort to apply Asset Management processes to all modes. Within modes, optimal strategies are identified for various funding levels.</p> <p>Currently, IT systems do not apply to all modes. However, MDOT is in the process of bringing Aeronautics and Public Transportation into the system as it migrates systems to the web.</p> <p>However, MDOT has little influence over non-highway modes, as each mode has its own funding. Furthermore, legislation prevents movement across modal boundaries. Therefore integration has to be on the operational side along with an attempt to coordinate activities and facilities.</p>
Southeast Michigan Council of Governments	Not at this time.
New York State Department of Transportation	At the Port Authority of New York and New Jersey and New York's Metropolitan Transportation Authority (MTA) Asset Management is used across modes including highways, tunnels, bridges, bus transit, subway transit, commuter rail, ports, port terminals, airports and aviation terminals. A uniform four-point condition rating scale is used across MTA agencies for all asset classes. Investment candidates are analyzed according to uniform standards across MTA agencies and asset classes.
Capital District Transportation Committee	CDTA (the transit authority) recently selected a vendor for fleet replacement based on lifecycle costs. Port, rail station and airport infrastructure have need estimates incorporated into the long-range plan.
Ohio Department of Transportation	Asset management principles have been applied to aviation, building and rest area planning.
Northeast Ohio Areawide Coordinating Agency	Somewhat. NOACA is encouraging use of Asset Management in other modes. The Project Planning Review (PPR) process used in all modes and involves staff, committee, public and intergovernmental consultation. Bigger agencies, like the transit agency, have developed systems to encourage this type of approach.



Washington State DOT	The Washington State Ferry System has an extensive management approach driven by lifecycle costing that has proven to be very effective. Other modes are just beginning to produce management plans at the direction of the Washington state legislature, which requires review by the Washington State Transportation Commission.
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<b>7. What improvements would you recommend in the implementation of Asset Management?</b>		
	<b>a. Aspects that require improvement?</b>	<b>b. Topics for future research?</b>
Colorado Department of Transportation	<ul style="list-style-type: none"> <li>• Better communication</li> <li>• Improved trade off analysis/optimization tools</li> <li>• Better global understanding of Asset Management by various levels of management</li> </ul> <p>For example, topics could be covered with engineers at various American Association of State Highway and Transportation Officials (AASHTO) and Transportation Research Board (TRB), etc. conferences.</p>	Improved trade off analysis/optimization tools
Maryland State Highway Administration	<p>Broader definitions of asset categories</p> <ul style="list-style-type: none"> <li>• Lighting, signs and traffic signals</li> <li>• Facilities for the disabled – pedestrian facilities, etc.</li> <li>• Environmental liabilities – underground storage tanks, drainage facilities, etc.</li> <li>• Integrate capacity expansion with pavement management</li> </ul>	<ul style="list-style-type: none"> <li>• How to assess the tradeoffs of allocating resources across various asset classes.</li> <li>• Quantifying the benefits of Asset Management approaches in terms of dollars saved.</li> <li>• How to effectively incorporate user perspectives into setting asset class performance standards, e.g., what does an International Roughness Index (IRI) of 'x' really mean to a motorist?</li> </ul>

Baltimore Metropolitan Council	<p>following aspects could facilitate the use of Asset Management:</p> <ul style="list-style-type: none"> <li>• Coordination and information sharing between state/local and MPO, assets owned by state and local</li> <li>• Delineating Asset Management or operations-related projects in the LRTP/TIP</li> <li>• Since capital projects don't include O&amp;M costs, it is hard to compare capital projects and operating improvements</li> <li>• Asset Management could be better integrated into the planning projects with the following improvements: <ul style="list-style-type: none"> <li>○ Developing regional performance measures</li> <li>○ By comparing anticipated operational improvements to capacity improvements</li> <li>○ By drawing public works and transportation operators into the process to provide input to planners and enhance the consistency of investment decision-making.</li> <li>○ Integrating Asset Management into corridor planning</li> <li>○ Developing analytic tools to assess cost/benefit, return on investment, performance measures</li> </ul> </li> </ul>	Future research could include additional options regarding private sector involvement in Asset Management and an Asset Management approach to safety.
Michigan Department of Transportation	<p>MDOT recommends the following improvements:</p> <ul style="list-style-type: none"> <li>• Develop an effective combination of process, software, and culture</li> <li>• Deal with staff turnover</li> <li>• How to alter reporting to capture details about maintenance work performed in addition to aspects necessary for financial reporting</li> <li>• Minimize separate data collection issues and ease workflow</li> <li>• Make data collection a part of a job, not an unpleasant add-on</li> </ul>	Further research in the practical application of global positioning systems for Asset Management would be useful.
Southeast Michigan Council of Governments	More training courses aimed at smaller communities would be beneficial.	Further research on data collection would be useful. For example, how often data needs to be collected and the minimum amounts necessary.

<p>New York State Department of Transportation</p>	<ul style="list-style-type: none"> <li>• NYSDOT recommends the following improvements: <ul style="list-style-type: none"> <li>◦ Review the recommendations of the AASHTO Asset Management Guide</li> <li>◦ Review the recommendations of National Cooperative Highway Research Program (NCHRP) Report 545 "Asset Management Tools"</li> <li>◦ Implement the AASHTO Strategic Plan</li> </ul> </li> </ul>	<p>Continue FHWA research, technical guidance, and training.</p>
<p>Capital District Transportation Committee</p>	<p>Support for serious transportation Asset Management is hampered at the federal level because of the absence of a vision comparable to that which led to construction of the Interstate system. Our governance structure is fragmented, leaving many gaps in the cracks. For example, funding for locally-owned streets and highways is often overlooked by State DOTs.</p>	<p>TIP/STIP relationships between State DOTs and MPOs; the degree of integration of non-state Asset Management into MPO and statewide plans.</p>
<p>Ohio Department of Transportation</p>	<ul style="list-style-type: none"> <li>• Improve integration of asset data collected from various sources, including local governments and private entities.</li> <li>• Deal effectively with a changing system. This will require handling of spatial and temporal changes.</li> <li>• Communicate effectively about all aspects of transportation Asset Management such as funding needs, customers and best practices.</li> </ul>	<ul style="list-style-type: none"> <li>• Simple tools for dynamically segmenting asset data collected at different locations.</li> <li>• Processes for extracting transportation Asset Management features from remote sensing information such as high resolution photography, Lidar or data collection vehicles.</li> <li>• Integration and maintenance of state transportation asset data with local government data for comprehensive network coverage.</li> <li>• Communicating Asset Management needs and benefits to local governments and legislators.</li> <li>• Identifying effective transportation Asset Management practices.</li> </ul>

<p>Northeast Ohio Areawide Coordinating Agency</p>	<p>The process took much longer to set up than anticipated. Technical, process and institutional complexities arose due to large number of players and high rates of staff turnover. At the next Asset Management peer review we may have a better idea of specific improvements.</p>	<p>None at the moment.</p>
<p>Washington State DOT</p>	<p>Additional asset classes can be integrated, such as rental property, right-of-ways, utility permits.</p>	<ul style="list-style-type: none"> <li>• Development of improved trade-off approaches</li> <li>• Development of user cost impacts of poor system management that are easily understood by non-economists.</li> </ul>