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Asset Management Peer Exchange

Transportation Asset Management – A Focus on Implementation

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16. Abstract This report summarizes the proceedings of the Asset Management Peer Exchange hosted by the Federal Highway Administration (FHWA) and the American Association of State Highway and Transportation Officials (AASHTO). The peer exchange was held in San Diego, CA on April 19, 2012. The peer exchange addressed various aspects of asset management implementation – how can one improve performance through better asset management? What are effective tools and techniques for asset management implementation? How do agencies plan, prioritize, and budget long-term asset needs? Managers from state DOTs and FHWA gathered for dialogue on best practices, challenges, and sharing of experiences.			
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1 Overview

This report summarizes the proceedings of the Asset Management Implementation Peer Exchange hosted by the Federal Highway Administration (FHWA) and the American Association of State Highway and Transportation Officials (AASHTO). The peer exchange was held in San Diego, CA on April 19, 2012.

1.1 Peer Exchange Purpose

The American Association of State Highway and Transportation Officials (AASHTO) and Federal Highway Administration (FHWA) sponsored Asset Management Peer Exchange aims to share best and current practices in asset management implementation. Participants from state Departments of Transportation (DOTs) presented their agency's asset management implementation experiences and learn about experiences and practices from their peers. The peer exchange provided a forum for state officials to discuss personal experiences or questions concerning asset management, receive feedback on upcoming plans, and support a national knowledge base of asset management tools and techniques. The key issues covered during the day event are:

- How can self-assessments and gap analysis tools from the TAM Guide assist in focusing on the most important activities to manage your physical assets?
- How can comprehensive risk analysis during the programming process improve asset management results?
- What are good models for the development and implementation of asset management?
- How is information from management systems included in the development of the Transportation Asset Management Plan (TAMP)?
- What is the relationship of the information that is used from management systems for the TAMP and how is this information used for the development of Statewide and Metropolitan Transportation Improvement Plans?
- How are performance targets for physical assets developed?
- How is this information tied to the programming of projects?
- How can understanding the value delivered for a given amount of money/investment be useful for TAM?
- What are best practices for collecting, analyzing, and integrating the data necessary to display the selected performance indicators and identify critical performance gaps?
- What are best practices for developing methods for effectively communicating system performance information such as “highway condition/performance health index” to partners, state legislators, Congress, and the media?

The key purpose of the Peer Exchange was the sharing of useful knowledge required to successfully implement asset management programs. Building on previous FHWA and AASHTO asset management peer exchanges and the National Asset Management Conference in San Diego, this Peer Exchange provided state DOTs with a forum to further the state of the practice and identify collective needs.

1.2 Peer Exchange Format

A list of peer exchange participants is presented in Section 1.4. The peer exchange consisted of a full day of presentations and group discussion on April 19, 2012. Butch Wlaschin, FHWA's Director of the Office of Asset Management and Ananth Prasad, Secretary of Florida DOT (FDOT) and Chair of the AASHTO Subcommittee on Asset Management, began the peer exchange by delivering the opening remarks. Next, Matt Hardy, AASHTO's liaison for the Subcommittee on Asset Management, and Hyun-A Park, President of Spy Pond Partners, LLC and the peer exchange facilitator, reviewed the workshop agenda and objectives. Following a context-setting presentation by Tim Henkel, the Director of the Modal Planning and Program Management Division and Assistant Commissioner of Minnesota DOT (MnDOT), the peer exchange agenda consisted of facilitated discussions covering four topics:

- Panel 1 – Asset Management Self-Assessment and Gap Analysis;
- Panel 2 – Asset Management and Managing Performance;
- Panel 3 – Asset Management Tools and Techniques; and
- Panel 4 – Asset Management and TIPs, STIPs, and LRPs.

For each panel, three or four practitioners from state Departments of Transportation (DOTs) each shared a 10-15 minute presentation of current practices within his or her agency. Group discussion periods followed each panel. An open forum at the start of the afternoon allowed all peer exchange participants to share thoughts and activities that were outside of the panel topics. Hyun-A Park helped lead the discussion sessions and the open forum. The states represented by these summary presentations for the panels were: Colorado, Pennsylvania, Iowa, Georgia, Missouri, North Carolina, Utah, Rhode Island, Maryland, California, Virginia, New York, Wyoming, Michigan, and North Dakota. The peer exchange agenda appears in the following section.

1.3 Peer Exchange Agenda

Thursday, April 19, 2012

8:30 Welcome and Opening Remarks

- Butch Wlaschin, FHWA
- Ananth Prasad, Florida DOT

Workshop Overview and Objectives

- Matt Hardy, AASHTO
- Hyun-A Park, Spy Pond Partners, LLC

8:45 State of the Practice

- Perspectives on Asset Management (Tim Henkel, Minnesota DOT)

9:00 AM Self-Assessment and Gap Analysis

One of the first steps in implementing an asset management program is the process of establishing where you are and where you want to go. The panelists will share their state's experiences getting started with asset management and in particular conducting self-assessments and gap analyses using the AASHTO TAM Guides.

- Show Me the Data: Asset Management Self-Assessment and Gap Analysis at Colorado DOT – *Scott Richrath (Colorado DOT)*
- Asset Management at PennDOT—Reorganization, Self-Assessment, and Gap Analysis – *Melissa Batula (Pennsylvania DOT)*
- Iowa DOT's Experience with TAM Gap Analysis and Self-Assessment Tools – *Matt Haubrich (Iowa DOT)*
- *Group Discussion*

10:15 Break

10:30 AM and Managing Performance

Being able to measure what you want to achieve and then being able to monitor if you are meeting your goals is a fundamental part of good asset management. States will share their perspectives and experience with asset management and managing performance.

- Managing Performance – *Angela Alexander (Georgia DOT)*
- Tracker—Measures of Departmental Performance – *Brian Reagan (Missouri DOT)*
- North Carolina's Journey Toward Managed Performance – *Jennifer Brandenburg (North Carolina DOT)*
- Transportation Asset Management: Utah's Journey— *Cory Pope (Utah DOT)*
- *Group Discussion*

- Noon** **Lunch**
- 1:00** **Open Forum**
All participants are encouraged to share any activities that they are engaged in related to asset management.
- 1:45** **AM Tools and Techniques**
Having good tools and techniques to support your asset management program is a key enabler to success. States will share their experiences with management systems, economic analysis, and other tools and techniques.
- Rhode Island’s Steps Towards a Successful Asset Management Program – *Joe Baker (Rhode Island DOT)*
 - Maryland’s Vision for Asset Management through an Enterprise GIS System – *Scott Pomento (Maryland State Highway Administration)*
 - Caltrans Asset Management Journey – *Steve Takigawa (Caltrans)*
 - VDOT’s Approach to Assessing Maintenance and Operations Needs – *Jeff Price (Virginia DOT)*
 - Group Discussion
- 3:15** **Break**
- 3:30** **AM and TIPs, STIPs, and LRPs**
Long range plans and programs establish the vision for what transportation agencies want to achieve for their assets. States will share their experiences integrating asset management with their planning and programming processes.
- Integrating TAM into Capital Planning and Investment – *Roderic Sechrist (New York DOT)*
 - Wyoming DOT Integrated Asset Management Model—Making the STIP – *Timothy McDowell (Wyoming DOT)*
 - Asset Management in Michigan – *Dave Wresinski (Michigan DOT)*
 - Supporting North Dakota’s STIP Development Using Asset Management – *Jack Smith (North Dakota DOT)*
 - Group Discussion
- 5:00** **Peer Exchange Wrap-Up**
Summary of day’s discussion and ideas to consider for future activities
- Steve Gaj (FHWA)
- 5:30** **Peer Exchange Ends**

1.4 Peer Exchange Participants

Name	State DOT
Coco Briseno	California
Steve Takigawa	California
Scott Richrath	Colorado
Ananth Prasad	Florida
Angela Alexander	Georgia
Jason Brinkman	Idaho
Matt Haubrich	Iowa
John Selmer	Iowa
Scott Pomento	Maryland
Dave Wresinski	Michigan
Tim Henkel	Minnesota
Brian Reagan	Missouri
Jennifer Brandenburg	North Carolina
Scott Zainhofsky	North Dakota
Jack Smith	North Dakota
Roderic Sechrist	New York
Andrew Williams	Ohio
Shael Gwartz	Ontario (Canada)
Melissa Batula	Pennsylvania
Joe Baker	Rhode Island
Cory Pope	Utah
Jennifer Royer	Vermont
Jeff Price	Virginia

Name	State DOT
Martin Kidner	Wyoming
Ed Fritz	Wyoming
Tim McDowell	Wyoming

2 Introductions

2.1 Opening Remarks

Butch Wlaschin welcomed participants on behalf of the FHWA and the AASHTO subcommittee to the Peer Exchange “Transportation Asset Management – A Focus on Implementation.” He mentioned the new AASHTO TAM Guide and its focus on the implementation of asset management. Butch noted that inter-agency discussions over the past two years have moved asset management principles and plans forward. As Congress is getting closer to passing reauthorization legislation for transportation funding, it is increasingly important to have a better understanding of what asset management means.

Butch recognized that the TRB’s National Conference on Asset Management presented a great opportunity to share ideas, best practices, and lessons learned—this information may help other state DOTs avoid pitfalls and encourage them to venture out into new areas for the implementation of asset management programs. The FHWA and AASHTO have sought to bring together state DOTs with different levels of maturity within the asset management arena. Through this Peer Exchange, participants can discuss their experiences and collectively move forward.

Butch recognized the FHWA’s efforts to modernize outreach through their video and audio recording of this Peer Exchange in San Diego. Through online access to some of today’s presentations and participant discussions, states not represented here can benefit from the Peer Exchange and move their own asset management programs forward. On behalf of the FHWA, Butch expressed his thanks to the participants for taking the time to attend the Peer Exchange in San Diego.

Ananth Prasad then welcomed the Peer Exchange participants on behalf of AASHTO and the subcommittee on Asset Management, noting that about 20 state DOTs from all across the country and a representative from Canada’s Ontario Ministry of Transport were present. He recognized that all participants do varying degrees of asset management, and the purpose of the workshop is to exchange experiences—no one state DOT has all the answers. Ananth emphasized that when participants return to their DOT they will have new skills to work with agency management to

advance asset management, and he encouraged participants to stay engaged and ask questions throughout the Peer Exchange.

Ananth also referenced the pending highway bill and MAP-21 in his discussion of investing transportation funds to gain maximum return on investment at minimum risk. Finally, Ananth focused on a nationwide need to go beyond pavement and bridges. DOTs are doing a good job managing those assets, but there are many other assets to manage that must be considered.

2.2 Peer Exchange Overview and Objectives

Matt Hardy, the Program Director for Planning and Policy at AASHTO and liaison to the subcommittee on Asset Management, brought participants' attention to the Peer Exchange information packet that was distributed. He emphasized the contact information listed, encouraging participants to use each other as resources as they worked to implement asset management at their state DOTs. Matt also reminded participants that they could access the recorded webinars that were focused on using the AASHTO TAM Guide online (tam.transportation.org).

Hyun-A Park welcomed all of the Peer Exchange participants, describing the rich and varied content of the upcoming presentations on asset management implementation. She walked the participants through the Peer Exchange agenda, reviewing panel topics and presentation logistics. Hyun-A then introduced the first speaker, Tim Henkel from Minnesota DOT.

3 State of the Practice

3.1 Perspectives on Asset Management

Tim Henkel of Minnesota DOT (MnDOT) began his presentation by acknowledging the gaps in asset management that exist in Minnesota. He posed a question to the group, asking how state DOTs and FHWA can address these gaps as we implement asset management on a national scale. In his summary of Minnesota's perspective on asset management, Tim noted that while Minnesota's status is fairly mature in its performance-based planning approach, the level of maturity varies across assets. There are very mature systems in place for pavement and bridges, but MnDOT's understanding of ancillary areas of asset management is more minimal. With respect to implementing asset management strategies, Tim posed four core questions that an asset management approach can help answer:

- What is our objective?
- What are our risks?
- How do we manage our risks?
- How are we doing?

MnDOT's asset management system is "quasi risk-based," historically treating pavement and bridges as the highest risk assets and investing there. Formerly, MnDOT focused primarily on capital investments without as much strategic emphasis on maintaining assets. Now, they have

recognized a need to develop a more comprehensive asset management framework. Through identifying maintenance needs in their 20-year highway investment plan, MnDOT is expanding their understanding of maintenance and operating costs. MnDOT has also developed a core internal working group and started forming asset management focus groups. MnDOT had traditionally taken a siloed approach, but is evolving to collect and evaluate data across silos. An enterprise software solution for asset management supports this broader, more balanced approach to asset management.

Tim noted that MnDOT has a great deal of work to be done in developing and institutionalizing an AM framework. Some areas where there are gaps in asset management data include risk-based management and cultural understanding (also identified by action committees at the TRB National Conference on Asset Management). Managing risk and performance involves trade-offs, and state DOTs are working to target the right investments within their states and nation-wide. Addressing these challenges requires shifting goals for decision-making and shifting cultures to look across silos and address system-level needs, beyond bridges and pavements.

In addressing goal setting from a risk-based perspective, Tim focused on the “state of good repair” concept of asset management. He noted that MnDOT is audited on a previously established goal of investing in preservation first, in which preservation of the existing system is prioritized above other investments. More recent shifts in goals and funding have led to a transition from preservation-first goals to a balanced investment approach that incorporates considerations of risk and operational performance.

After describing MnDOT’s approach to asset management, Tim focused on the role of data resources in shaping MnDOT’s asset management plan—a great deal of data has been collected, but not necessarily the right data. Data is the foundation for decision-making, but what’s the right amount of information?

In his conclusion, Tim described the framework necessary to support MNDOT management: risk management, performance management, and asset management. These parameters help MnDOT meet strategic and business objectives and department goals—the MnDOT organization is evolving from independent silos to a cooperative body that addresses overall department objectives, risks, and management strategies.

4 Asset Management Self-Assessment and Gap Analysis

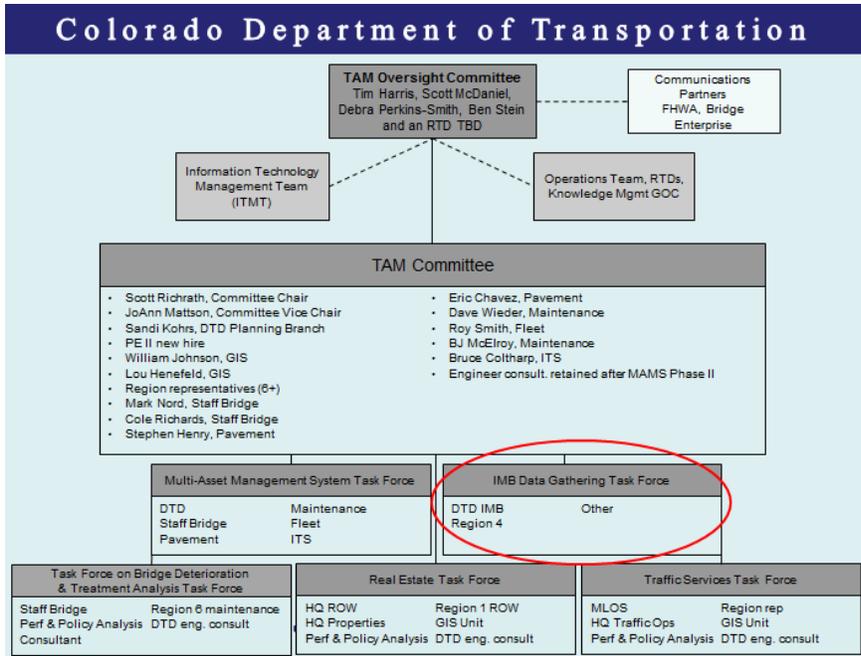
4.1 Show Me the Data: Asset Management Self-Assessment and Gap Analysis at Colorado DOT

Scott Richrath presented on the state of Colorado’s asset management journey. He believes that Colorado DOT (CDOT) is at about the average position for DOT asset management progress—while they have done some important work, other states are more advanced. Scott described the bridge and pavement programs that preceded the asset management plan. More recently, CDOT focused their priorities on other technology initiatives such as the enterprise resource planning (ERP) system, instead of asset management. Now, CDOT is resuming their focus on their asset

management program. CDOT faces a continuous challenge to improve asset management, working to keep up with software development and data collection strategies.

Scott also discussed the use of the AASHTO Transportation Asset Management (TAM) Guide in CDOT’s asset management plan. An organized AASHTO TAM Guide “book club” meets weekly to review a chapter of the Guide, and the group used the Guide to conduct an agency self-assessment. Most recently, the Data Gathering Task Force has focused on data collection tools and techniques recommended in the AASHTO TAM Guide (Figure 4.1).

Figure 4.1 CDOT Transportation Asset Management (TAM) Committee Organization



Through the self-assessment process, data and information proved to be the largest gap in CDOT’s asset management framework, although there were additional gaps. CDOT is working to determine if the data they have are the right data, and have prepared a performance data integration plan. Strategies for maturity in pavement management and best practices are included in this new plan.

The CDOT self-assessment was a great place to start for improving on performance data integration and additional asset management goals. In his conclusion, Scott emphasized the importance of learning what skill sets are needed to develop a comprehensive asset management plan.

4.2 Asset Management at PennDOT-Reorganization, Self-Assessment, and Gap Analysis

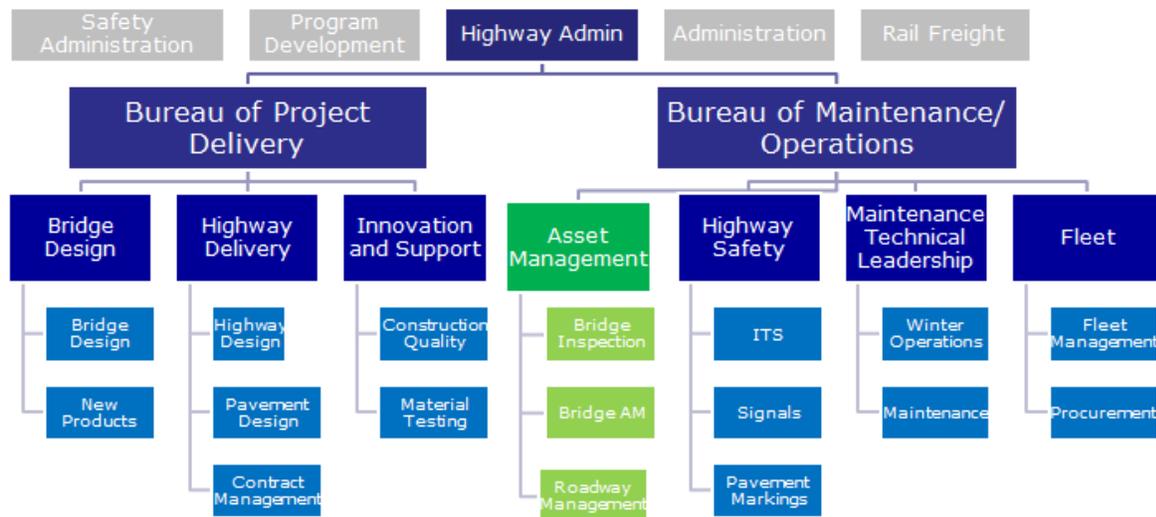
Melissa Batula presented on Pennsylvania DOT’s (PennDOT’s) efforts to restructure their approach to asset management. While she emphasized that asset management was a core business

at PennDOT, she also acknowledged a need for better asset management organization on both county and local levels. The average bridge in Pennsylvania is over 50 years old, and PennDOT is currently evaluating the conditions and needs of its existing inventory of 8-20 foot local bridges. PennDOT’s challenges in asset management include a large quantity of aging infrastructure on both state and local levels. In discussing why PennDOT assets are rated so poorly, Melissa mentioned Pennsylvania’s freeze-thaw climate, heavy truck traffic, and a large customer base.

Pennsylvania’s MPO districts are poorly aligned, which creates difficulties with planning and funding capacity projects and maintaining assets. However, Melissa noted that the development of new asset management goals with planning partners has been very successful. PennDOT and their partners have communicated asset management needs through an Annual Performance Measures Report, organizing needs by asset, county, network, and short- or long-term variables. Agency goals for driving continuous asset improvement and taking a risk-based approach to pavements and bridges pre-date the reorganization of PennDOT’s asset management approach.

The PennDOT’s department structure was reorganized in order to include an Asset Management division under the Bureau of Maintenance and Operations (Figure 4.2). Bridge inspection, bridge asset management, and roadway management offices under the Asset Management division remain connected to a number of other divisions. After reorganization, PennDOT’s Asset Management Division focused on developing and strengthening policies and procedures to support strong asset management approach on the system, program, and asset level.

Figure 4.2 PennDOT Reorganization: Asset Management Division



In order to implement asset management within PennDOT’s new organizational framework, executive staff members and technical experts must work together to develop an agency “improvement roadmap.” With consultant assistance, PennDOT planned their “roadmap” based on the AASHTO TAM self-assessment, gap analysis and an implementation plan (to be completed in June 2012). Reworking the agency to support asset management facilitated dialogue between different departments and offices, although there is little consensus in gap analysis efforts. Melissa brought up several challenges with PennDOT’s gap analysis:

- *Composition*—balancing technical staff versus decision making participants
PennDOT held initial sessions with technical staff and follow up sessions with decision makers
- *Scheduling*—requires a large staff commitment
PennDOT identified crucial sessions, identifying specific and/or additional participation requests
- *Format*—balance ideal face-to-face sessions with travel expenses and time commitments
PennDOT organized face-to-face, 4-hour midday sessions and web conferencing participation for shorter sessions
- *Relative Sessions*—keeping session questions relevant to the respective audience,
PennDOT selected gap analysis questions specific to each session group
- *Value Added*—maintaining meaningful participation and emphasizing value of gap analysis
PennDOT determined that session discussions were more valuable to their agency than an actual score

As Melissa wrapped-up her presentation, she outlined PennDOT’s aims for effective communication, reorganization, self-assessment, and gap analysis as key components of PennDOT’s asset management effort. The next step for PennDOT is the completion of their implementation plan, which will include requirements for an enterprise asset management system. The Asset Management division is interested in pulling information from other systems through the enterprise, but questions how they will organize new data in an asset-specific system.

4.3 The Iowa DOT’s Experience with TAM Gap Analysis and Self-Assessment Tools

Matt Haubrich presented on Iowa DOT goals for creating an asset management framework. He began by acknowledging agency challenges to communicate, describing initial asset management efforts in 2009 as a “false start.” More recent efforts with the AASHTO TAM Guide’s gap analysis in 2010 and 2011 haven’t been especially representative of Iowa’s state of asset management. Still, the gap analysis process identified a need for improvement in program delivery and helped Iowa determine what their next steps with TAM should be. In his discussion of gap analysis, Matt also emphasized the importance of trusting management partners and setting clear targets when conducting the analysis.

Next, Matt discussed the self-assessment that Iowa DOT conducted. Again, the group of agency managers participating in the assessment was frustrated with the lack of shared understanding of agency goals. While Matt described a state DOT at the beginning of its TAM implementation journey, he also identified a need for a “model” asset management program that may help Iowa understand what their resources are and what their agency needs.

4.4 Group Discussion

Roderic Sechrist began the brief discussion after the first panel with a question concerning the customization of self-assessment and gap analysis. He observed that many state DOTs had struggled with answering some of the questions from the AASHTO TAM Guide. The panelists agreed that an agency can develop a custom version of the self-assessment and gap analysis tools. Matt Hardy noted that there is a need for scaling elements within the AASHTO TAM Guide self-

assessment. Introducing the concept of an agree/disagree scale and developing a more detailed scale of asset management maturity levels could be useful.

5 Asset Management and Managing Performance

5.1 Managing Performance, Georgia DOT

Angela Alexander began her presentation on Georgia DOT's (GDOT's) asset management experience by describing the link between strategic planning, performance management, and asset management. At GDOT, asset management began in the maintenance division, with strong department leaders committed to this three-part asset management approach. After outlining the GDOT approach to asset management, Angela provided a detailed description of GDOT's current planning processes, system evaluations, performance measures, and target development. These asset management efforts include:

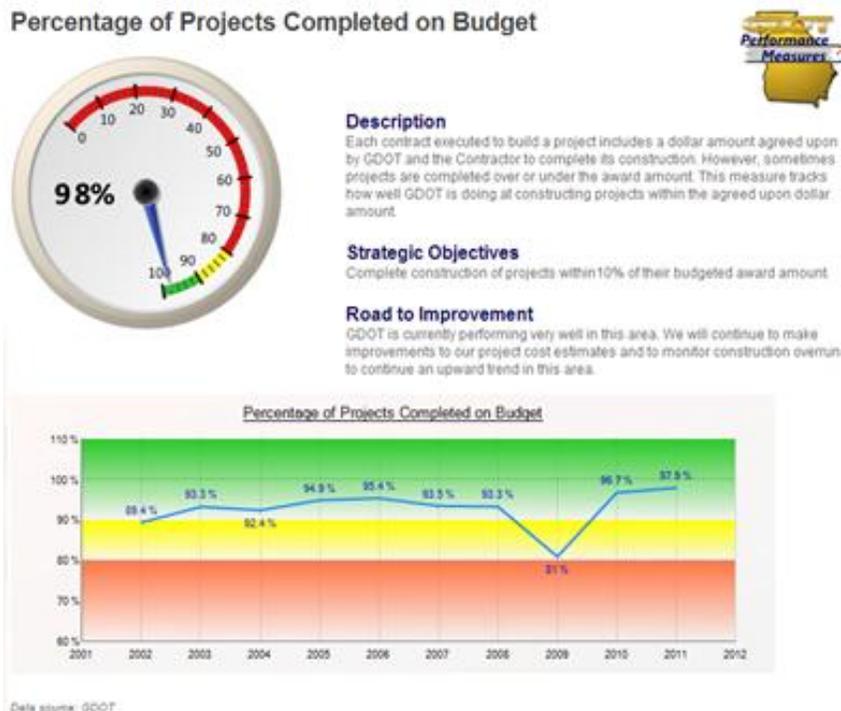
- Updated Strategic Plan for 2013
- Detailed TAM Implementation Plan
- Development of a new Asset Management and Reporting System
- District-level Performance Measures

Angela described the implementation plan in more detail: it will include clear, actionable steps for GDOT to take towards effective asset management. Furthermore, GDOT is aiming to implement an asset management framework rather than a more detailed, project-specific analytical tool. This department-wide approach to asset management will inform planning decisions while providing opportunities for input from engineers, field technicians, middle managers, and other stakeholders.

As she began her discussion of asset management actions that GDOT has taken, Angela defined two key goals for GDOT: taking care of existing assets efficiently and investing in assets that may put Georgia's traveling public at risk. In applying these goals to asset management processes, Angela emphasized a need for analysis of asset condition, rather than basic counts and categorizations. GDOT does not currently have a system that stores data on all assets: the planned Asset Management and Reporting System will address this need.

In the next section of her presentation, Angela described GDOT's efforts to track the relationship between performance measures and agency decision-making. GDOT has implemented a Dashboard tool that provides quarterly updates on maintenance, safety investments, and preservation projects (Figure 5.1).

Figure 5.1 Example of GDOT Performance Management Dashboard Reporting
 Percentage of Projects Completed on Budget



Using real-time data, the Dashboard also assesses GDOT’s ability to plan and complete projects on time and on budget. Angela ended her presentation with a summary of the strengths and weaknesses of the Dashboard project. She noted that, although the use of real-time data allowed the Dashboard to be implemented in under 12 months, these data are difficult to check for accuracy. Overall, the Performance Management Dashboard makes an important connection between data and decision-making at GDOT.

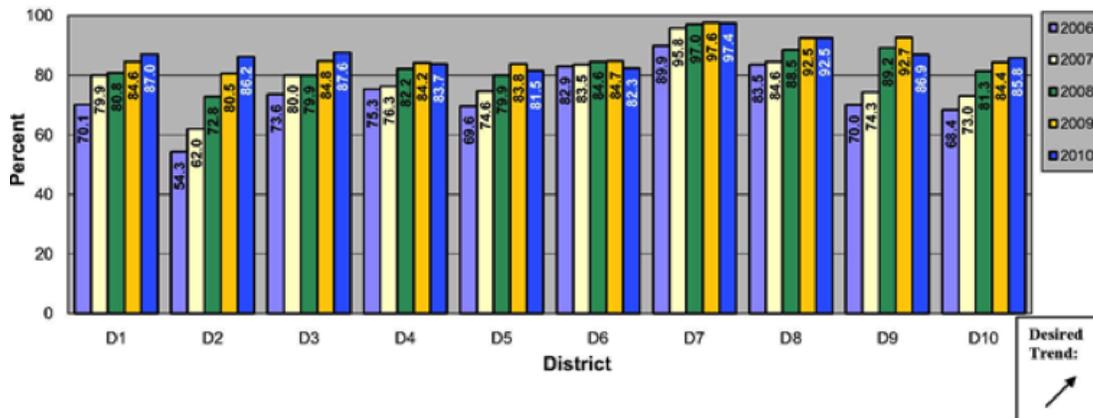
5.2 Tracker-Measures of Departmental Performance, Missouri DOT

Brian Reagan presented Missouri DOT’s (MoDOT’s) performance management system “Tracker” as a method for increasing agency accountability and innovation. Brian described Tracker as articulating 18 “tangible results” through both a book format and a series of meetings. MoDOT defines tangible results as deliverables that Missouri travelers expect from the department. Each of the 18 tangible results has a “result driver,” a MoDOT staff member who is responsible for delivering that result. Furthermore, each tangible result has specific performance measures associated with it.

Overall, Tracker identifies over 120 performance measures that support tangible results. Each performance measure has a “measurement driver,” an individual responsible for monitoring that measure and making recommendations to the result driver. Brian also provided examples for a few of the 18 tangible results and their associated performance measures that are addressed through this Tracker framework. Smooth and unrestricted roads and bridges, roadway visibility, and the efficient movement of goods are all tangible results developed by MoDOT management and customer input. While conditions for some of MoDOT’s tangible results have not improved

significantly since 2005, benchmark performance measurements allow MoDOT to track changes year to year (Figure 5.2).

Figure 5.2 MoDOT Chart of Major Highways in Good Condition



The Tracker was implemented with a change in MoDOT management in 2005, and senior management leads department-wide Tracker meetings in order to coordinate efforts between different districts, divisions, and offices. The meeting serves as a peer exchange, where district and division leaders, measurement and result drivers, and other agency members present and discuss results.

Districts and divisions also have their own trackers, the D-Tracker, which publishes and presents a report at Tracker meetings. Earlier examples of fleet and IT assets represent the variation in asset needs, emphasizing the importance of the focused, detailed approach on individual assets required by the Tracker framework. The Tracker meetings coordinate these approaches, involving several different levels of leadership—the senior management, chief engineers, and district leaders are at the Tracker meeting in order to provide input on district approaches and results. This means measurement drivers can compare results at the district level, developing best practice statewide. Managers will ask questions about significant changes, holding everyone accountable and keeping department channels of communication open.

Brian summarized his presentation by presenting two potential problems that have come up in his experience with performance management. First, staff must spend the time to develop the “right” priorities. If senior management supports a performance measurement, you will get results—you just have to ask for the right measures and projects. The second concern involves communication about measurement priorities—it is challenging to choose the right measures. For example, while overall IRI is measurement of performance, an area of the road with a good IRI may still need to be worked on. However, you have to choose a performance measure and begin prioritizing that selected measure in order to make progress. Brian summarized his presentation of the Tracker by acknowledging the difference between measuring performance and effectively closing performance gaps.

5.3 North Carolina’s Journey toward Managed Performance

Jennifer Brandenburg of North Carolina DOT (NCDOT) presented on NCDOT’s incorporation of performance evaluation strategies into their agency plan. She described the NCDOT roadway

management division and the offices that currently use an asset management program. Goals for asset management within each NCDOT division include:

- State Road Management
- Pavement Management
- Structure Management
- Fleet and Material Management
- Materials and Tests
- Construction
- Roadside Environmental

Jennifer stated that NCDOT's first asset management efforts began in 1998, when the department developed a course towards achieving the following goals:

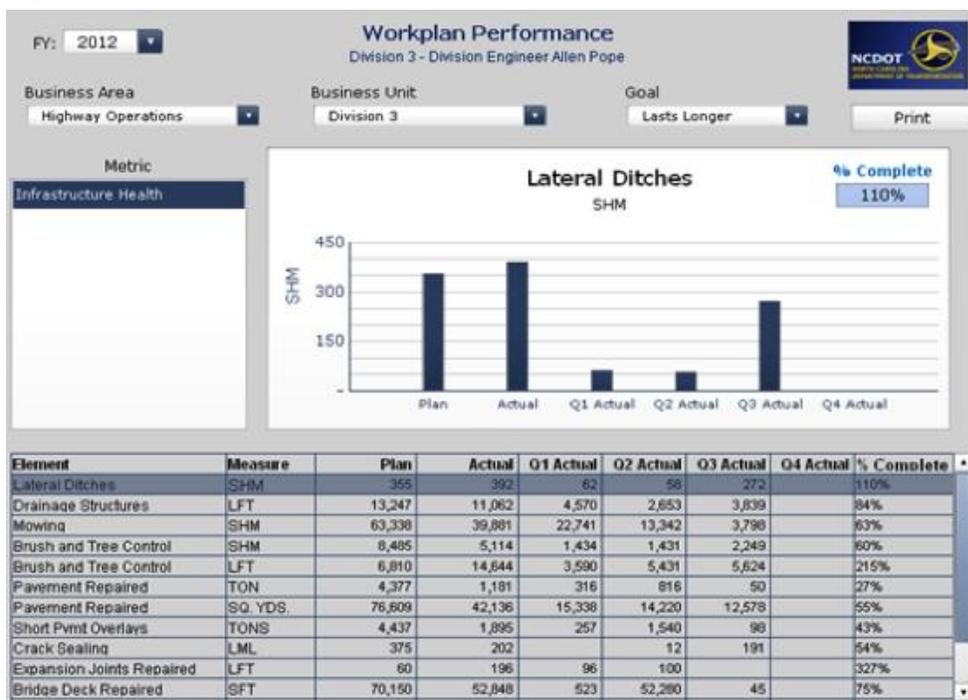
- Unconstrained funding between asset management areas
- Project funding as necessary to achieve desired Level of Service (LOS)
- Credibility with both the legislature and political leaders
- A shift in focus from reactive to proactive maintenance
- Performance driven standards
- Highway condition measurements
- Meaningful annual maintenance plans
- Indices for safety, preservation, and aesthetics
- Comparisons between actual and planned work

North Carolina's General Statute 136-44.3, which was passed in 2008, requires the calculation of annual cost of routine maintenance, resurfacing, and project backlog. NCDOT's 2008 report on the annual cost of these processes led to new levels of management accountability and the restructuring of NCDOT's asset management work program. The Maintenance Condition Assessment Program (MCAP) was implemented and expanded, and a maintenance management system (MMS), a pavement management system (PMS), and a bridge management system (BMS) were implemented.

When Performance-Based Maintenance Contract (PBMC) legislation was passed, NCDOT recognized a need to move towards a more performance-based organization and expand levels of DOT accountability. Through emphasizing accountability at the department, unit, and employee levels, NCDOT can improve the accuracy of performance reporting.

Employee evaluation was difficult to correlate with leading and lagging indicators—a Performance Dashboard Appraisal (PDA) was developed in 2009 to increase employee accountability. Both public and internal management dashboards have been developed to monitor organizational performance and asset conditions in real time. Jennifer gave some examples of NCDOT's internal dashboards (established in 2010), which use real-time results and an automated tool for scorecard metrics to produce detailed analysis and reporting of performance and conditions (Figure 5.3). While the PDA has been well received by the public and the legislature, an MMS is also used to track work accomplishments.

Figure 5.3 NCDOT Work Plan Dashboard



Jennifer also discussed NCDOT’s approach to maintenance level of service (LOS), which was developed in response to the PBMC legislation. There was limited time to develop the LOS program so they used Washington State DOT’s Maintenance Accountability Process’ LOS approach as a starting point. The program has evolved over the years to cover over 20,000 miles of automated data collection. Tablet PCs are replacing 80,000 miles of visual surveys and paper forms, and a GIS-based asset-rating system was implemented in 2010. In her conclusion, Jennifer noted that funding continues to restrict NCDOT projects. They would like to implement a tradeoff analysis system to continue to improve the overall condition of North Carolina’s transportation system.

5.4 Transportation Asset Management: Utah’s Journey

Cory Pope of Utah DOT (UDOT) began his presentation by summarizing a logical project selection process, based on capacity, preservation, and safety. He recognized that the biggest challenge in transportation asset management is resource allocation: although maintenance needs outpace funding availability, a lack of funding should not prevent necessary projects. Balancing department goals for capacity, preservation and safety between competing programs or projects is a major challenge for UDOT.

Utah’s performance measures strategies, described in the “Strategic Direction” report, have been in place for over 10 years. The report has increased agency transparency, establishing credibility and trust with the public and legislature. This report outlines UDOT’s “Final Four Strategic Goals” related to

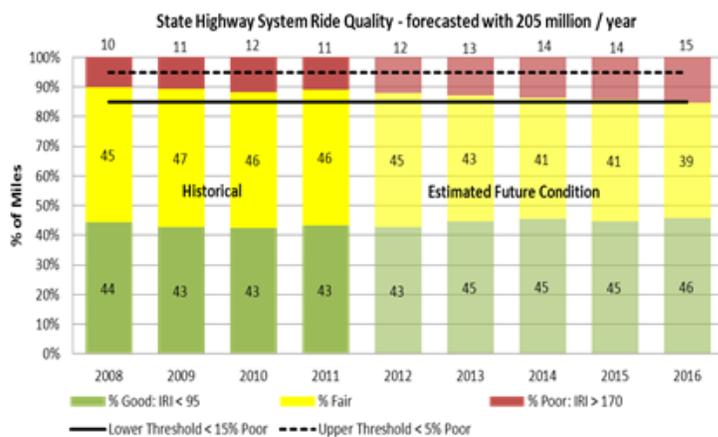
- Preserving infrastructure;

- Optimizing mobility;
- Improving safety; and
- Strengthening the economy

Cory acknowledged that tradeoffs are a challenge within each strategic goal, but UDOT aims to optimize results across all four goals.

In the next section of his presentation, Cory focused on preserving infrastructure. UDOT sets upper and lower thresholds of condition in order to gauge when and where to allocate funds. Cory included slides on pavement and bridge conditions statewide, including historical data and estimating future conditions (Figure 5.4). UDOT spends approximately \$180 million of federal funds and \$20 million of state funds on maintaining overall pavement condition. The agency has also developed a critical bridge list based on 30-40 parameters, evaluating all of Utah’s 1,800 bridges and ranking fewer than 20 as “poor,” with all other bridges in “good” or “fair” condition.

Figure 5.4 UDOT Chart of Statewide Pavement Conditions



Revisiting his introductory points, Cory emphasized the importance of asking “are we spending in the right places?” and re-evaluating UDOT’s funding priorities. In terms of road maintenance, UDOT developed a road map in the 1980s that illustrates the life cycle of pavements and reinforces the agency belief that “good roads cost less.” A 2001 asset management workshop helped UDOT identify gaps, and a major rebuild of I-15 was funded in 2002. For the past five years, UDOT has been enlisting contractors to improve data collection processes. These data led to the production of pavement condition graphs that supported a proposed increase in Utah’s gas tax, reinforcing the value of quality data and agency communication.

While UDOT initially used a number of vendors to facilitate asset data collection, they are currently trying to integrate this data into one agency-wide system. The next step in data collection is the implementation of mobile Light Detection and Ranging (LiDAR) data collection, which will improve the design of transportation assets and infrastructure.

5.5 Group Discussion

During the discussion following Cory's presentation, Tim Henkel asked Cory how UDOT establishes priorities for improved data collection. Cory referenced asset value and whether or not the department will spend federal money on data collection. Pavement assets have received the most funding for data collection, and other transportation assets are far behind. Next, Ananth asked about safety as a priority for funding and data collection and Cory agreed that it was important to consider safety as well.

Katie Zimmerman asked Brian Reagan about the process of comparing Missouri to other states, and Brian answered that there are a limited number of states producing the same type of data. MoDOT tries to examine states in similar asset management positions and benchmark states for comparison.

Roderic Sechrist asked both Brian and Jennifer Brandenburg if they could discuss any issues with data integrity when sharing data with the public. For example, when NCDOT puts data into the MMS do any issues come up? Brian responded first, stating that issues with data integrity are partially addressed through close examination by measure owners. Jennifer agreed that it is important to look through data and identify outliers. A large sample count also helps support data integrity at the county level. Scott Richrath also addressed Rod's question, describing a 20-question survey that Colorado uses to score which data they should collect. The state transportation commission has provided some money to fund data collection for other assets, and data will be collected based on previously established needs.

Joe Baker (RIDOT) observed that everyone seems to have MMS for tracking maintenance, but wondered how information from contract forces is incorporated. Melissa responded that notifications are supposed to be incorporated after work is completed—while it typically works for bridges and other assets, PennDOT has had problems with guardrail information.

Martin Kidner (WYDOT) posed a general question about asset management versus performance management definitions—how does each state DOT manage tradeoffs between asset management and performance in other areas? Cory recognized that this tradeoff is a huge challenge and is not sure how to meet it. Jennifer added that every decision is tied to tradeoff analysis, and they are working towards a balance between asset management and other areas of performance. Angela said that GDOT has a similar approach to NCDOT's: asset management measures are not currently the driving force in tradeoff decisions. Butch provided an example that was discussed in a previous Peer Exchange held in Cheyenne on prioritizing safety, describing hazardous overhead signs and high mast lights as high safety priorities. He also noted issues with ownership for traffic and safety assets, concluding that it may be difficult to make decisions about asset responsibility.

Ananth noted that the Colorado approach to making tradeoffs in asset management sounds good, and followed Butch's Cheyenne example by stating the need for assessing and prioritizing high mast lighting replacement. While asset value is important, safety is too. He also responded to Martin's initial question on asset management and performance management definitions, regarding performance measures as necessary for both asset management and other areas. At FDOT, they set overarching performance measures that connect funding to achieving these measures.

Matt Haubrich was concerned about maintaining inventory data once it is collected and tying maintenance activities to traffic and safety assets. For instance, IADOT's systems have not tracked the work done in a high mast light at an interchange. He noted that state DOTs need to establish an appropriate level of detail for data collection. Ananth concluded the discussion with an observation that state DOTs tend to have Data Rich Information Poor (DRIP) situations - they are good at collecting a lot of data but not able to glean good information from it. You want to tie this data to an investment—this connection is where the benefits are. High mast lighting is still a relevant example—there is no avoiding the initial investment, but benefits outweigh the costs.

6 Open Forum

At the start of the afternoon, an open forum allowed participants to bring up any topics of interest that were not covered in the panels. Andrew Williams (Ohio DOT) began the discussion by describing Ohio's mature AM initiatives. Initially, ODOT put forward a set of funding recommendations to the state leadership and their plans were approved. In terms of asset management organization, ODOT is dealing with three levels of leadership: from the grassroots, day-to-day maintenance to the mid-level management and executive officers.

ODOT has established performance management for pavement and bridges, tying measures to evaluations of district engineers enforcing accountability down the line of command. Beyond pavement and bridges, ODOT has conducted surveys and developed lists of additional needs for data collection. These lists cite culverts, barriers, signs, and bicycle- and pedestrian-focused assets as key areas for improvement. ODOT is also exploring the use of high-speed mobile LiDAR, testing LiDAR capabilities by mounting the equipment to planes. There is a concerted effort to utilize geotechnical support for collecting information on buried assets, and ODOT would like to work on an AM plan in the near future. Scott Zainhofsky (North Dakota DOT) asked Andrew if he was aware of any technology for the high-speed measurement of load carrying capacity or distress. Andrew replied that the high-speed LiDAR he discussed may work for those measurements, and the technology is available from several vendors.

Jason Brinkman discussed Idaho DOT's recent reorganization and his new role as the Director of Transportation Systems and Asset Management Tools. New executive management (including Ryan Ness, formerly of Michigan DOT) and additional group members have a lot of ideas about how to move AM forward. Funding is not extremely siloed, so the agency has the ability to make tradeoffs that maximize system conditions. Idaho cites similar goals to Utah in their most recent report, although the preservation goal is implied by its connection to the other three articulated goals for safety, mobility, and economic opportunity, which were inspired by existing management system products. In order to achieve agency goals, Jason emphasized a need to update and integrate Pontis and re-examine tradeoffs between available asset management tools.

Jennifer Royer from the Vermont Agency of Transportation (VTTrans) described the partnership that has developed between the Vermont, Maine, and New Hampshire DOTs. While VTTrans is a smaller agency, its goals are similar to those of larger agencies. They are working to develop Measures of Effectiveness (MOE) with Maine and New Hampshire, addressing performance

management on key issues in all three states. These states have worked collaboratively in many areas since the 1990s, developing a Maintenance Management System (MMS) and a Managing Asset Transportation System (MATS). A performance management report for pavement, bridges, signs, and safety has been developed (at the VTrans website <http://www.aot.state.vt.us/>).

Shael Gwartz from the Ontario Ministry of Transportation noted that Ontario is in a climate similar to New York's and Michigan's, with an extensive road network. The Ministry began looking at asset management about 10 years ago, but preparing the organization to implement AM strategies was challenging. While technical experts in pavement and bridges embraced AM, developing effective tools and techniques for implementation, the Ministry has not focused on other assets (95 percent of asset value is in bridges and pavement). Across the province, the annual allocation of funding for expansion and rehabilitation of bridges and pavement is still in question. BMS and PMS are supporting decision-making processes for project funding, but year-to-year timeframes are additional challenges to investing in bridge assets. A number of PM goals fit into Ontario's long-term plan for 2020, and the budget for capital programming has doubled over the past five years. Shael emphasized Ontario's need to expand PM and AM strategies to other assets, and is curious about using dashboards to increase agency transparency. Additional spending on indirect costs has limited project budgets, and Ontario is monitoring spending to maximize direct spending on assets and investment value—they have developed a strategic target to spend 75 cents of every funding dollar on pavement and bridges.

At the conclusion of Shael's description of the state of asset management in Ontario, Tim Henkel asked how he developed the 75-cent number. Shael responded that his office had examined historic patterns of spending through the past 5 years of project contracts, finding a range of 50-80 cents and an average of 60 cents spent per funding dollar—75 cents is the Ministry's stretch target for direct spending.

7 Asset Management Tools and Techniques

7.1 Rhode Island's Steps Towards a Successful Asset Management Program

Joseph Baker of Rhode Island DOT (RIDOT) presented on his agency's state of asset management maturity. He began by describing how Rhode Island got started with asset management, emphasizing the lack of management systems for operations. Asset management was initiated in the RIDOT's Division of Highway and Bridge Maintenance and Safety. At this point, RIDOT is aspiring to develop better maintenance tracking activities and become a national leader in asset and performance management.

About 5 or 6 years ago, RIDOT reviewed management practice in other states. Although they were initially focused on performance-based contracting, RIDOT was more encouraged by opportunities for asset management and quickly formed a core asset management group to establish an asset management program. This core team at RIDOT, led by the Division of Maintenance, includes representatives from GIS, IT, Financial Management, Planning, Environmental, Design, and Construction offices. The small size and consistency of membership

in this group has simplified RIDOT's transition to asset management program implementation and provided important opportunities for communication.

Joe described the existing business management systems that RIDOT has implemented, emphasizing a need to integrate these systems through a Maintenance Management System (MMS), VueWorks. The implementation of this MMS (initiated February 2012) is a three-phase process that aims to transform RIDOT's asset management into a fully integrated system. Phase I will support RIDOT's abilities to track, schedule, and evaluate operations, Phase II will implement a fully integrated asset management process, and Phase III will be the transition to using asset management as the basis for agency decision making. RIDOT aims to use asset management as the key to fully understanding the life cycle of an asset, the short- and long-term consequences of business decisions, and creating agency transparency and accountability for users.

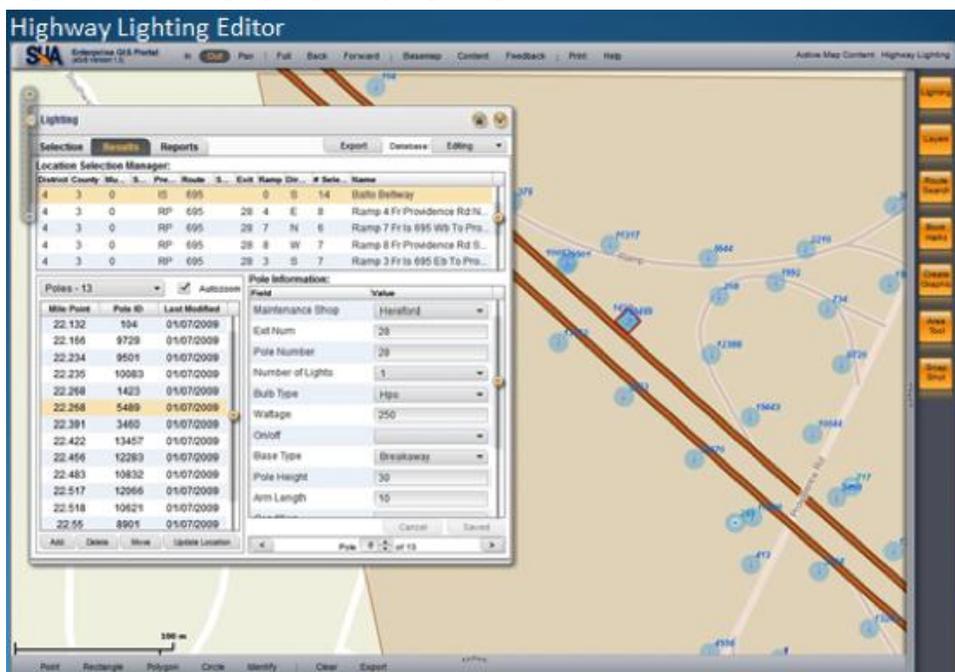
At the conclusion of his presentation, Joe noted RIDOT's need to conduct self-assessment and gap analysis processes in order to manage their assets more effectively. While RIDOT has a great inventory for some assets, such as lighting and surface drainage, data collection for signs and signals is still in progress.

7.2 Maryland's Vision of Asset Management through an Enterprise GIS System

Scott Pomento presented on Maryland State Highway Administration's (SHA's) use of an Enterprise GIS System to coordinate their asset management program. Scott articulated the SHA vision for a fully integrated AM program—GIS-based data and comprehensive documented plans describe goals for sustainable management practices and adaptations to climate change. In his introduction, Scott noted that flooding is a significant issue in Maryland, and the SHA must consider how to address flooding concerns associated with climate change. Furthermore, the Highway Systems & Engineering Division must adapt assets for increases in temperature, precipitation in the spring season, heat in the summer season, storm frequency and intensity, and "100-year flood event" frequency, plus stronger hurricanes and a sea level rise of approximately 5 feet.

The SHA currently uses asset management programs for bridge, pavement, and drainage assets. The next step in asset management for the SHA is an Asset Data Warehouse (ADW), which would integrate all asset information into one system. This ADW would serve as the official asset inventory, with a centralized GIS database, easy-to-use tools for maintaining asset information, and integrated maps for editing and displaying asset data (Figure 7.2). Furthermore, the ADW would enable SHA to interface with established asset management and maintenance management systems, accept new asset data sets, develop comprehensive reporting capabilities, and integrate data within Maryland's Enterprise GIS System.

Figure 7.2 Managing Highway Lighting Assets with the SHA Asset Data Warehouse (ADW)



Scott also described SHA’s vision for ADW management of specific assets and data collection methods, including system tools for selecting assets based on specific locations and/or features and direct editing of asset features. Scott discussed SHA’s additional goals for customizing queries, developing new reporting formats, integrating maintenance records and condition assessments with established systems, and introducing mobile applications for users.

Next, Scott’s presentation focused on the connection between ADW and enterprise GIS system capabilities. He listed three core values that the enterprise GIS System promotes:

- *Collaboration*—integrating databases of data-rich offices and allowing data owners to maintain stewardship
- *Dissemination*—reaching a large GIS customer database
- *Coordination*—maintaining a sustainable database and using real-time data to drive decision-making processes

Enterprise GIS capabilities can integrate ADW, pavement assets, and crash and intersection data. Scott concluded his presentation by connecting the ADW and enterprise GIS System to Maryland’s concerns about flooding—these well-integrated and specific data management tools may improve the accuracy of SHA predictions for asset maintenance needs.

7.3 Caltrans’ Asset Management Journey

Steve Takigawa presented on California DOT’s (Caltrans’) work to streamline data collection methods and justify department spending. He described strategic planning, performance management, and asset management as data-driven and performance-based concepts, emphasizing Caltrans’s need to minimize data collection, maximize their budget, and simplify project goals to

stay on time and on budget. Steve listed Caltrans’s asset management goals for increasing safety, mobility, project delivery, stewardship, and quality service. He used a series of charts to relate these goals to the transportation management system strategies Caltrans has implemented, illustrating an institutional shift in asset management and discussing allocation of funding. Steve cautioned participants to “watch what you wish for”-maintaining assets and raising standards while ensuring that you’re spending money in the right places is a major challenge.

Caltrans is working to maximize transportation system performance and accessibility. They have recorded statewide traffic congestion in Daily Vehicle Hours of Delay (DVHD) since 2008, completed more planned projects within predetermined timeframes and budgets, and are working to preserve more pavement assets. Caltrans has also planned Ready to List (RTL) milestones for capital projects, tracking the delivery of transportation projects statewide (Figure 7.3). Additional goals for mobility and stewardship are reflected in Caltrans’ data management priorities.

Figure 7.3 Caltrans Delivery of Programmed Capital Projects



Caltrans and its local transportation and transit agency partners are improving data collection methods and their analysis of transportation trends. Through using ground penetrating radar (GPR) and automated pavement condition surveys (APCS), integrating traffic databases and GPS coordinates, and implementing a pavement management system (PaveM), Caltrans is developing clear asset management priorities. The State Highway Operation and Protection Program (SHOPP) meetings provide an additional forum for leadership to prioritize goals and projects.

Steve emphasized that an asset management system must have agency-wide support and clear communication between Caltrans and public stakeholders. Coordinating existing management strategies, executive leadership, and local and district-level staff make “multi-objective optimization” and informed decision-making challenging—setting priorities and overcoming organizational frustrations is key for effective asset management and accountability. Through developing a standardized asset inventory, conducting condition assessments, evaluating performance measures, and life cycle analyses, Caltrans will be able to dedicate resources more efficiently and make the right decisions with the information you have.

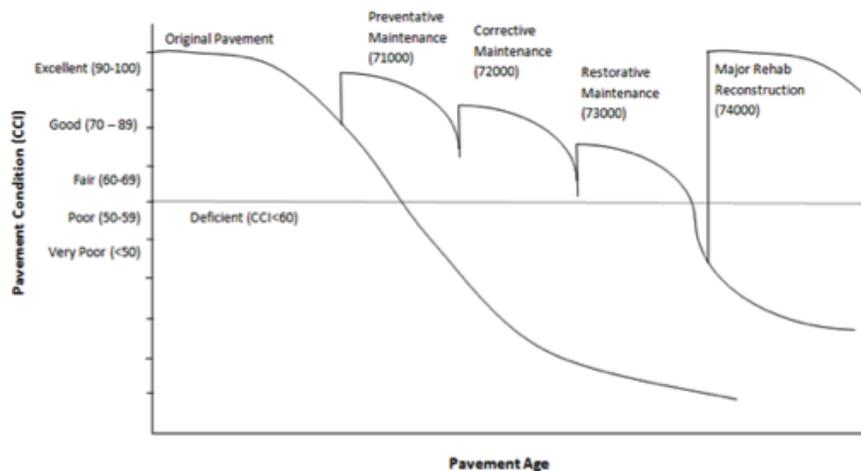
7.4 VDOT’s Approach to Assessing Maintenance and Operations Needs

Jeff Price presented on Virginia DOT’s (VDOT’s) definition of maintenance and their maintenance work with pavement, bridges, and other assets. Transportation legislation from 2004

uses a broad definition of maintenance—Jeff explained that, at VDOT, any work short of replacement is classified as maintenance. Pavement and bridge construction are considered part of life-cycle maintenance and are included in the needs assessment (Figure 7.4).

VDOT is using different approaches to address needs of assets beyond pavement and bridges within the needs assessment—the majority of approaches focus on inventories, maintenance management models, and historical expenditures or replacement. VDOT has increased their maintenance budget and spending on other assets in 2006, 2007, and 2008. Now, less than 50 percent of VDOT’s \$1.4 billion annual maintenance budget is focused on pavement and bridges; the majority of the budget is spent maintaining other assets.

Figure 7.4 VDOT Pavement Reconstruction as Part of Life-Cycle Maintenance



Jeff also described VDOT’s current pavement management strategies. VDOT has hired a contractor to maintain all interstate and primary roads, plus 20 percent of Virginia’s secondary roads, each year over the past several decades. In terms of other assets, VDOT has piloted an automated data collection program. While this program worked well for assets visible from a vehicle, there is no information on asset condition. Since 2009, a “cross-optimization” automated system of data collection has proven to be both reliable and cost effective for VDOT. In discussing VDOT’s next steps in asset management, Jeff noted that they are moving much closer to allocating resources between districts based on needs assessment.

7.5 Group Discussion

Matt Hardy began the discussion with a question on VDOT’s methods of allocating resources for maintenance projects. He asked Jeff how Virginia keeps from rewarding districts who purposefully underperform to get more money. Jeff described the quarterly performance reviews conducted by the VDOT commissioner - VDOT staff members do not want to have to defend poor asset conditions in their district. Furthermore, Jeff stated that VDOT’s goal is to achieve equity in asset management and maintenance projects.

Melissa Batula posed a question for Scott Pomento on SHA’s approach to old data. Scott described SHA’s priorities for asset data management, stating that they are approaching old data

slowly and prioritizing bigger issues first. Lighting, guardrails, and signs are the first priorities, and once SHA has collected basic information on those assets they will begin to re-examine historic data. He noted that there are not enough personnel to approach the management of old data and the collection of new data at once: reducing department vacancies is an important step in developing asset management priorities. Right now, SHA is also considering tracking trash as an asset, given that the agency spends money on managing it. Matt Hardy provided a follow-up observation, noting that the need for a data dictionary is a key theme from the TRB's National Conference on Asset Management. In the context of SHA's work to prioritize data collection for specific assets, Matt asked Scott what data he needs and how he decides which data items to collect. Scott said that they were trying to get as much data as possible within budgetary and personnel constraints. Looking at Maryland's lights, drainage, and other assets requires a wide range of focus, from specific information to basic locational data. Data needs for an asset are evaluated on a case-by-case basis.

Martin extended this discussion of how state agencies can approach data collection, noting that an agency will support data collection if there is also a good plan for maintaining the data. He also asked Jeff Price about the cross-optimization process of data collection, observing that it seems more human-based than automated. Could it be more automated, or should it always be flexible? Jeff agreed that it is challenging to automate this process, and VDOT needs to look at different results in order to find an acceptable one.

Butch addressed a comment to Scott Pomento concerning the importance of managing runoff in Maryland. Scott acknowledged that watershed implementation is a very big issue—in fact, because of its size, the watershed database is handled separately from the rest of Maryland's asset data warehouse.

Scott Richrath posed the final question of this panel discussion, asking Steve his opinion on the best ways to look at safety assets. Steve said that it is clearly important to look at risk, and safety is relevant in terms of managing risk. Steve emphasized that asset value is not always the best measurement of asset importance when increasing safety and managing risk. For example, signs have minimal value but are essential to safety. Wrapping up the discussion, Steve observed that it is challenging to set goals and priorities for asset management. Setting accurate targets for data collection and maintenance often means managing other factors, such as agency staffing and vacancies or environmental issues.

8 Asset Management and TIPs, STIPs, and LRP

8.1 Integrating TAM into Capital Planning and Investment, New York State DOT

Roderic Sechrist described the long-term role of asset management in New York State DOT (NYSDOT) planning. He began his presentation by providing historical context for TAM at NYSDOT. In 2003, NYSDOT formally announced their effort to implement asset management. Rod cited an early FHWA case study, "Economics in Asset Management: The New York Experience," which examined NYSDOT's innovative asset management efforts. However, Rod described a subsequent drop in asset management momentum between 2003 and 2010 due to the

loss of key staff members in a siloed organization. Due to failed efforts to reorganize NYSDOT structure, the asset management program (run by the Policy and Planning Division) had minimal interaction with other divisions within NYSDOT. Additional problems stemmed from the narrow focus of NYSDOT's asset management program. Targeting bridges was ineffective and led to the underfunding of pavement and other physical assets. These issues with NYSDOT's asset management program were related to the decentralization of agency management and decision-making processes, stalling the asset management program until 2010.

Now, transportation planning in New York is at a critical crossroads. Deteriorating and aging infrastructure, combined with recent drops in federal and state resources for infrastructure maintenance, calls for smart investment through asset management strategies. Rod spoke to several other state DOTs, including Oregon, Utah, and North Carolina about their programs in order to re-establish effective asset management at NYSDOT. Rod emphasized the importance of focusing on preservation first, maximizing returns on investment, making sustainable decisions, and approaching asset management as a system rather than a project. He described the importance of integrating these asset management principles into a department-wide decision-making process. Now, the Capital Asset Management-Capital Investment (CAM-CI) team is working to develop standardized guidelines and review existing programs with several clear goals in mind. These goals include:

- Assessing the state of Transportation Asset Management (TAM) across NYSDOT
- Identifying best practices for TAM
- Recommending TAM implementation activities
- Establishing an asset management framework and process
- Developing a connection between TAM and investment
- Developing Comprehensive Program Update Instructions (integrating TAM into program development, review, and execution)

NYSDOT has implemented a new asset management framework in order to address the goals that the CAM-CI team articulated (Figure 8.1). This framework will support NYSDOT's efforts towards agency-wide consistency, accountability, and centralized decision-making.

Figure 8.1 NYSDOT Unifying Preservation Strategy

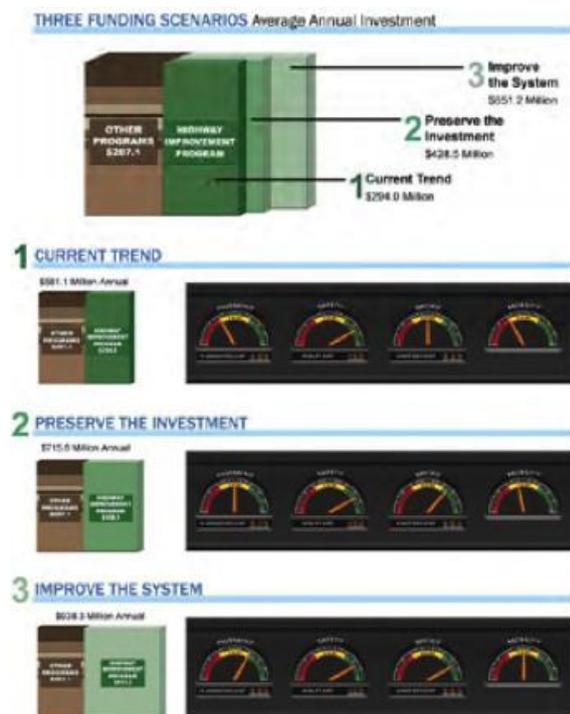


While Rod emphasized the value of the CAM-CI approach, he also described potential outcomes of NYSDOT’s new TAM framework. New York’s bridge and highway conditions are being maintained more effectively due to new asset management strategies for system preservation, renewal, and modernization. Although each region of New York is expecting to install centerline rumble strips over 50 percent of qualifying mileage during a five-year period, a statewide team must approve projects beyond preservation. Many regions got these projects approved, but some local installations are still pending. This focus on preservation indicates a shift in NYSDOT’s approach towards asset management and investment.

8.2 Wyoming DOT Integrated Asset Management Model-Making the STIP

Tim McDowell described the process of integrating asset management into Wyoming’s State Transportation Improvement Program (STIP). In 2000, WYDOT experienced a significant decrease in state funding while managing concerns about enhancing transportation safety. Asset management will help WYDOT inform the public about their goals, priorities, and needs. In order to develop priorities for transportation investment, Wyoming’s Long-Range Transportation Plan (LRTP) illustrates several scenarios based on current and potential asset management strategies, demonstrating “if you do x, you will achieve y” (Figure 8.2). The LRTP supported TAM as the most effective way to maintain Wyoming’s infrastructure on limited funds. WYDOT developed a “plan, check, act, do” framework for communicating transportation needs and making strategic investments.

Figure 8.2 Three Funding Scenarios—WYDOT’s Long Range Transportation Plan



As the State Programming Engineer, Tim works to put the asset data collected by WYDOT into the STIP. In 2010, the STIP included a district candidate list for over 2,015 pavement projects. There were three categories for resurfacing projects, and each category included specific targets for project timeframe and cost. The STIP also projected a leveling of asset conditions, or a slower decline of existing assets through implemented management strategies. WYDOT will conduct follow-up measurements, reporting work done in the districts and continuing to improve methods of asset treatment and project prioritization. They are expecting to develop bridge and safety candidate lists for projects to add to the STIP—these updates to our investment plan will reflect our success with asset management through the STIP process.

Tim wrapped up his presentation by emphasizing that WYDOT’s inclusion of asset management principles in the STIP was a key step in making TAM part of statewide management practices.

8.3 Asset Management in Michigan

Dave Wresinski described the asset management approach that the Michigan DOT (MDOT) has used over the past 20 years. He began his presentation by describing Michigan’s process of establishing and achieving trunkline goals for pavement and bridge condition. In order to meet these goals for asset condition, MDOT shifted away from a “worst first” maintenance strategy. Instead, MDOT focused on making the right improvements at the right time. By 2007, 95 percent of Michigan’s freeways and 85 percent of non-freeways were in good or fair condition. MDOT developed a \$450 million target for funding pavement preservation statewide. Using an asset management framework to evaluate the cost, condition, system size, and Annual Average Daily Traffic (AADT) associated with each project, MDOT developed a formula to distribute pavement funding between regions and limiting overall costs.

MDOT publishes a rolling Five Year Plan annually, adjusting investment strategies based on asset conditions and needs. In 2002, new state legislation established a Transportation Asset Management Council to collect physical inventory and condition data, establishing goals for asset maintenance that inform the Five Year Plan. The Council is a 10-member board, composed of representatives who work at the state, county, or municipal level. This group decided to establish the Pavement Surface Evaluation and Rating (PASER) survey and used it to evaluate local transportation conditions.

After describing Michigan's successful cooperation between state and local transportation officials, Dave addressed issues of funding that MDOT is currently coping with. A decreasing population, fewer vehicle miles traveled (VMT), and reduced revenues make it difficult or impossible for MDOT to match federal aid for transportation funding. Based on a recent legislative report, there will be a budget shortfall of \$1.7 billion by the end of the current planned period.

Dave advocated for the expansion of asset management strategies to Michigan's entire Federal Aid System. He observed that, while there is a strong recognition of transportation funding needs, challenges exist to make any changes to improve the funding situation.

At the conclusion of his presentation, Dave played MDOT's Asset Management video for the group, which was recently recorded and posted for the public. The video provides basic information on the asset management principles MDOT is using to prioritize needed infrastructure maintenance and construction programs on their limited budget. The video can be accessed here: ["Asset Management at Work" - an educational video from Michigan DOT.](#)

8.4 Supporting North Dakota's STIP Development Using Asset Management

In his discussion of North Dakota's STIP, Jack Smith outlined the STIP development process and described how asset management tools may support state DOT planning. External factors, such as weather or geography, limit the North Dakota DOT's (NDDOT's) ability to collect data and complete construction projects. Due to seasonal constraints, the STIP must be drafted based on old data and updated as new asset data, such as the degree of ride, rut, and distress of pavement, becomes available. Jack described North Dakota's STIP Development Cycle in the following steps:

- Data collection
- Draft STIP
- Highway Performance Classification System Report
- Final STIP
- District Priorities

Balancing work types and mitigating environmental conditions are important goals of the STIP. The draft is compiled from previously submitted district priorities, and uses an estimated budget to generate a list of potential projects. This draft is presented to NDDOT's executive management and districts, then to the public for comment. The final STIP will incorporate updated data, a clearer picture of federal funding opportunities, and responses to public comments. For North Dakota, asset management systems aim to recommend projects for the STIP. Jack also mentioned

using cross-asset tradeoff analysis at NDDOT, which will demonstrate the effects of funding assets at a given level or of a given type. As his presentation concluded, Jack emphasized the department goal of applying asset management systems to additional assets.

8.5 Group Discussion

In the final discussion of the peer exchange, several participants discussed take-away points and lessons learned. Martin began the discussion, describing two key points that may be useful for asset management implementation at WYDOT. First, he identified scope creep in pavement projects presented at the Peer Exchange and emphasized a need to focus on miles treated rather than dollars spent. Second, Martin referred to points made concerning miles of roads in poor condition: maintaining current conditions is good, but poor conditions are increasing rapidly (especially on low volume roads). Scott Zainhofsky echoed Martin's observations, adding that North Dakota developed graphs that break pavement conditions down by system classifications and other variables. They found that using miles paved as the measure for projects led to districts performing many small projects rather than a few large ones. He expressed his concern about the unintended consequences of shifting performance measures.

Melissa asked Rod about NYSDOT's goals for and definitions of asset preservation. She noted that PennDOT is aiming for 85 percent preservation, but this definition includes replacement in kind and rehab projects. In response, Rod included deck replacement and other bridge element work in New York's definition of preservation. In terms of pavement preservation, he added that culverts, relines, invert paving, thin treatment, and cold in-place recycling are all considered preservation strategies.

Katie Zimmerman posed a question to Wyoming and North Dakota about how the STIP might contribute to the development of an asset management plan. Martin replied that the LRTP and STIP thoroughly document the financial and asset data and details that are necessary for an asset management plan, although it will not have all of the components. In the final question of this discussion, Rod asked Dave about the MDOT video he showed the group during his presentation. Dave said that Michigan's Asset Management Council is about to release it, and anyone interested can find it posted online.

9 Peer Exchange Wrap-Up

Steve Gaj thanked the peer exchange participants for attending the event and briefly summarized the day's discussions. He listed key points of interest, including asset management and planning, data, risk management, and gap analysis. He noted that these points are important to transportation planning and management because of a greater national focus on performance and accountability. Asset management practices are, and will continue to be, influenced by MAP 21 legislation and upcoming transportation policy decisions. However, we also need to look closely at asset management as it relates to good practice and state DOT leadership. Speaking on behalf of AASHTO and the FHWA, Steve emphasized that these agencies want to work with state DOTs to develop and implement asset management plans. He posed a question to the group, asking "if states are managing assets, are they also implementing asset management?" This important

question highlights the difference between preliminary, project-based asset maintenance and applying asset management strategies on a department-wide scale. Through the self-assessment and gap analysis in the AASHTO TAM Guide, performance measures and management, risk management, using asset management tools and techniques, and incorporating asset management into STIPs, LRTPs, and RTPs, state DOTs can maximize their resources.

Steve summarized the state of asset management nationally and the relationship to pavement management systems (PMS) and bridge management systems (BMS). He noted that a few states still use their PMS to undertake a worst first approach to prioritizing projects. However, many peer exchange participants have implemented preservation-first approaches to asset management, finding more efficient ways to maintain transportation infrastructure. Approximately half the States are using their BMS for decision-making and for example, many States do not use the full capability of their BMS to manage their bridges. It appears, in many cases, the BMS is used primarily as an inventory and condition database. All States should look to the TAM Guide to determine which asset management approach works best for their state.

Steve pointed out that performance management provides important support for asset management goals. We must develop both short-term priorities for asset maintenance and accurate performance measures and strategies for maintaining assets throughout their life cycle – a whole life approach. Using the AASHTO TAM Guide and considering best practices, state DOTs can determine which assets are at risk, which projects to fund, and how to balance goals for preservation and development.

Next, Steve brought up some themes from the panel presentations and discussions. He referenced the Dashboard tool that Georgia and North Carolina have implemented, noting that this is a good method for communicating with stakeholders and increasing agency transparency. He also recognized issues of department culture, data collection, management of other assets, and climate change adaptation as major themes from the peer exchange. Steve said that the self-assessment tool is a great place to begin addressing these issues. State DOTs can also work to identify and address gaps in available data through reaching out to local stakeholders and partners. Asset management is often an organizational issue, and effective asset management often stems from borrowing several different strategies and ideas. Each state DOT can combine ideas and best practices in a system that suits their specific organizational needs. Ultimately, asset management is a way of doing business.

Steve also summarized the Peer Exchange's focus on funding, budgets, and maintenance costs. He stated that good roads cost less, and the National Highway Institute (NHI) is working to address cost barriers for state DOTs. They are also developing a new course for asset management planning. This peer exchange will inform the course development, and the video recorded today will be a useful tool to communicate best practices and ideas.

Butch followed Steve's talk by expressing his personal thanks to peer exchange participants. At the next event, he hopes to see more FHWA participants: Butch emphasized that all national transportation agencies need to be on the same page. Furthermore, he expressed a concern about the asset management terminology used during the peer exchange. A data dictionary would be a

useful tool to get everyone on the same page, speaking the same language. At this stage, each state is calling the same assets or management techniques something different.

In his discussion of improving transportation agency communication, Butch noted that it was useful to share state DOT asset management experiences through the peer exchange format. He concluded with the idea that the transportation community should work to develop measures of success for asset management practices.

Ananth made the final comments of the day, stating that the transportation funding situation is likely to get worse before it gets better. Asset management will be a useful strategy for coping with funding challenges, making the case for which improvements are needed. The American Society of Civil Engineers (ASCE) expects that project backlog will be a big issue for a long time. Not every state uses a standard version of asset management—however, all state DOTs should continue improving and implementing their strategies for data collection, agency organization and communication, and decision-making processes. Ananth concluded his talk and the peer exchange by stating a need for state DOTs and the national transportation community to continue to raise the bar on asset management best practices.

10 Appendix A: Survey Summary

10.1 Post-Peer Exchange Survey Summary

To collect feedback on the Peer Exchange, an online survey was distributed after the event. Survey questions related to which aspect of the Peer Exchange were most successful, which aspects needed improvement, which follow up activities would be useful, and which points were most important or interesting provided important ideas and suggestions for subsequent peer exchange events. The survey responses were related to the discussion sections from the Peer Exchange, and may be used to help generate further discussion, collaboration, and Peer Exchange topics. The follow lists the responses collected for each of the survey questions.

10.1.1 What aspects of the Peer Exchange were most successful?

- The logic of the presentation builds from start to end greatly facilitated the understanding
- I think the ability to hear from other states about their specific models for implementation, as well as their challenges.
- State presentations regarding their progress towards TAM implementation.
- Attendance
- Hearing the status of the different DOTs in implementing Asset Management
- eGIS demonstration by Scott Pomento from Maryland.
- Conversations between states. Presentations.
- Great exchange of information on asset management.
- The exchange of information. Seeing where each state is and what struggles they have had.
- Exchange of experiences, history, and perspectives of other agencies working through the same issues related to implementation of asset management.

10.1.2 What aspects of the Peer Exchange needed improvement?

- I was disappointed in how long some of the formal presentations went, reducing the time for discussion afterwards. Many topic groups only had one or two questions at the end before it was time to move on.
- The round-table format worked well, but the room was a bit too small to really get everyone engaged.
- I wanted more time for discussion among the participants. I would be interested in possibly a series of questions posed for group discussion (instead of all presentations).
- Nothing
- Not much. I think that the format and the timing of the presentations were appropriate.
- Reduce time dedicated for presentations; allow more time for discussion.
- I could have provided a lot of information on other things that my state is doing. In fact, I felt like when I left, folks had a misconception of my state's processes. This was primarily due to my lack of experience in peer exchanges. In retrospect, I would have given an

overview of our total process and then show how the specific topic of the panel fit into that process.

- It would have been nice to have more time to discuss issues of concern among participants, but I think everyone was worn out from the conference so this might not have been needed.
- Would like to have copies of documents they referenced. More time to discuss things. Maybe some roundtable type small groups to allow for talking in greater detail.
- Too many presentations, not enough time to talk about issues.

10.1.3 What follow up activities do you suggest to help you and your peers? Do you have any specific suggestions for AASHTO?

- Continue to budget/fund peer exchanges, also it had a huge synergy to attach to the AM conference.
- Perhaps a sharing session on risk management -- how we think about and define risk and how we can systematically manage risks.
- A follow-up Peer Exchange with the same participants/states to check on progress made and the lessons learned along the way would be very beneficial.
- Best Practices - Contact List: Use the TAM Guide - Gap Analysis to establish who is doing what; establish a list of contacts (e.g., Policy Guidance - Risk Management: Minnesota (Cassandra Isackson))
- Having an interactive website or e-news board where agencies can post questions. Perhaps that exists already.
- Webinars will be good, as they help impart the information to more staff in each state. Let's figure out a way to make some of this "hands on." Either workshops for "Communicating Preservation Needs" or live demos of some of the technology that supports Asset Management.
- I think a summary paper by each state with contacts would be good. A general outline could be provided where each state talks about what they are doing in different areas (automation, pavement, bridge, safety, trade off, performance measures, funding distribution, etc.) and then provide a contact for that particular area if someone is interested in more information.
- Continue doing peer exchanges
- There is an existing MQA website which catalogs participating states performance reports, etc. Would be great to link the data provided at this meeting to that site. Would love to upgrade that site and use it as a clearing house for all AM data.

10.1.4 What did you take away from the Peer Exchange that was most important or interesting?

- Minnesota's discussion about state of good repair is too lofty of a goal, that the DOT must strike a balance, considering risk, but you just can't say "preservation first" and make it work.
- The GDOT model was an "aha!" moment for us.

- All the states had different practices that could be used in TAM implementation. I particularly liked the "tracker" meeting that Missouri mentioned. I'm also interested in how a few states customized their TAM self-assessment.
- Lots of interest in TAM but collectively a long way to go!
- Having contact names for Asset Management in each organization will be very useful in communicating with various organizations going forward.
- eGIS from Maryland was how many assets and layers tied together in a single platform for display and decision making. We need to figure out a common definition for "Risk Based Asset Management."
- That many states are facing the same issues and demands we are facing financially, physically and politically. The most interesting conversations were finding out how they are dealing with the same issues.
- Relationships between existing activities (such as strategic planning) and TAM
- I found some new state contacts and some ideas I want to pursue with them.
- Many of the other DOTs have moved beyond where my agency is. We considered ourselves to be leaders in TAM a few years ago, but it is clear to me now that implementation has stalled and we've even lost ground in some areas. It is nice to know other agencies are making progress. Many things have changed about the availability and application of technology that are exciting and interesting.

10.1.5 What topics would you like to see covered in future asset management Peer Exchanges?

- A difficult area that seems to be of concern is those actions to assets that are blurred between operations and asset management. One example that was brought up a couple of times was tracking maintenance and the impacts on assets. When a DOT maintenance team works on a pothole, it may have some asset impact but mostly an operational. What are some best practices and techniques on using this data? I was reviewing the original self-assessment from volume 1 of the asset management guide and was wondering if all the questions are still optimal. I recommend a workshop where practitioners review the self-assessment and determine if it does lay the best groundwork for the work in volume 2.
- Integration with risk management, performance management and strategic planning.
- How DOTs are linking TAM, strategic planning, risk management and performance management.
- Implementation examples; Modal examples (e.g., transit)
- How organizations are dealing with cross asset funding optimization (how does the organization determine how best to allocate money among all the asset categories.
- Cultural successes and challenges of asset management implementation. Communicating preservation needs. Comparing tools and technology for Bridges, Pavement, Transit and other assets. Balancing policy, planning, and performance.
- I would like to see a peer exchange based on a realistic approach to asset management. You could encourage states that have done many of the things folks are moving to (GIS, DTIMS, PONTIS, relational databases, etc.) and explain what did and didn't work. For

example, many of these tools are very detailed and require lots of resources to maintain and operate. In addition, despite claims to the contrary, they are not flexible enough to emulate "real world" decisions. It is nice to have a dream of this perfect world where we collect data and just go do the perfect thing. But we all have to go home and actually do business with different objectives, different political constraints, etc. In my opinion, the trick is to weave asset management into your business practices. There are things that folks can start doing immediately at very low costs to get started. You don't need special computer programs, web pages and countless studies to start moving in the right direction.

- How agencies have facilitated change management
- Technology initiatives. What systems are people using? What data are they collecting and how? What would they change if they could?
- With all the information that is now available on TAM, what it is, all the benefits, how to implement, etc. Why are some agencies still reluctant to embrace it? Also, the institutional, organizational, political challenges of integrating asset management system with financial and other enterprise systems continues to be a major hurdle for implementation and realizing the full benefits of TAM. How do we overcome these challenges?

10.1.6 Do you have any other thoughts on the Peer Exchange that you would like to share?

- I believe the Peer Exchange is still the best capacity building option available to the DOT's.
- It was excellent that we were able to include it at the end of the TAM conference, but it also meant that most of the attendees and themes were familiar faces from the conference. I'm curious what is happening in the states that were NOT there.
- I really enjoyed the Peer Exchange and found the time very useful.
- None
- I really enjoyed attending.
- Very beneficial. Many thanks to FHWA, AASHTO for hosting. Great to get so many states in one room. More time for Q&A at the end of the day might help break up an otherwise lengthy day of presentations. Maybe even consider breaking into assigned breakout groups based on four topic areas for the last 90 minutes or so. Or break the entire exchange into one group for each chapter of an Asset Management Plan and task each group with outlining their chapter. Then each chapter reports out to the entire exchange. This might be a good post-authorization exercise to help encourage/shape federal rules promulgation.
- Although everyone is extremely knowledgeable at FHWA and AASHTO, you need to have an open mind and listen to other ideas. The whole purpose of a peer exchange is to bring new ideas.
- Thanks for the opportunity to participate.
- Again, I like having so many agencies there to exchange ideas with, but there needs to be more time spent doing that than time spent giving presentations.