

7. PROCESS IMPROVEMENTS





Asset management is a process of continuous improvement. Each process used to develop the TAMP, whether it be life cycle planning or risk management, needs to be reevaluated on an ongoing basis to keep practices current. Process improvements are the stepping stones to the next iteration of the TAMP. By identifying, maintaining, and updating a list of process improvements, Iowa DOT will have a roadmap for future advances in TAM practice.

Introduction

This chapter supplements the discussion of current asset management practices in Iowa with key process improvements that will serve as a guide to enable Iowa DOT to continue maturing TAM practices. Not only must Iowa DOT update the TAMP every four years, but it is also good practice to maintain a list of process improvements. The TAMP is a living document that will evolve to reflect changing TAM practices and processes.

Federal Requirements

FHWA requires that a state DOT update its TAMP and development processes every four years. FHWA recommends that state DOTs conduct periodic self-assessments of TAM capabilities in 23 CFR 515.19(d). Based on the results of the self-assessment, the state DOT should conduct a gap analysis to determine which areas of its asset management process require improvement. In conducting a gap analysis, the state DOT should complete the following.

- Determine the level of organizational performance effort needed to achieve the objectives of asset management.
- Determine the performance gaps between the existing levels of performance effort and the needed levels of performance effort.
- Develop strategies to close the identified organizational performance gaps and define the period of time over which the gaps are to be closed.



7.1 TAM Process Improvements

Development of Initiatives

This TAMP describes Iowa DOT's existing asset management practices. With an eye toward the future, Iowa DOT conducted an asset management self-assessment and identified a series of initiatives for enhancing asset management. The self-assessment effort consisted of the following activities.

- **Step 1: Gap analysis survey.** Over 30 Iowa DOT staff members completed an online gap analysis survey based on one provided in the American Association of State Highway and Transportation Officials' (AASHTO's) Transportation Asset Management Guide, Volume I. Participants were asked to rate the degree to which Iowa DOT practices align with the state-of-the-art in asset management.
- **Step 2: In-depth interviews.** Several staff members participated in a series of face-to-face interviews. The objective of these interviews was to discuss existing practices in more detail.
- **Step 3: Self-assessment workshop.** The objective of this workshop was to discuss and prioritize the gaps and to discuss options for addressing them. The workshop was an all-day event in which senior staff discussed Iowa DOT's asset management vision and goals and identified initiatives for asset management improvement.
- **Step 4: Development of an implementation plan.** The results of the assessment are documented in an Asset Management Implementation Plan.

List of Initiatives

The following process improvement initiatives were developed as part of the TAM self-assessment effort; as noted, many have seen significant progress over the past several years.

- Implement an **asset management governance structure**. Iowa DOT has established this structure as discussed in Chapter 1; the structure will continue to be reevaluated to ensure it is effective in advancing asset management across the department.
- Develop an **asset management communications plan** that describes how Iowa DOT will communicate with key stakeholders regarding asset management. The plan, parts of which are already being implemented, will address the strengths, weaknesses, opportunities, and threats to implementing TAM. A key component of this plan has been the annual cycle of presentations to the Iowa Transportation Commission to discuss asset management, bridge and pavement needs, and planning efforts related to the Iowa Interstate Investment Plan, integrated corridor management efforts, and resiliency.
- Develop an **asset management training plan** that identifies who would benefit from asset management training and defines a training strategy for each group. The training could also include helping staff across Iowa DOT understand asset management roles and responsibilities.



- Develop **asset management procedures** for each asset class. The goal of this initiative is to advance each asset class into a mature state so that Iowa DOT can eventually incorporate all assets into its performance-based planning framework. Iowa DOT has reviewed examples from other states and initiated discussions with the TAM Technical Committee on this topic.
- Develop a **maintenance quality assurance program** to apply to the assets managed by Iowa DOT's Districts. This effort focuses on assets beyond bridges and pavements. The goal of the effort is to understand the performance of Iowa DOT's maintenance operations and relate outcomes to expenditures.
- Develop an **asset management data governance strategy** to identify the data and analytical capabilities required to support asset management practices and define an approach to meet these needs in the most efficient and effective manner. Iowa DOT has developed a Strategic Data Business Plan to lay the groundwork for how data is managed and governed across the department.
- Develop a **formal risk management process** to enable Iowa DOT to formally consider risks in investment decisions. Risk continues to be integrated into the pavement and bridge management systems; also, a workshop was held with members of the TAM governance structure to update the risk register for this TAMP.
- Develop procedures for incorporating **whole-life considerations**, including managing bridges and pavements throughout their whole life and incorporating whole-life costs into Iowa DOT's decision-making process.
- Develop a method for performing **risk-based tradeoffs** between investments in bridges and pavements in order to optimize budget allocations.

Additional Initiatives

The following process improvement initiatives were developed independent of the TAM self-assessment effort.

Project Prioritization and Scoping

An ongoing process improvement effort has included refinement of the Project Prioritization and Scoping Tool. This application includes pavement management software recommendations as well as bridge data and a host of other roadway and reference data. The current prioritization schema includes scores for safety, pavements, bridges, roadway class, traffic, and mobility that can be used to prioritize projects. The application allows users to access asset management data to assist in project decision-making. The application also includes information on other system needs and risks, such as the State Long-Range Transportation Plan (SLRTP) analysis layers discussed in Chapter 4. The tool helps make this data more readily available for project designers and decision makers.

Building from Iowa DOT's robust linear referencing system (LRS) and many Iowa DOT data sources, a new project concepting tool is also being explored. A current prototype tool helps bring together sources of data to streamline the development of certain types of project concepts, leading to more consistent and data-driven project concept statements that align with the SLRTP and TAMP.

Pavement

Iowa DOT is continuing work to configure its pavement management software program so it can better understand the relationship between funding and future conditions. As discussed in Chapter 3, Iowa DOT is also using an in-house pavement stewardship tool for planning purposes and evaluating the performance of pavement management software against this tool. As Iowa DOT continues to enhance its pavement management system, it will be able to estimate the remaining service life of its pavements and incrementally improve pavement strategies to maximize pavement investment.

Additional improvements to pavement management processes could include performing life cycle planning with longer analysis periods to provide decision-makers and the public with better information, further inclusion of traffic and/or truck volume in pavement recommendation analysis, decentralized access to pavement management data and analysis tools, and additional training for Iowa DOT staff.

Iowa DOT also continues to institutionalize its TAM governance structure relative to pavement management. While a pavement management team has been meeting regularly for the past few years to work on improvements to pavement management systems and practices, a recently completed pavement management strategic planning effort will help guide the future of pavement management at Iowa DOT. The following plan components were developed.

- **Pavement Management Strategic Plan (PMSP):** Discusses Iowa DOT pavements, the business case for pavement management, and an overview of efforts to-date.
- **Pavement Management Programmatic Plan:** Discusses proposed organizational structure, needs and gaps, recommended actions, and an implementation schedule.
- **Pavement Management Tactical Plan:** Discusses detailed actions, tasks, responsibilities, investments, and deadlines.

Recommendations of the PMSP include the following.

- **Organization and staffing:** No Iowa DOT staff are dedicated to pavement management full time. There is an immediate need to establish a dedicated team led by a champion with the vision and authority to fully implement pavement management at Iowa DOT.
 - Work has begun on this recommendation; as this TAMP is being finalized, Iowa DOT is in the process of hiring a new supervisor who will oversee and champion the implementation of the PSMP by building a team to lead pavement management efforts into the future.
- **Policy:** The establishment of policies and procedures related to pavement management will help unify pavement management efforts across Iowa DOT and provide continuity amid staffing changes and turnover.
- **Communication/Coordination:** Improvements will provide data to decision makers and feedback to owners of the pavement management system. This coordination will enable a continual-improvement feedback loop.
- **Life Cycle Planning:** More effective life cycle planning will help Iowa DOT put its substantial data collection to work in selecting projects and developing the resurfacing, restoration, and rehabilitation (3R) program, Interstate renewal (4R), and maintenance programs (MP/MPIN).
- **Technology:** Without dedicated staff to ensure pavement management models are up to date, decisions will be suboptimal, and staff will lose confidence in pavement management recommendations. Additional staff are needed for keeping pavement management models up to date, reviewing and realigning decision trees used for treatment selection with field practice across the state, and running needed analysis scenarios to support planning and project selection.



Implementing the PMSP will support developing the organization, policies, procedures, and technology that will result in more effective pavement management at Iowa DOT, helping to fully implement a philosophy of stewardship that supports delivering the right treatment to the right pavement at the right time.

Bridge

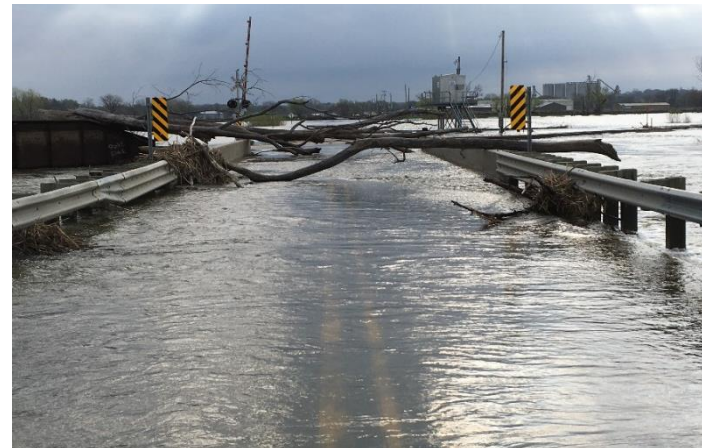
As noted in Chapter 3, Iowa DOT currently uses an optimization and prioritization system called NBI Optimizer, developed by Infrastructure Data Solutions, but is working to develop its use of the AASHTOWare Bridge Management System (BrM) program. Once the BrM program is fully functional, deterioration modeling and project planning will be done with BrM. The BrM program incorporates element-level data and will be able to provide more detailed project types than the current NBI Optimizer software. The Bridges and Structures Bureau is partnering with the Bridge Engineering Center at InTrans to develop BrM.

The Bridges and Structures Bureau has also been part of the national pooled fund study led by Michigan DOT on major bridges. This project has developed new elements for the BrM to use with major bridges. These new elements may be incorporated into major bridge inspections if they are approved by AASHTO.



Resiliency

As discussed in Chapters 3 and 5, significant efforts are underway related to resiliency planning. This includes the creation of a Resiliency Working Group (RWG) to help lead the department's resiliency efforts; a flood resiliency analysis of the Primary Highway System that assessed the system in terms of its robustness and redundancy against flooding; work to incorporate future hydrological conditions into bridge design for critical structures, with draft design guidelines currently under review; and continued efforts to improve pavement standards with features like armored shoulders and embankment protections. Future RWG efforts include additional vulnerability assessments; implementing vulnerability or resiliency into the Five-Year Program, particularly in the context of the Promoting Resilient Operations for Transformative, Efficient, and Cost-saving Transportation (PROTECT) program; improving department cybersecurity; determining alternative routes for emergency closures; and continuing to incorporate resiliency and climate change into planning and design. The RWG will continue to be a critical sounding board for the topic of resiliency and asset management.



Financial Sustainability

As bridges and pavements deteriorate, work is required to fix them. As the backlog of required work increases, the value of the assets decreases. This decrease is further impacted by inflation, which increases the cost of the required work. This loss of value can be offset by investing in the assets. Over the long term, if the investment levels keep up with the loss of value due to deterioration, then a transportation system is considered financially sustainable. If, however, the system loses value over time, it is unsustainable. Because bridge and pavement conditions are expected to deteriorate over the next ten years, Iowa DOT considers its highway system to be financially unsustainable.

Iowa DOT is working to develop a more detailed approach for assessing financial sustainability. Part of this effort is to develop an improved asset valuation approach. The goal of this effort is to better understand and communicate the long-term financial implications of the expected budget levels. One outcome of this effort would be the ability to present condition gaps in terms of dollar funding.

Iowa DOT is looking for opportunities to implement recently completed research, such as NCHRP Web-Only Document 335: A Guide to Computation and Use of System-Level Valuation of Transportation Assets (NCHRP 23-06). Iowa DOT staff participated in the development of this report, and there may be an opportunity to pilot the resulting framework. Iowa DOT has a long and rich tradition of supporting research, including research on topics related to asset management.

Cross Asset Resource Allocation

In the future, Iowa DOT plans to use bridge and pavement management systems and other resources to better link asset performance with funding levels, as well as to evaluate risk and whole-life cost. As these tools improve, Iowa DOT will be better able to inform the Iowa Transportation Commission and other stakeholders of the relationship between funding and future performance levels. In the past, Iowa DOT has used similar tools for specific asset classes but rarely in a general fashion to describe investment tradeoffs across assets and programs.

Other Improvements

Other future initiatives include the following.

- Determining the optimal steady state asset conditions
- Tracking maintenance costs
- Life cycle cost analysis for bridges
- Further exploration of the topic of TAM and equity
- Enhancements to the annual consistency report submitted to FHWA that outlines TAMP implementation and asset management investments

