**SCAN TEAM REPORT**

NCHRP Project 20 68A, Scan 14-01

# Leading Management Practices In Determining Funding Levels For Maintenance And Preservation

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# Executive Summary

## Overview

Maintenance and operations activities are critical to the safety, smoothness, and sustainability of the nation's transportation system. Ongoing investments in planned maintenance activities reduce the overall cost of preserving the highway system and help keep the traveling public moving in a safe and reliable manner. As the nation's transportation system ages, gas tax revenues decline, and the long-term adequacy of highway funding remains uncertain, it is imperative that transportation agencies identify strategies that could lead to a more reliable and sustainable level of maintenance funding to address these growing needs.

Although the transportation industry recognizes the challenges associated with uncertain and inadequate levels of maintenance funding, practical and implementable solutions to address these challenges are not widely available. As a result, finding solutions to address these challenges remains a top priority. Securing adequate funding for maintenance is one of the most pressing issues for many state maintenance managers.

Within the transportation community, there is evidence of practices that have the potential to secure more consistent and adequate funding for maintenance and preservation activities. To explore this topic further, a domestic scan took place in the fall of 2015 to investigate successful practices that have led to reliable and adequate funding levels to support maintenance programs, as well as state Departments of Transportation (DOTs) that are using performance data to set performance targets, allocate funding to districts/regions, and establish maintenance priorities.

A desk scan was conducted to review information on the state-of-the-practice and identify promising practices. The results of this scan led to the observation that the practices of three state agencies indicated that either maintenance funding levels are adequately funded to address maintenance needs (Florida) or state maintenance funding allocations are largely based on needs-based budgeting to meet maintenance performance targets (Utah and Washington State); these states are referred to as Category 1 states. In addition, the desk scan identified a number of other state DOTs that are using maintenance performance data to allocate funding at the regional/district level and/or to improve fiscal accountability. These states, which included Arkansas, Arizona, Colorado, Mississippi, North Carolina, Tennessee, and Wisconsin) were classified as Category 2 states.

Based on the information from the desk scan, a regional model was used for scheduling two scan trips. The first, which took place from August 31 to September 3, 2015, began in Nashville, TN, where representatives from state transportation agencies in Arkansas, Maine, Mississippi, North Carolina, Tennessee, and Wisconsin presented information on the use of performance data in maintenance planning and budgeting activities. The week concluded in Florida, with presentations by representatives from the state DOT. In addition, representatives from Virginia DOT presented their maintenance practices by phone.

The second trip took place from October 5 to 8, 2015. The trip began in Utah, where the scan members heard presentations from the Utah DOT on its maintenance funding practices. Washington State DOT hosted the remainder of the trip. In addition to presentations by that agency's representatives on the use of performance-based budgeting to support maintenance activities, representatives from the Arizona and Colorado DOTs made presentations to the scan team on their maintenance planning and budgeting activities.

## Summarized Findings

The key findings from the scan include those described below.

**Finding 1: The culture within Category 1 agencies fully embraces performance-based management at all organizational levels.**

A fundamental scan finding focused on the agency culture in the three Category 1 DOTs. Agency culture is a hard concept to describe. For the purposes of this discussion, culture is defined as the predominant attitudes, values, and practices that distinguish one state agency from another. An agency's culture is reflected in its internal and external communications, policies and priorities, business practices, and organizational decisions. An agency culture that strongly embraces performance-based management is a distinct feature of the Category 1 agencies that participated in the scan. These three agencies have the following characteristics:

- Everyone is on board, from upper management to maintenance technicians.
- Agency personnel can explain the organization's goals and priorities.
- Stakeholders, including maintenance personnel, have a place at the table to determine maintenance funding levels.
- The agency shows it is committed to performance-based management through word and action.
- Personnel are held accountable for achieving performance objectives.
- Resources that assist with achieving the goals are provided.
- Data, not historical allocations or practices, drives funding decisions.
- Continuous improvement is a mantra. Progress is reported regularly and feedback is solicited so that improvements can be made at all levels.

**Finding 2: The Category 1 states and several Category 2 states have established a strong relationship with elected officials based on trust in agency decisions.**

Establishing and maintaining a productive working relationship with state legislators was another key feature of Category 1 states and several Category 2 states. Relationships deemed productive are characterized by a give and take of information, mutual trust, and regular communication. Agencies that have productive working relationships with their state legislatures can respond quickly to requests for information or identification of needs. The legislators have confidence in the information their DOT provides them and in the DOT's ability to meet performance targets based

on the funding provided.

DOTs that have a good working relationship with their state legislatures recognize the ongoing effort that is required to establish and maintain that relationship. These DOTs work to educate new members of the legislature on how they establish and prioritize funding needs. They communicate regularly with the state legislature on their progress, making the information both meaningful and useable to the representatives. These DOTs also use the opportunity provided by these regular communications to explain anomalies or anticipate issues before they arise.

**Finding 3:    Performance measures and targets are needed to link investments with results.**

**Finding 4:    Performance targets should be achievable with available funding and resources.**

Maintenance performance measures are used to show the results of asset investments to executive leadership and to establish maintenance priorities for field personnel. Targets are often set based on funding available, statewide priorities, and customer expectations. Maintenance categories are typically prioritized, and those priorities are reflected in the targets that are set. Safety assets, for example, typically have the highest targets, while activities associated with aesthetics typically have lower targets associated with them.

Performance targets support budgeting discussions at both the statewide and district/regional levels. At the statewide level, performance targets drive the investment levels for funding maintenance. Once the maintenance budget is set, funding is allocated to the regions and districts based on the number of assets they maintain, the number of assets that must be addressed to reach their performance target, or some other factor.

One of the challenges that agencies discussed during the scan was getting maintenance personnel to understand that exceeding a performance target is not desirable. Although most maintenance personnel pride themselves on the quality of their work and would much rather receive an A on their maintenance quality assurance (MQA) scores, funding is usually not sufficient to fund maintenance activities beyond the targets on a statewide basis. This has been a cultural lesson that agencies have had to work on with their staff, shifting the attitude from getting the highest possible score to achieving the target.

**Finding 5:    The degree to which data is used to make investment decisions is strongly related to the degree of confidence that managers have in the information available to them.**

**Finding 6:    Because of the importance of data and the demand on resources associated with these activities, several agencies have initiated efforts to streamline their data collection efforts.**

Data is the foundation on which a performance-based management system rests. However, to be successful, data needs to be accurate and reliable, and all stakeholders need to have confidence in that data. As states make the transition from using historical expenditure information to performance-based data to predict and defend budget needs, they are making decisions about what and how much MQA data to collect, which methods of data collection to use, and how to ensure that the data collected is of the desired level of quality.

When there is a high level of confidence in MQA data, maintenance personnel can conduct analyses and communicate reliably with upper management, the legislature, and the public about performance. A significant level of confidence in MQA data allows agencies to use the information more broadly, and decision-makers can trust the information they receive and use it with confidence to make funding allocation decisions. Although most of the states that participated in the scan were collecting MQA data, there was significant variation in the levels of confidence in the data and, as a result, significant differences in how the data was being used.

The scan also found that several state transportation agencies are streamlining their data collection activities and integrating data usage to increase efficiency and reduce redundant and nonessential data collection tasks.

**Finding 7:   Performance-based organizations have established business processes, implemented software tools, and used available resources creatively to support their programs.**

Adequate program support extends beyond just funding. Agencies that have adopted a performance-based program have business processes, software tools, and other resources available to support their efforts.

## Recommendations

The following recommendations were developed from the key findings.

**Establish Performance Measures and Targets That Drive the Development of a Unified Agency Culture**

Consistently demonstrated across Category 1 state DOTs was a culture that supported performance-based management at all levels of the organization. Performance data was used to communicate funding needs to elected officials and to show that available funds were being used effectively. These organizations use performance data to drive funding allocations to the regions/districts rather than relying on historical allocations that do not reflect need. Performance measures are established to support these activities, institutionalize agency priorities, build agency and individual accountability, and create a culture that emphasizes transparency. Within this culture, agency personnel know what is expected of them and how their success is being measured. Information is regularly shared internally and externally to monitor progress and establish or maintain credibility with various stakeholders. While funding is typically not sufficient to address all of an agency's needs, the agency has a clear vision of what can realistically be accomplished and communicates that vision using achievable performance targets that reflect constrained funding.

By establishing effective performance measures and establishing the DOT culture around them, the agency is able to:

- **Support investment decisions**
  Funding allocations for maintenance are based on need rather than on historical funding levels. As a result, agency priorities are addressed, and there is a high degree of confidence that performance targets based on available funding will be achieved.

- **Set priorities using a consistent, explainable methodology**
  Priorities no longer seem haphazard or based on the whim of political forces.

- **Explain the impact of different funding levels on performance**
  By establishing clear links between funding and accomplishments, an agency is in a better position to communicate funding needs and convey the impact that funding increases or decreases can be expected to have on level of service.

- **Build trust with the legislature**
  The agency can clearly state its goals, what it needs to meet them, and how it will measure its progress toward meeting its goals. The legislature knows what it can expect based on the funding provided and can monitor progress and make sure funds are being used as intended.

- **Align everyone in the organization**
  All employees know what the agency is working to achieve and can explain how their roles and responsibilities support the goals. This unifies the employees, transcending the traditional silos that divided different teams, departments, regions, and districts.

- **Establish an effective data collection and analysis plan**
  Rather than collecting vast amounts of data with no clear purpose, data collection and analysis efforts are focused on accurately establishing and explaining the current condition of the agency's assets, where that condition needs to be to meet the performance goals, and the level of funding required to reach those goals.

- **Improve communication and hold itself accountable**
  By establishing performance goals, the agency can communicate to all stakeholders what work it intends to do with the funding provided and how those decisions were made. The agency can also report regularly on its success and explain instances where goals were not met.

### After Establishing the Agency's Performance Measures and Targets, Allow Regions and Districts Flexibility in Planning Work Activities

A foundational pillar of performance management is accountability at both the agency and individual levels. After they had established performance measures and targets, several agencies demonstrated the benefits of establishing a culture in which regions/districts were provided flexibility in developing their work plans in accordance with agency-defined performance targets. Various methods were in place to ensure that agency priorities were addressed, including audits, central office review of the work plans, and the use of a central-office maintenance coordinator. By establishing a culture that provides a balance between responsibility and accountability, agencies are able to:

- **Manage expectations in terms of performance rather than pots of money**
  This results in a necessary transition in the way business is done, shifting from the traditional focus on managing money to include a focus of equal importance: managing work activities.

- **Set attainable goals**
  The regions and districts are in the best position to know where money needs to be assigned to meet the required performance goals. They also need the flexibility to address changes in the condition of the assets or environment that could affect targeted levels of service.

- **Transmit the performance-based management culture to the regional and district levels**
  Aligning regional and district-level goals with the agency's performance goals reinforces the agency's performance-based management culture, and it becomes the established mode of doing business at all levels within the agency.

- **Establish and maintain credibility with communities**
  Regions and districts can explain to the communities they serve what they intend to do and how they intend to do it. They are able to regularly share progress and explain challenges to success. This transparency builds confidence and trust between customers and the agency.

- **Invest in tools and technology that allow for greater efficiency**
  Regions and districts that demonstrate their ability to use resources effectively make the case for additional investments in tools and technology that can increase efficiency and improve results.

**Develop Customer-Driven Targets to Convey Need and Achievable Targets for Accountability**

Agencies use their targets to tell a story to the public and the legislature. The targets help explain what work was done, the impact of that work on the network's overall condition, and what can be done in the future at various funding levels to maintain or improve the system. Targets also help the agencies to plan by establishing current and expected levels of service.

The participants in the scan demonstrated that performance targets should reflect factors that resonate with the traveling public and elected officials. However, for accountability purposes, the performance targets should be set at a service level that is realistic and achievable with the funding level provided. Aspirational goals, which set desired conditions unencumbered by funding limitations, serve an important role in communicating funding gaps to stakeholders; however, they cannot be used to foster accountability. Establishing customer-driven and achievable targets allows an agency to:

- **Be held accountable and show how level of service is tied to the level of funding**
  The target should be achievable with the funding provided, and the agency should be able to communicate how the level of service will change with different levels of funding.

- **Hold managers accountable for the decisions that are made and the level of service that is attained**
  In an organization with a strong performance-based culture, agency managers should welcome the responsibilities associated with their position and expect to be held accountable for the decisions that are made. This balance between responsibility and accountability is critical to ensure that agency goals are achieved.

- **Track and communicate progress and validate priorities**
  Data can be used to ensure that spending is supporting agency priorities and to make necessary adjustments when unexpected events occur. To foster accountability and transparency, agencies should regularly communicate maintenance accomplishments to both internal and external stakeholder groups.

**Develop National Guidance on Data Quality, Governance, and Utilization**

A key scan finding focused on the level of confidence that agencies had in their performance data and its influence on how extensively the data was used to make investment decisions. Differences in data collection methodologies and procedures among the states significantly influence the level of confidence in the data and its usefulness for making investment decisions and holding employees accountable.

As demonstrated during the scan tour, the 12 participating state DOTs represented a range of MQA data collection approaches. For instance, some of the approaches use automated data collection processes featuring LiDAR, while other states use manual processes to collect the data. Most of the states inspect representative samples to reflect statewide conditions, but the number of samples inspected varies dramatically. Additionally, the scan states represented a number of different approaches to manage data quality and to keep the asset inventory current.

Based on the scan's findings, data issues appear to be a significant obstacle that could hinder agencies' ability to adopt the Category 1 states' practices without national guidance in the following areas:

- **Data collection procedures**, including the determination of the number of samples that are needed to use data for investment decisions and accountability purposes at different levels of the organization

- **Quality management**, to identify processes and procedures that result in high-quality data collection efforts that can be used to support maintenance investment decisions

- **Innovative uses of technology**, highlighting some of the innovative ways that maintenance personnel have overcome data collection challenges using technology

- **Data governance**, to help ensure consistency in the data collected, to establish data collection protocols for each type of data, to define roles and responsibilities for data management, and to map links to all users of the data

- **Data usage**, including examples of how performance data can be used to support investment decisions at different levels of complexity