

A 2-day workshop was held to advance MnDOT's asset management maturity and to ensure compliance with federal TAMP regulations. The potential obstacles to the agency's success generated by the workshop participants are summarized in this report.

Asset Management Workshop Summary

April 3–4, 2019

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TRANSPORTATION ASSET MANAGEMENT (TAM)

WORKSHOP—SUMMARY

Overview

The Minnesota DOT (MnDOT) published its first transportation asset management plan (TAMP) in 2014. An updated version was published in 2018, and a third version is being finalized for submittal to the Federal Highway Administration (FHWA) on June 30, 2019. By the same date, MnDOT must submit documentation to FHWA demonstrating that the TAMP investment strategies have been implemented.

The implementation of the TAMP investment strategies relies heavily on an alignment between the project and treatment selection processes that form the basis for the 10-year Capital Highway Investment Plan (CHIP), the State Transportation Improvement Program (STIP, which serves as the basis for annual work plans for maintenance and operations activities), and MnDOT's longer-term planning and target-setting activities. This alignment involves the coordination and collaboration of District personnel, asset managers, planning and programming personnel, and financial managers. This coordination means that information sharing and outreach activities are critical to ensuring consistency in the application of asset management principles throughout the agency and advancing the maturity of MnDOT's asset management program.

To support these efforts, the Asset Management Project Office (AMPO) hosted a 2-day workshop on April 3 and 4, 2019, for agency leadership to share information about the TAMP content, identify and promote practices that are consistent with the TAMP, and identify obstacles to the TAMP's implementation. The names of the individuals who participated in at least 1 day of the 2-day workshop are presented in appendix A. Follow-up activities to further develop the ideas generated are under development.

Objectives

The workshop was intended to improve the effectiveness of MnDOT's investments by supporting its TAM objectives and ensuring that TAMP commitments are met. This goal was accomplished through the following objectives:

- Identify key information contained in the TAMP, including asset data, priorities, and commitments.
- Describe the impact of TAM policies and obligations on decision-making.
- Identify federal requirements related to asset management and the consequences of noncompliance.
- Identify current business practices that are consistent with TAM and the TAMP.
- Identify obstacles to the TAMP's implementation.

Format

The 2-day workshop was held from 9:00 a.m. to 3:00 p.m. in Minneapolis, MN. The workshop agenda was designed to feature both information sessions and facilitated breakout sessions. The first day consisted entirely of information sessions that introduced MnDOT's TAM objectives and presented the TAMP as a tool to facilitate the implementation of MnDOT's TAM principles.

The FHWA provided a summary of the federal requirements for Transportation Performance Management and the TAMP, including requirements for TAMP certification and consistency determination. The afternoon included a chapter-by-chapter summary of each of the chapters included in the TAMP. Content from the draft version of the June 30 submittal was provided to the participants to serve as the basis for discussion. The agenda for day 1 is presented in figure 1.

Workshop Agenda, Day 1, 9:00 a.m. to 3:00 p.m.

9:00 a.m.	Welcome and Introductions <ul style="list-style-type: none"> Opening remarks from agency leadership
9:30 a.m.	Workshop Objectives and Format
9:45 a.m.	Introduction to TAM at MnDOT
10:15 a.m.	Break
10:30 a.m.	The TAMP as an Implementation Tool <ul style="list-style-type: none"> What is a TAMP? What is required? MnDOT's approach to TAMP development
11:00 a.m.	Federal Requirements <ul style="list-style-type: none"> TPM requirements TAMP requirements for certification TAMP consistency determination Potential penalties
11:30 a.m.	Lunch
12:30 p.m.	TAMP Review
3:00 p.m.	Adjourn

Figure 1. Day 1 agenda.

The second day consisted of small-group activities to address potential obstacles to the TAMP's implementation in the areas of:

- Life-cycle planning (LCP).
- Project selection.
- Roles and responsibilities.

Participants were randomly assigned to groups to cover one topic in the early morning (Session 1) and another topic later in the morning (Session 2). Each group had a facilitator to help ensure

that the groups addressed each of the questions they were assigned. In the afternoon, the facilitators provided a summary of the discussions, and participants voted on the most pressing issues before adjourning. The agenda for day 2 is provided in figure 2.

This report summarizes the findings from those discussions and presents the results of the voting.

Workshop Agenda, Day 2, 9:00 a.m. to 3:00 p.m.

9:00 a.m.	Session I—Group Activities
10:30 a.m.	Break
11:00 a.m.	Session II—Group Activities
12:15 p.m.	Lunch
1:30 p.m.	Debrief
3:00 p.m.	Adjourn

Figure 2. Day 2 agenda.

Breakout Group Topics

Each of the breakout groups was provided with specific questions related to one of the three topics to discuss during sessions 1 and 2. The questions for LCP, project selection, and roles and responsibilities are presented in figures 3, 4, and 5, respectively. Each of the breakout groups represented participants with a range of job functions, which helped ensure that multiple aspects of each topic were addressed.

LIFE-CYCLE PLANNING

Session I	Session II
<ol style="list-style-type: none"> 1. In your group's opinion, how well do current capital and maintenance projects adhere to the planned LCP strategies outlined in the TAMP? What are the primary factors influencing any differences that are identified? Is there better adherence for some assets than others? How can MnDOT document that LCP strategies are being followed? 2. What challenges do you anticipate related to the implementation of the proposed LCP strategies? What information/decisions/authority are key to their implementation? 	<ol style="list-style-type: none"> 1. What data is crucial to support your role in managing MnDOT assets in accordance with the planned LCP strategies? Are there gaps in the availability of data you need? 2. Other than the amount of money available, are there funding constraints that impact your ability to manage assets effectively over their life cycle? For example, are there limitations to how funds can be used that restrict options unnecessarily? 3. What incentives, policies, or other strategies would support an increased focus on LCP strategies at MnDOT?

Figure 3. Breakout group questions on LCP.

PROJECT SELECTION

Session I	Session II
<ol style="list-style-type: none"> 1. How do you use asset performance data to support your efforts to identify and prioritize projects? Are there weaknesses to this process that should be identified? For example, do you have enough access to the information needed to manage highway assets on a timely basis? Is the information timely? Do you have confidence in the quality of the data you are using? 2. What obstacles do you envision to the TAMP implementation related to: <ol style="list-style-type: none"> a. Existing planning and programming processes related to MnSHIP or STIP development? b. Coordination between capital and maintenance planning and programming? c. Preventive maintenance set-aside and execution? d. Project development and scoping? 3. What actions are needed to ensure that the STIP and annual work plans are aligned with the TAMP? 	<ol style="list-style-type: none"> 1. How do you use asset performance data to support your efforts to identify and prioritize projects? Are there weaknesses to this process that should be identified? For example, do you have enough access to the information needed to manage highway assets on a timely basis? Is the information timely? Do you have confidence in the quality of the data you are using? 2. Is the level of authority or coordination between Districts and other MnDOT business areas appropriate to ensure that the TAMP investment strategies are implemented? Is your answer the same for all types of treatments (preventive maintenance, rehabilitation, reconstruction)? Are there checks and balances that could be incorporated into the process to better align planned and actual work activities? 3. Do existing tools available to you provide useful information to support the implementation of the TAMP investment strategies? If not, what are the gaps you've noted? 4. Are current practices for tracking maintenance activities adequate to support TAMP implementation? In other words, do you know what work was performed when managing assets?

Figure 4. Breakout group questions on project selection.

ROLES AND RESPONSIBILITIES

Session I	Session II
<ol style="list-style-type: none"> 1. What part of the TAM implementation do you feel you "own" in your position at MnDOT? Are there any known gaps in the "ownership" of TAM, or are there any unreasonable expectations that exist on any functional area right now? 2. Do agency personnel have a good understanding of MnDOT's asset management objectives and how they relate to job responsibilities at all levels? What aspects of the asset management processes are not well understood? For example, are targeted and desired conditions known and understood? Are the benefits of using preventive maintenance known? Is there a sense of ownership and accountability for asset management decisions? 	<ol style="list-style-type: none"> 1. What part of the TAM implementation do you feel you "own" in your position at MnDOT? Are there any known gaps in the "ownership" of TAM, or are there any unreasonable expectations that exist on any functional area right now? 2. What steps are needed to ensure the right balance between authority and responsibility for implementing TAM at MnDOT? What are the key considerations to making this balance successful and sustainable? 3. Is MnDOT getting the expected life out of its treatments? If not, are there training, specification, or inspection issues that might be contributing to this issue?

Figure 5. Breakout group questions on roles and responsibilities.

Findings

Key points raised during the discussions on each of the three topics are summarized in this section of the report.

LCP

Session 1

- The successful implementation of desired LCP requires a high-level executive within the agency to advocate for these projects with external stakeholders.
- Districts need help making trade-off decisions, including tools and guidelines. In addition, flexibility is needed to be able to adjust decisions based on available funding.
- Participants indicated that current funding levels do not support an LCP approach. Funding is often not available to do the "right" fix, so a lesser fix is applied even though it will not perform well.
- For the TAMP implementation to be successful, maintenance personnel will need to understand their role.
- LCP concepts are generally understood for pavements and bridges but not for other assets.
- The strategies presented in the TAMP are for asphalt pavements. Participants did not feel MnDOT was adept at maintaining concrete pavements using inhouse forces.
- There are many different opinions on when various treatments should be applied and how long they will perform.

- It will take time for the agency to shift from being primarily reactive to more proactive. This will require District personnel to have a granular understanding of how the components of each asset class perform.
- Participants indicated that data for LCP are currently scattered across several data systems for construction and maintenance. Business processes and tools need to be developed to evaluate options across assets.

Session 2

- Data gaps can vary by District, but in general the group indicated that for assets other than pavements and bridges, the life-cycle strategy may not be known. Additionally, Districts do not have data that allow them to know where an asset is in its life cycle.
- The condition improvement from a given treatment is not always consistent, which makes it difficult to model.
- LCP can be done without complex models. Existing models often rely more on assumptions than on data, which needs to be considered during the decision-making process.
- In terms of potential funding constraints that interfere with the use of LCP strategies, participants reported that having separate capital and operational appropriations can make it difficult to determine how work on some assets will be paid for. There are also challenges with one-time funding that has time constraints associated with it because Districts are forced to fit a particular action into the fund amount.
- Districts expressed interest in getting additional operations and maintenance funding when they add to the inventory so they can maintain the assets properly.
- There are public relations issues that will need to be addressed to successfully implement LCP strategies. This involves educating the legislators and the public about the need for funding when new assets are added to the inventory. Education would also help discourage outside pressure to shift funds to address fires.
- Other challenges relate to needs competing with implementing LCP strategies. For instance, Districts often try to address congestion issues that are not tied to the need for an LCP strategy. There is also pressure to address functional needs that compete with condition-based needs.

Project Selection

Session 1

- To better align the STIP and annual work plans, the degree to which the TAMP is directing investments must be clear. There also needs to be better coordination with the central office to evaluate the impact of project selections by the District on targets.
- Participants generally agreed that the set-aside for preventive maintenance is not sufficient to address the needs. There needs to be better guidance at the planning and management levels for preventive maintenance and studies to demonstrate the return on investment that is possible. There is a tendency to “borrow” from preventive maintenance set-asides to reduce the number of roads in poor condition.

- To improve project scoping, participants indicated that scoping needs to be done earlier in the process. The participants also expressed interest in having flexibility to change project scopes and timing when needed.
- Groups identified a number of obstacles associated with the TAMP implementation, including:
 - Lack of accountability.
 - Too many subcategories.
 - Swings in funding, which hinder planning.
 - Inflation, which limits what can be done with available funding.
 - A lack of statewide awareness and understanding of the TAMP.
- To better coordinate capital and maintenance activities, participants suggested that it would be helpful if there were more flexibility in funding. Right now, any operational money spent on preventive maintenance saves capital dollars, but those savings don't go back to the operations budget. This makes it hard to justify spending maintenance dollars in this way. They also noted that there doesn't appear to be a strategic plan for operational expenditures as with capital spending. Finally, they suggested establishing a process that considers maintenance needs in the development of the STIP.
- The delay in getting pavement condition data makes it difficult to use the information in project selection. Participants indicated that they receive the information at the end of the year, which gives them only one month before STIP drafts are due. They also indicated that they would benefit from additional information on all future projects in development, even those related to other modes of transportation.
- In general, participants indicated that they have confidence in the data they receive except for some of the condition information. The lack of confidence in data quality creates duplicate work because Districts have to verify the data in the field. They do not rely on as-built data because of the number of changes made in the field.
- Weaknesses raised during this session included legislative influence on project selection, lack of maintenance histories, inconsistent bridge and culvert inspections, lack of expected treatment lives, and the resources required for data collection.

Session 2

- Performance data are being used to support project selection decisions, but their use varies considerably. In some cases, participants indicated that the information helps them to make more meaningful and thoughtful investment decisions. Others said the data are primarily used to prioritize needs across the network rather than select projects. Some participants commented that there is an overreliance on data rather than human factors, engineering judgment, and field knowledge.
- Performance data are primarily used to make decisions regarding pavements and bridges because data are not as available, understood, or integrated for other assets.
- Of all the data considered, roughness information and other information from the pavement management system are useful for pavement decisions and serve as the primary factor for selecting pavement projects. However, factors such as maintenance effects, public input, traffic volumes, and other asset work needed would also be useful.

- For bridges and culverts, condition information is commonly used, but culverts seem to be rated in worse condition than they actually are.
- The biggest weaknesses to the project selection process were identified as:
 - The lack of measures and targets.
 - The timeliness of the data.
 - Integration of data systems.
 - Granularity of the data.
- Integrated decisions that consider all asset needs along a project are a challenge that forces Districts to consider risks, long-term performance, coordination with maintenance, political pressure, and so on. Addressing multiple assets as part of a project leaves little money for preventive maintenance activities.
- Existing tools are generally considered to provide useful information except for ancillary assets. Additional mapping would also be useful.
- Current practices for tracking maintenance activities are not generally considered to be adequate for supporting the TAMP implementation. Only maintenance work done by contract is captured, so they are missing work done by MnDOT forces.
- There was not a lot of discussion about the existence of checks and balances to better align planned and actual work activities. There was some thought that having preventive maintenance goals might help ensure that those projects are done. In general, participants thought the level of authority or coordination between Districts and other MnDOT business areas was appropriate, although at times there are different opinions as to when to apply certain treatments (such as chip seals).
- The benefits of preventive maintenance treatments are not well understood.
- Districts expressed interest in having the flexibility to shift money from one major category to another but should be expected to explain their reasons for doing so. They also expressed interest in getting more information on bridge strategies that should be used.
- Available tools could be improved by refining TAMS, completing asset inventories, developing performance models for bridges, developing performance models for ancillary assets, and conducting inspections on non-bridge drainage assets.

Roles and Responsibilities

Session 1

- Participants indicated that there is not an agency-wide understanding of asset management. People generally understand the objectives, but the lack of necessary funding makes it difficult to implement those objectives.
- Participants indicated that there is more understanding needed in the preventive maintenance area, including proper methodologies to apply under different scenarios. This is complicated because the benefits associated with preventive maintenance, especially for bridges, are not known. In addition, there is a lack of understanding about LCP and how the TAMP will be used.

- There are many aspects of the TAM process that District personnel feel they own, but they don't think the TAM and where it fits in the decision-making process are well understood. The Districts have a sense of ownership in the assets they maintain and pride in their jobs but not necessarily in the TAM principles. The field personnel indicated that they are performing many of the TAM functions, but the guiding principles and philosophies are not widely shared.
- Participants said their ownership in implementing the TAM is influenced by outside interests that override their best intentions. Because they are underfunded, tradeoffs like these are painful. They also indicated that there is uncertainty in how these tradeoffs should be resolved at the District level.
- Asset priorities are not well understood, and it is not clear that Districts are investing in accordance with agency priorities. In addition, participants indicated that performance targets are not well understood.
- The benefits associated with preventive maintenance are not well understood. There is a general understanding that these treatments can extend life, but this understanding is not universal. The benefit/cost associated with these treatments and the expected life extension are also not understood. Additionally, because preventive maintenance is a set-aside fund, Districts see that as a fund that can be borrowed against.
- The use of performance targets focused on the percent poor seem to encourage worst-first behavior. They do not get credit for applying preventive maintenance treatments.
- Participants indicated that they did not feel that TAM is integrated into their current processes due to a lack of direction and accountability. The TAM is new to many people, so it will take time and effort to integrate it into current practices more fully.

Session 2

- There are several issues related to training and workforce development that could improve the implementation of the TAM. For instance, it would help if personnel had a better definition of the life expectancy of various assets, although the participants acknowledged this is a complex topic. There is a willingness to hold contractors responsible for their work, but often schedule and budget demands compromise project quality. There are also challenges associated with keeping good inspectors on staff.
- To better balance authority and responsibility to implement the TAM, participants suggested that all individuals impacted by the selected strategy should be involved in its selection. They suggested that the implementation should be staged and that communication will be a key. They also emphasized the importance of follow-up and providing support to the Districts to adhere to the TAM strategies. To build buy-in, participants suggested helping people understand how their jobs fit into the process and add value.
- When asked whether MnDOT is getting the expected life out of its treatments, participants indicated that treatment timing is often delayed because of funding, which impacts the feasibility of the work. The participants again expressed a lack of understanding of the expected life of a treatment, so they don't know whether they are getting the expected performance out of the work being done. Some of these issues could be addressed with training, guidance on treatment applications, and research on treatment performance.

- The participants identified several gaps in ownership for TAM, including duplication of efforts and tracking (different people are involved with different aspects of data collection of a single asset), coordination with maintenance, tracking work completed by MnDOT staff, and lack of confidence in the pavement management recommendations. There also appears to be a perception that there are unreasonable expectations on the data input side, but participants indicated that this may be due to the lack of information on the benefits to the data. Field staff need to better understand the need for documentation to build buy-in.
- To overcome these gaps, there need to be clear benefits and a better understanding of how the TAMP will be used and what responsibilities have been established for its implementation. Buy-in is key to success. These objectives can be accomplished through training and pilot implementations to demonstrate benefits.
- There are some gaps in ownership related to bridge inspections for hydraulics and maintenance culverts.

Prioritized List of Action Areas

During the debriefing, breakout group facilitators were asked to identify common themes that emerged through the discussions. The facilitators presented these themes to the entire group, and participants were given ten sticky notes that could be used to vote for the most pressing issues that need to be addressed to further the implementation of TAM at MnDOT. Individuals were given the option of voting all ten of their votes on one item, or they could distribute their votes to two or more topics. The results of the voting, in prioritized order, are presented in table 1.

The results illustrate that Districts face a number of challenges during the project selection process that interfere with their ability to implement LCP strategies. These challenges include pressure from outside sources, the desire to fix all asset needs within the scope of a project to minimize interruptions to the traveling public, pressure to use funding for deteriorated assets, and the lack of clear expectations for meeting preservation targets. The exercise also identified several data-related issues, including the lack of data to support LCP for assets other than pavements and bridges. The participants placed a high priority on efforts to direct more funding for maintenance and preservation activities and to provide more flexibility in how those funds can be used. Communication was also a theme throughout the responses, including the need to educate elected officials about the long-term financial implications associated with expanding the asset inventory and share benefits associated with asset management at the field level.

Table 1. Prioritized list of action areas.

Category	Issues	Votes
LCP Project Selection	Strategies are needed to direct more funding toward preventive maintenance treatments to ensure they are implemented.	62
LCP Project Selection	More discretionary funding for maintenance activities is needed.	42
LCP	Efforts are needed to build an understanding at the legislative level that additional funding is needed when new assets are added to the inventory.	41

Project Selection Roles & Responsibilities	Data-related issues emerged, including the need to demonstrate the return on investment for data collection activities. Participants recognized the resource limitations they face and wanted to ensure that a balance is developed between efforts to collect more data and the agency's ability to sustain these programs. Other topics included how to use the data to make decisions, the need for more coordination, and the importance of data quality.	40
LCP	An improved long-term funding strategy is needed to enable MnDOT to be more proactive than reactive.	33
Project Selection LCP	Although pavements typically drive project selection, a strategy to determine a consistent approach for addressing other assets within the same project is needed.	29
LCP	Network-level performance measures need to be translated to drive project-level LCP strategies.	25
LCP Project Selection	More flexibility is needed in terms of available funding programs.	24
Roles & Responsibilities	Efforts are needed to develop the capacity to implement and sustain asset management initiatives. This includes addressing both personnel needs and the needs for additional tools.	18
Roles & Responsibilities LCP	MnDOT would benefit from clearly defined roles, asset management terminology, and life-cycle expectations. Asset management efforts should consider resource demands and the return from those efforts.	17
LCP	There is a need for a better understanding of how to apply LCP concepts to ancillary assets.	17
Project Selection	Districts would benefit from clear guidelines on how to make trade-offs between different investment options. Project prioritization is typically made at the field level, and outside influences can trump the best intentions to follow an LCP strategy. Better guidance would help Districts evaluate competing needs. In addition, there is a need for better coordination between maintenance and programming.	13
LCP	Data quality for assets other than pavements and bridges needs to be improved to apply LCP concepts on ancillary assets.	12
LCP Project Selection	There is a need for improved coordination between project selection and scoping. This should involve	12

	looking at future needs and improving communication between these activities.	
LCP Project Selection	Project selection decisions should consider the broader, network-wide implications rather than focus only on individual project needs.	11
Project Selection	User costs should be considered as part of an ideal LCP strategy. This will support trade-off decisions for Districts trying to determine whether all assets should be incorporated into one project or whether the work will be conducted under separate projects.	9
Roles & Responsibilities	There is a need to create more awareness as to how positions at the field level relate to the TAMP implementation. This will likely include an accountability piece to determine whether targets are being met.	8
Project Selection Roles & Responsibilities	Strategies are needed to demonstrate the benefits to asset management systems. The benefits may include demonstrating how the information can be used to request funding and improve coordination with other agency plans.	4
Project Selection	Efforts to improve the communication between project-level decision-making and the expectations of the public and other external stakeholders should be expanded.	1

Next Steps

Following the April workshop, AMPO is considering hosting a second workshop or a series of focus group meetings to address some of the key themes that emerged from the facilitated discussions. At the present time, key questions that might be addressed during the next sessions include:

- Identifying strategies to dedicate funding for preventive maintenance.
- Communicating and organizing outreach activities to build buy-in for TAM at the field level.
- Training and guidance needed to promote preventive maintenance treatments.
- Improving life-cycle management of ancillary assets.
- Building consensus on the District's role in supporting asset management.
- Developing guidance on tackling trade-off decisions at the District level.

These topics will be discussed in more detail, and this section of the report will be updated once the final plans are developed.

APPENDIX A—LIST OF PARTICIPANTS

Insert final list of names from MnDOT