

# NCHRP 20-24(104)

## State DOT Implementation of MAP-21 Performance Measure Rules

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**SPECIAL NOTE:** This report **IS NOT** an official publication of the National Cooperative Highway Research Program, the Transportation Research Board, or the National Academies of Sciences, Engineering, and Medicine.

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The opinions and conclusions expressed or implied are those of the research agency that performed the research and are not necessarily those of the Transportation Research Board or its sponsoring agencies. This report has not been reviewed or accepted by the Transportation Research Board Executive Committee or the Governing Board of the National Research Council.

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# 1.0 Introduction

The Moving Ahead for Progress in the 21st Century (MAP-21) Act and Fixing America's Surface Transportation (FAST) Act legislation introduced performance management into the Federal Highway Program (FHWA) through the establishment of goals, for which State Departments of Transportation (DOT) and Metropolitan Planning Organizations (MPO) will be required to report on and make progress towards targets they will set against a number of national performance measures. The objective of this new aspect of the Federal program is to focus Federal funds on the achievement of national goals, increasing accountability and transparency, and improving investment decision-making through performance-based planning and programming. The MAP-21 Act/FAST Act performance areas include safety, infrastructure condition, system reliability, freight movement and economic vitality, congestion reduction, and environmental sustainability. The implementation of the long-awaited legislation promises to change the way State DOTs and MPOs conduct transportation planning.

The American Association of State Highway and Transportation Officials (AASHTO), the DOTs, and others have commented extensively as the responsible federal agencies have undertaken through the federal rulemaking process to implement these new mandates. The DOTs have sought to understand what the new requirements will mean for organization and management of the programs for which they are responsible, and to prepare to meet these new requirements. In addition, research sponsored by NCHRP, FHWA, and others has produced useful information and laid a foundation for performance measurement and management. At the time this research was commissioned in 2015, it was apparent that the DOTs and MPOs varied substantially in their readiness to meet new requirements and the likely consequences of the new mandates. Research was needed to evaluate the readiness of agencies' to meet the challenges of new performance- and outcome-based program management requirements and to provide at least preliminary guidance to assist these agencies in implementing the new rules.

The objectives of this research were to (1) assess the degree of state DOT readiness for the data collection, data standards, analysis, and reporting required to conform to new federal rules implementing performance measurement and management; (2) develop guidance such as data-assessment tools, leading practices, and practical examples to assist DOTs and other agencies to meet the new rules; and (3) propose research to develop additional guidance that would help DOTs and others to conform to federal rules and effectively implement performance- and outcome-based program management.

The research took place during the uncertain time while Notice of Proposed Rule Makings (NPRMs) were being released, comments were solicited and many discussions were taking place at the national, state and local levels regarding the possible implications of the Rule Making. There were many useful parallel efforts underway by FHWA and states to assess readiness and begin to prepare guidance. Most of the rules were finalized near the end of the study period. As a result, the research approach changed throughout the effort per panel recommendations and consultation. However, the broad objectives of the research to assess State and MPO needs and assist them in being ready to implement and conform to the federal rules remained the focus throughout the study.

The research effort began in April 2106. The research team researched the MAP-21 NPRMs, comment dockets and final rules as they were released. During a panel meeting on March 24, 2017, the panel agreed that the most useful product to meet the intent of the project was an Interactive Performance

Measurement Implementation Timeline tool. The research team worked closely with Missouri DOT and the panel to develop a timeline tool for State DOTs, MPOs and transit agencies to use to better understand the requirements of the final rules and relationships among them. This final report summarizes the functionality of the tool and provides instructions for its use.

# 2.0 Performance Measurement Implementation Timeline Tool

## Description

The web based interactive tool is intended to help State DOTs, MPOs and transit agencies organize their needs related to reporting measures and setting targets according to MAP-21 rules. The tool is based on a Missouri DOT (MoDOT) FAST Act MAP-21 Implementation Matrix and is compatible with the Transportation Performance Management (TPM) Portal currently in development by AASHTO. Users will be State DOTs, MPOs and Transit agencies.

## Background

MoDOT and partners developed an excel spreadsheet that summarizes all the performance measures, data needed, and required deadlines related to target setting and reporting for MAP-21 and the FAST Act. It is organized by *Who* (Transit agency, State DOT, or MPO), *Functional Area* (transit, safety, planning, asset management, freight) and *Performance Measure*. It was continually updated as the rules were finalized. Some of the deadlines are dependent on each other, which makes visualizing them within the spreadsheet challenging. Also, some requirements are dependent on dates as are penalties.

The MoDOT spreadsheet was specific to MoDOT needs and various changes were implemented to make it more universal. There was a need to view the timelines by agency, rule, functional area, target setting deadlines, reporting requirements/deadlines, and planning products impacted. Agencies also wanted to be able to customize the timeline to add their own critical path milestones and add additional features as necessary.

The research team developed a database based on the MoDOT one to document each measure, who is responsible for reporting, the associated rule, deadline item, type of deadline (submit report, target or report performance), data source, network for which the measure is reported, and how significant progress is determined. It ultimately acted as the underlining database that powered the online timeline tool. The baseline spreadsheet upon which the tool was based can be found in the timeline tool website, under “Learn More.”

## Functionality

The tool was designed with the following functionality aspects in mind

1. Tool must be simple and user friendly.
2. Access will be through the AASHTO TPM Portal.

3. Agency must be able to select and filter (in a menu similar to Amazon.com search) if they would like to see the timeline by 1. Agency (Transit, State DOT, MPO); 2. Functional Area (transit, safety, planning, asset management, freight); 3. Measure; or 4. Type of deadline (targets, reports, planning products integrated, penalties and when significant progress is assumed to be made). Note that penalties and when significant progress is made do not apply to all measures.
4. More than one filter for each must be allowed (e.g., user wants to see the timeline for transit agencies and State DOTs for transit, and safety functional areas for all deadlines). This would return a timeline that includes all measures and all deadlines for transit and safety, for State DOTs and Transit agencies.
5. User can enter Fiscal Year, Long Range Transportation Plan (LRTP) date or other predetermined date and the tool will build a timeline around it.
6. The tool will indicate how the products integrate with each other: “how does item x (target, due date on report, other product) impact my product/report?” e.g. Highway Safety Improvement Program (HSIP) targets feed into the Strategic Highway Safety Plan (SHSP) and LRTP.
7. User must be able to generate a report in printable pdf format.
8. User must be able to download an excel spreadsheet containing the query. The output must be customizable so that User can add their own content such as explanation, milestones, etc.
9. Allow for filtering and pivot tables.
10. Include a web link to resources (e.g., final rules, fact sheets, webinars). These should also be on the TPM Portal website).
11. Sub filter for transit – to determine if agency is Tier 1 or Tier 2 (given different dates and requirements apply).

## Access

The tool can be accessed through the AASHTO TPM Portal at <http://www.tpm-portal.com/>

## 3.0 Further Research

Based on research conducted, this section identifies further research to enhance agencies' abilities to meet Federal requirements for performance management and implement effective performance- and outcome-based plans, programs, and management processes. Needs are organized under the following headings: Timeline tool, coordination, planning process, target setting and data/tools.

### Timeline Tool

The development of the tool incorporated feedback from team members, the panel, and other stakeholders. During this feedback and QA process, a number of functional and software enhancements were suggested to improve the tool. These are listed here as possible future enhancements to the software.

#### Functionality

1. Research filtering widgets that provide a more intuitive or dynamic filtering experience, such as nested filters, including commercial software.
2. Provide users with simpler reports based on table data, rather than always showing the full table. For example, simple and advanced table views.
3. Provide users with a way to save the column state of the table between sessions.
4. Research alternate table widgets that provide better printing and/or exporting functionality, including commercial software.
5. Research alternate timeline widgets that provide exporting functionality, including commercial software.

#### Usability

1. Create a guided walk-through of the tool as a dynamic overlay of the website, in order to interactively help new users understand how the tool works.
2. Hold a focus group or usability session with stakeholders to test ideas on how to make the site navigation and querying functions more intuitive, especially targeting the three types of agency users.
3. Make the site more dynamic using AJAX or similar tools.
4. Improve site loading and filtering performance where feasible.
5. Improve the graphics of the timeline report icons.

#### Administrator Interface

1. Provide a user interface for administrators to adjust timeline parameters, such as an administrator web page.
2. Provide a mechanism for users to send feedback to administrators, such as an email address or feedback form.
3. Standardize the procedure for incorporating additional data sets and rules into the tool.

## Coordination

Effective coordination between DOTs, MPOs and transit agencies will be essential for meeting performance measurement requirements. Following are two key areas of need:

1. Best practices in DOT-MPO-Transit agency coordination on target setting and calculation of performance metrics. This research should address when and how the coordination needs to happen to make sure target setting and performance reporting deadlines are met.
2. Practices and methods for alignment of long range plan and TIP adoption cycles with PM1, PM2, PM3, and transit asset management report publication requirements. This research should answer the question: When does the internal and inter-agency coordination need to happen so that all the plans can be adopted prior to deadlines? For example, following is a non-comprehensive list of performance reports that are new or will occur on new cycles: SHSP, HSIP Annual Report, DOT TAMP, Transit Asset Management Plan, DOT System Performance Report, MPO System Performance Reports, Baseline Performance Period Report, Mid-Performance Period Progress Report, Full Performance Period Progress Report, and corresponding CMAQ Performance Plans.

## Planning Process

Research is needed to answer the following question: What would a continuous, performance-based planning process look like that would fully integrate all the requirements? DOTs could take advantage of the fact that the results of all the PM1, PM2 and PM3 analysis and reporting could feed into the next LRTP and TIP, and then the policies and assumptions from the LRTP and TIP could feed the next update of the PM1-2-3 plans and performance reports. However, it is not clear how this could occur and what steps and best practices a State DOT could employ.

Research is also needed to document assumptions States and MPOs are making to satisfy fiscal constraint requirements for plans that require a prioritized, fiscally-constrained list of projects (State Freight Plan, State Rail Plan, TAMP, Transit Asset Management Plan).

## Data

The following research is recommended related to data to support performance measure development.

1. Best practices in data archiving, multi-year trend analysis, and projecting 2-year, 4-year, and longer-term performance for purposes of the various reports.
2. Research on development of bridge and pavement tools to forecast condition, report and include deterioration models, rates and curves, and user costs—to forecast future needs and determine the effectiveness of different preventative actions/measures.

3. Examples and best practices related to safety and mobility trend and forecast tools. For example, what are the impacts of improvements on future performance in these areas?
4. Best practices on how State DOTs are working with MPOs and transit agencies to assemble data for required performance measures reporting – particularly at the Planning Boundary level.
5. A thorough evaluation of how NPMRDS v2 compares to NPMRDS v1 with respect to performance measures, to determine how or whether trends using both data sources can be developed.

## Target Setting

A synthesis on target-setting methods would be beneficial—it also would be useful to review target setting in a few years to assess how well targets were estimated.