

I-75 PROJECT – TRUNKLINE PROGRAM OPERATIONS TEMPLATE

By: Michigan Department of Transportation

IN THIS CASE STUDY YOU WILL LEARN:

1. How the Michigan Department of Transportation (MDOT) was able to minimize July 4th holiday backups in a construction zone by using zipper walls to provide variable lanes.
2. How legacy data was combined and analyzed quickly by a data management system to determine the best times of day to move the zipper wall to mitigate traffic.
3. How the DOT worked across departments to gather the needed data from multiple systems.

BACKGROUND

Through strong leadership and key champions across the agency, the Michigan Department of Transportation (MDOT) has built a foundation and culture that supports not only strategies and solutions to improve safety and mobility, but also operations program funding and project prioritization. MDOT employs Transportation Systems Management and Operations (TSMO) strategies and solutions to provide more efficient use of existing transportation resources by implementing strategies, deploying technologies, and integrating systems to address freeway and arterial congestion, improve safety and mobility, and encourage sustainability. To help overcome operations program and project funding challenges, MDOT developed the Trunkline Program Operations Template and provided funding that specifically supports TSMO project strategies and solutions. This template is intended to provide funding for an integrated program to optimize the performance of existing multimodal infrastructure by implementing systems, services, and projects to maximize capacity and/or improve the security, safety, and reliability of the transportation system. New federal rules require states to measure, monitor, and set goals based upon a composite index of travel-time reliability metrics. Travel-time reliability measures how consistent the travel-time is from one point to another, and from one day to the next. Federal regulations require states and Metropolitan Planning Organizations (MPOs) use three performance measures for assessing travel-time reliability. Travel-time data used to calculate each measure is purchased by the Federal Highway Administration (FHWA) and made available



for use by states and MPOs. The vehicle probe data set used for the federally required measures is called the National Performance Management Research Data Set (NPMRDS). The data is processed through an analytical software tool known as the Regional Integrated Transportation Information System (RITIS). The travel time reliability measures, as defined in the PM3 federal rule are:

- Level of Travel Time Reliability (LOTTR) on the interstate: % of person-miles traveled on interstate that are reliable
- LOTTR on the non-interstate National Highway System (NHS): % of person-miles traveled on the non-interstate NHS that are reliable
- Freight Reliability Measure on the interstate: Truck Travel-Time Reliability (TTTR) Index Measure

TSMO PLANNING, STRATEGIES, AND DEPLOYMENT

The information below provides the data-driven analytics used to calculate MDOT Operations Freeway and Non-Freeway program project prioritization. Each element of this scoring system had to be easy to understand, meaningful, and not overly burdensome to produce. Roughly 20 different performance measures were considered, and the process narrowed it down to 6-7 different measures. These measures also allow the ability to compare a diverse range of projects to ensure the best projects are selected. Some example type projects include:

- Flex Route (Active Traffic Management, hard shoulder running, ramp metering, etc.)
- Weave/Merge Lanes
- Roundabouts
- Signal Improvements (detection, adaptive corridor systems, etc.)
- Turn Lanes
- Safety Improvements
- ITS Devices
- Interchange/Intersection Improvements

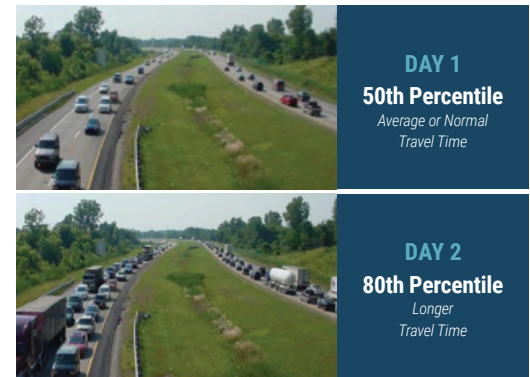
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TRAVEL TIME RELIABILITY TARGETS AND METHODOLOGY

PM3 Reliability Measures – Final State of Michigan Targets

Measure	Baseline from Jan 2017 to May 2018 <i>(Source: NPMRDS – RITIS)</i>	Recommended 2-Year Target(s) CYE 12/31/2019	Recommended 4-Year Target(s) CYE 12/31/2021
Interstate Travel Time Reliability	2017 - 85.2% 2018 - 85.8%	75%	75%
Non-Interstate NHS Travel Time Reliability	2017 - 86.1% 2018 - 85.8%	--	70%
Freight Reliability	2017 - 1.38 2018 - 1.49	1.75	1.75

Example of Unreliable Corridor



Point systems used for scoring performance measures are as follows:

Operations Freeway Scoring (total 100 points):

- (30 points) Benefit/Cost Ratio
- (30 points) Overall Benefit
- (15 points) Safety Benefit (Time of Return)
- (10 points) Combining with an Existing Project
- (7.5 points) Planning Time Index > 2 or LOTTR > 1.5
- (7.5 points) Travel Time Index > 1.5

Operations Non-Freeway Scoring (total 100 points):

- (30 points) Benefit/Cost Ratio
- (25 points) Overall Benefit
- (20 points) Duration Since Last Awarded Project in Region
- (10 points) Safety Benefit (Time of Return)
- (5 points) Planning Time Index > 2 or LOTTR > 1.5
- (5 points) Level of Service: E or F, or Travel Time Index > 1.5
- (5 points) Combining with an Existing Project

COMMUNICATIONS PLANNING AND EXECUTION

MDOT established two new funding programs totaling \$50 million annually that focus on improving travel reliability, congestion, operations, and safety of traffic on the freeway and non-freeway network. Project selection occurs through the annual Highway Call for Project (CFP) process. A subcommittee of the CFP was established to review and recommend projects and ensure the program/project is meeting goals, strategic direction, and funding targets. The subcommittee, composed of central office and region members, developed criteria for project evaluation. Regions submit candidate projects for consideration annually, as part of the CFP. The subcommittee submits the program to the Operations Steering Committee for review. The recommended candidates are forwarded from the Operations Steering Committee to the CFP Approval Committee for approval with final selections announced by MDOT's

leadership. These programs use a wide range of funding sources: the Federal Surface Transportation Program, National Highway Performance Program, Highway Safety Improvement Program, and Congestion Mitigation and Air Quality.

OUTCOMES, LEARNINGS AND PUBLIC BENEFIT:

A key component of these programs was to improve the reliability of the road network and to address the federal reliability requirements. To ensure MDOT is accomplishing this goal, a before and after analysis will be performed on all projects. An example analysis was performed on US-23 just north of Ann Arbor where an Active Traffic Management System was recently constructed. This included hard shoulder running, managed lanes, variable advisory speeds, and a queue warning system. The travel time for Southbound US-23 in the AM peak through the project limits existing condition, was shown to be somewhat congested and very unreliable. After construction the congestion was all but eliminated and is now considered a reliable segment.

MDOT has secured a dedicated source of TSMO funding to improve corridor safety, congestion, and reliability, separate from traditional reconstruction and rehabilitation funds. These funds work together with ITS, Signals, and Safety according to the MDOT Trunkline Program Operations Template and align with operational strategic areas of focus in the MDOT Organizational Strategic Plan and the MDOT TSMO Implementation and Strategic Plan. The Freeway and Non-Freeway programs are in the first year of performance and align well with meeting goals of MDOT's TSMO strategic plan. After the first year of project submittals, very little changes have been requested of the program. The scoring systems have identified the best projects to move forward and as the programs mature, adjustments will be evaluated to ensure they meet the current internal and external customer needs of safety and reliability.

FURTHER INFORMATION

Michigan TSMO Strategic Plan

NOCoE Knowledge Center: <https://transportationops.org/knowledge-center>