ODOT Transportation Systems Management & Operations Plan

Performance Measures Brief

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Ohio Department of Transportation

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PID: 97927

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Introduction

Historically, state departments of transportation (DOT), including Ohio DOT (ODOT), have focused efforts and resources primarily on construction and maintenance activities. Limited focus and resources have been placed on daily operational needs. The Federal Highway Administration (FHWA) has highlighted, through their Office of Operations, the Fixing America's Surface Transportation (FAST) Act, and Moving Ahead for Progress in the 21st Century (MAP-21) legislation, the need for state DOTs to strategize, implement, and evaluate the integration of systems management and operations into the agency. This requires an ongoing, iterative process that evaluates strengths, weaknesses, opportunities, and threats (SWOT) within the context of other agency plans and initiatives while taking into consideration relationships and interactions with stakeholders. As technology and demands on infrastructure change and funding and resources become more strained, ODOT must be positioned to meet these challenges and increase efficiency in the existing system through operational improvements.

To this end, ODOT developed a Transportation Systems Management and Operations (TSMO) Plan. ODOT's TSMO Plan will serve as a road map to guide the Department as it continues to integrate operations, asset management, and preservation into the organization. The TSMO Plan is the basis for statewide policy and process changes aimed at increasing the focus and execution of traffic operations to better meet future system needs.

Establishing an operations performance measurement program supports the goals and objectives of the TSMO Program in several ways. It provides transparency, identifies problem areas, guides investments based on data, and evaluates past investments. Applying performance management principles to operations will help improve the effectiveness of operations programs. Traditionally, planning and analysis occur at the front-end of projects. Once projects are underway, there is rarely ongoing analysis to measure their performance. In a customer-focused environment, however, it is critical to constantly evaluate how well services are being delivered and to devise methods to better serve Ohio's citizens. A performance management approach enables DOTs to not only detect problems but also learn from successes and failures. It also provides an early warning as problems arise. Lastly, making more effective investment decisions is even more important today because of the strained financial environment transportation agencies face.

Performance measurement is a key component in the transition to a performance and outcome-based program. The FHWA is increasingly focused on better planning for operations through objectives-driven, performance-based planning. The recent increase in the availability of third-party operations-related data allows DOTs to define new TSMO-related performance measures that are easily understood. By defining measurable objectives, the most cost-effective and highest priority strategies can be identified, deployed, and tracked.

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ODOT's TSMO Performance Measures

Currently ODOT tracks 21 Critical Success Factors (CSFs). Two of the CSFs are directly related to TSMO and fall into the Operations category. These are Travel Time Reliability Index (TTRI) and Snow and Ice Control.

While not recommended to be elevated to a CSF, there are a number of operations-related program objectives, performance measures, and associated targets that have been developed to measure the TSMO Program at various levels as available data allows.

These operational performance measures will allow ODOT staff and the TSMO Council to monitor and track progress related to the implementation of TSMO strategies and achievement of ODOT's Mission and Goals.

The performance measures developed for ODOT's TSMO Plan were grouped into Program, Secondary, and Monitoring categories, as shown in **Table 1**. Each program objective in **Table 1** includes specific performance measures and an associated target, describing what needs to occur to accomplish the goal.

Program measures are the measures for which the TSMO Program will be evaluated by the TSMO Council. These measures will guide priorities, track implementation, and define success. **Table 2** contains a detailed explanation for each program measure, including a description, target, data sources, and a general example of the measure. By achieving the target which accomplishes one of the TSMO Program goals, ODOT will show growth on the Capability Maturity Model scale, indicating progress for the TSMO Program.

Table 1 also includes secondary measures, which are a sub-measure of data already being measured as part of a program measure. For example, for the program measure "Maximize free flow travel time on Ohio's freeway system," there is a secondary measure in **Table 1** that is "Optimize travel time reliability on major freight corridors."

The third group of measures shown in **Table 1** are monitoring measures and are meant to provide insight to the Division of TSMO staff on the progress of various TSMO activities and functions.

Conclusion

Organizations that are managed through data-driven performance measures are better positioned to assess progress in the evolution of their programs. In other words, what gets measured gets managed. This approach allows for more informed decisions on policy, resource allocations, and staffing. By implementing TSMO performance measures, ODOT will be able to better prioritize TSMO expenditures and resources with measurable results. These results will guide future decision-making and position ODOT as a leader in TSMO.

Table 1: Performance Measures Matrix

Level	Program Objectives	Performance Measures	Targets
Program Measures	Reduce secondary crashes caused by traffic incidents.	Percentage of secondary crashes to primary crashes on monitored freeways.	< 15% of all TMC-verified crashes.
	Reduce work zone related crashes.	Frequency of work zone crashes.	Reduce by 1% over a 5 year moving average.
	Reduce roadside "struck by" incidents.	Frequency.	Zero.
	Maximize free flow travel time on Ohio's freeway system.	Percent of time motorists experience free flow travel time (TTRI).	> 88%
	Increase resilience of the transportation system to winter weather events.	Percent of routes that recover speeds within 10 MPH of the expected speeds within 2 hours of a snow event ending.	> 96%
	Reduce Incident clearance.	Duration.	To be determined.
	Reduce Roadway clearance.	Duration.	To be determined.
	Optimize signalized corridors.	Percentage of corridors retimed per year.	25% of Tier 1 and Tier 2 Corridors.
	Reduce work zone traffic delays.	Number of hours the operating speed is less than 35 MPH per monitored work zone.	Increase no more than 25% over preconstruction.
	Provide consistent incident response and management across the state.	Percentage of TIM trained emergency responders in state (DOT/Public Works, Fire, Police, Towing, EMS).	Increase by 5% per year over 5 years.
Secondary Measures	Optimize signalized corridors.	Percent arrival on green.	> 97%
	Optimize travel time reliability on major freight corridors.	Percent of time freight operators experience free flow travel time (TTRI).	> 94%
Monitoring Measures	Maximize Equipment and communications reliability.	Percent asset uptime.	97%
		Communications network up time.	97%
		Percent asset beyond service life.	Less than 10%
	Respond to and clear heavy vehicle incidents as quickly as possible.	Response < 45 minutes; Clearance < 90 minutes.	Informational only.
	Expand TMC surveillance and management capabilities.	Percent of congested corridors (based on TTRI and LOS analysis) with fixed ITS.	Informational only.
		Number of mobile data collection devices (AVL/GPS, cameras, weather sensors).	Informational only.
	Manage TMC staff workload.	Number of incidents logged.	Informational only.
	Provide timely, accurate, and comprehensive information to customers.	Increase OHGO impact - average number of notifications opened per incident.	Increase year to year.
		OHGO usage - number of personalized routes created.	Informational only.
		Incident verification (incident occurrence to time public is notified).	90% of incidents posted within 10 minutes.
	Hold after action review (AAR) meetings for 100% of incidents that exceed clearance goals.	Percentage of meetings that occur within 30 days.	100%
	Monitor key transportation assets/events to prevent harmful acts.	Number of assets/events monitored.	Informational only.
	Promote TSMO tools to improve Emergency Management.	Number of agencies with CCTV and ODOT Data Access.	Informational only.

Table 2: TSMO Program Measures

Goal	Program Objectives	Description	Performance Measures	Targets	Data Source	Data Format	Definitions of Important Terms	Responsible Office	Example
Safety	Reduce secondary crashes caused by traffic incidents.	FHWA estimates that 20% of all crashes are secondary crashes. The severity of secondary crashes is also higher than typical crashes. Enhanced TIM policies and procedures that target secondary crash reduction will improve both safety and mobility.	Percentage of secondary crashes to primary crashes on monitored freeways.	< 15% of all TMC-verified crashes.	ATMS Data	CSV	Secondary crash: any crash in either direction that can be attributed to an initial crash.	Operations and Safety in partnership with DPS.	In August 2017, 8% of all TMC logged incidents were categorized as a secondary crash.
Safety	Reduce work zone related crashes.	While highway fatalities are declining overall, there has been a slightly higher rate of decline in work zone fatalities. This is likely due to safety measures and public education. Further work in the areas of work zone design, educational campaigns, and technology applications can help make positive impacts in this area.	Frequency of work zone crashes.	Reduce by 1% over a 5 year moving average.	ATMS Data and historical crash records	CSV	Work zone crashes: crashes that occur directly related to work zone activity in the following areas: Before first Work Zone Warning Sign, Advanced Warning Area, Transition Area, and Activity Area.	Safety and Roadway Engineering.	Over the last five years, work zone crashes have been reduced by 2.5%.
Safety	Reduce roadside "struck by" incidents.	“Struck by” crashes are crashes involving roadside workers or emergency responders. They can be caused by operator error or errors in procedure. To address this issue, training is critical to maintaining a safe work environment. Work zone traffic control design is also a key factor.	Frequency.	Zero.	Crash Records	CSV	Struck by crashes: crashes that involve police officers, roadway workers, firefighters, and other first responders who are hit by a motorist while on duty assisting at an incident or in a work zone.	Operations in partnership with DPS.	Struck by incidents involving incident responders have been reduced by five from the previous year.
Reliability	Maximize free flow travel time on Ohio's freeway system.	Travel time reliability measures the extent of unexpected delay. It describes the consistency or dependability in travel times, as measured from day-to-day and/or across different times of the day.	Percent of time motorists experience free flow travel time (TTRI).	> 88%	HERE Traffic Analytics	XML	Existing CSF monitored by ODOT		
Reliability	Increase resilience of the transportation system to winter weather events.	The Volpe Center 2014 document entitled Transportation System Resilience, Extreme Weather and Climate Change identified four forces for increasing resilience: 1) Assessment of climate-change risks and vulnerabilities; 2) Adaptation strategies; 3) Mitigation of the consequences; and 4) Planning for resilient infrastructure systems.	Percent of routes that recover speeds within 10 MPH of the expected speeds within 2 hours of a snow event ending.	> 96%	HERE Traffic Analytics	XML	Existing CSF monitored by ODOT		

Note: The evaluation time-frame for each program level performance measure is data-dependent. A yearly analysis is a recommended minimum for each performance measure. As data availability becomes real-time and the analysis process more automated through a dash board or other software, the measure should be updated as frequently as possible.

Table 2, continued

Goal	Program Objectives	Description	Performance Measures	Targets	Data Source	Data Format	Definitions of Important Terms	Responsible Office	Example
Reliability	Reduce Incident clearance.	Incident Clearance is defined as the time between the first recordable awareness of the incident and the time at which the last responder has left the scene.	Duration	To be determined.	ATMS Data	CSV	N/A	Operations	In July 2017, Franklin County averaged an incident clearance time of 65 minutes.
Reliability	Reduce Roadway clearance.	Roadway Clearance is defined as the time between the first recordable awareness of an incident (detection, notification or verification) by a responding agency and first confirmation that all lanes are available for traffic flow.	Duration	To be determined.	ATMS Data	CSV	N/A	Operations	In July 2017, Franklin County averaged a roadway clearance time of 33 minutes.
Efficiency	Optimize signalized corridors.	To improve the efficiency of signalized intersections, transportation professionals must make sure that equipment, such as signal heads, control boxes, and sensors, are functioning optimally, and that the data, which include traffic volumes and intersection specific traffic movements, are current and reliable.	Percentage of corridors retimed per year.	25% of Tier 1 and Tier 2 Corridors.	Signal Inventory Records	Shapefiles	Corridors retimed: locations that have developed and implemented optimized timing plans based on traffic counts.	Operations	In 2016, ODOT re-timed 33% of Tier 1 and Tier 2 corridors.
Efficiency	Reduce work zone traffic delays.	Traffic flow is disrupted and delayed at a work zone because the traffic capacity and the vehicle speeds are lower in the work zone than on other portions of the roadway. Traffic delays at a work zone include delays caused by deceleration of vehicles while approaching the work zone, reduced vehicle speed through the work zone, time needed for vehicles to resume freeway speed after exiting the work zone, and vehicle queues formed at the work zone.	Number of hours the operating speed is less than 35 MPH per monitored work zone.	Increase no more than 25% over preconstruction.	HERE Traffic Analytics	XML	Work zone traffic delays: the cumulative time the 85th percentile speed is less than 35 mph.	Operations and Roadway Engineering.	In 2016, of the 15 monitored work zones statewide, three exceeded the target threshold.
Coordination	Provide consistent incident response and management across the state.	Consistency in policies and procedures for incident management and response will improve working relationships with stakeholders like the state police and provide cross-training opportunities.	Percentage of TIM trained emergency responders in state (DOT/Public Works, Fire, Police, Towing, EMS).	Increase by 5% per year over 5 years.	Training Records	Spreadsheet	TIM trained emergency responders: percentage of all emergency responders that have taken the SHRP2 four hour Emergency Responder Training.	Operations	In 2016, ODOT increased the percentage of TIM responders trained from 31 to 36% statewide.

Note: The evaluation time-frame for each program level performance measure is data-dependent. A yearly analysis is a recommended minimum for each performance measure. As data availability becomes real-time and the analysis process more automated through a dash board or other software, the measure should be updated as frequently as possible.