

Federal Highway Administration Office of Operations Recent TSMO Resources

Communication Resources

Linking TSMO and Transportation Equity Fact Sheet

This fact sheet offers a framework to support State and local transportation agencies in advancing transportation systems management and operations (TSMO) programs and projects in ways that can support equity goals and offer equity-related considerations when deploying TSMO strategies.

Available at: <https://ops.fhwa.dot.gov/publications/fhwahop2338/fhwahop2338.pdf>

TSMO Benefits Outreach Materials

The presentation on “TSMO: Harnessing the Value of Transportation System Performance” provides State-level examples of the measurable benefits of transportation operations strategies. The slides could be used by States or regions to highlight effective operations in their own presentations and outreach.

Available at:

<https://ops.fhwa.dot.gov/publications/fhwahop22p048/fhwahop22p048.pdf>

An infographic on *TSMO: Getting More from Our Existing System* demonstrates some of the benefits of using operational strategies. It is available in an easy-to-read and understandable format as a poster or slides.

Available at:

https://ops.fhwa.dot.gov/publications/fhwahop22067/fhwahop22067_8.5x11.pdf

Complete Trip Data Fact Sheet

This fact sheet provides the results of recently completed research into the notion of complete trip data—data that provide, at a minimum, location, time, and mode of travel for trips on the multimodal transportation system. The fact sheet contains information on complete trip data, sample fields to be used in an acquisition, and potential uses of the data.

Available at: <https://ops.fhwa.dot.gov/publications/fhwahop22066/index.htm>

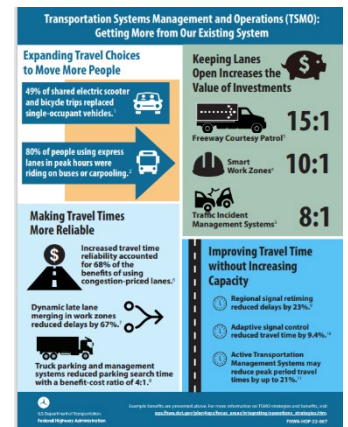
Coordination of Safety and TSMO

A Web page and a set of resources highlight opportunities for enhancing the integration and coordination of TSMO and safety programs. Effective practices for linking operations and safety in planning, data, project development, strategy identification, and organizational approaches are described. The resources include three case studies, two summary brochures, and a webinar recording.

Available at: https://ops.fhwa.dot.gov/plan4ops/focus_areas/integrating/safety.htm

Connecting TSMO With Other Disciplines

This Web page includes slide decks exploring ways TSMO can collaborate with other key disciplines in a transportation agency. The slides build on previously published fact sheets to provide more in-depth information and can be downloaded and modified by TSMO professionals for use in presentations to their colleagues in other disciplines and senior leadership. The presentations cover planning, environment,



Source: FHWA.

design, construction, maintenance, safety, asset management, performance management, human resources, and freight.

Available at: https://ops.fhwa.dot.gov/plan4ops/focus_areas/integrating/tsmo_factsheets.htm

Operations Performance Measures Resources

These updated Web pages include links to operations performance measures defined through program areas in FHWA's Office of Operations and State Departments of Transportation (DOTs) performance websites.

FHWA Program Links: https://ops.fhwa.dot.gov/perf_measurement/program_links.htm

State DOT/Metropolitan Planning Organization performance reports, dashboards, and plans:

https://ops.fhwa.dot.gov/perf_measurement/state_links.htm

Mainstreaming TSMO

The following set of resources support mainstreaming TSMO in transportation agencies. Resources include:

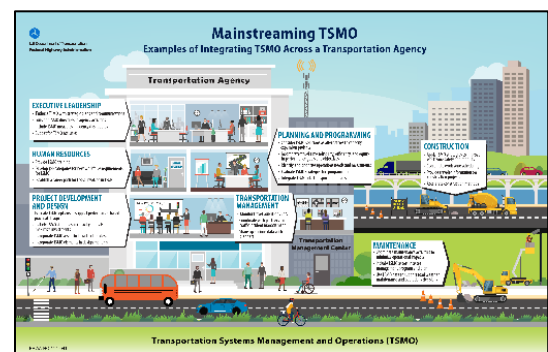
- An *Infographic* shows ways a transportation agency can integrate TSMO throughout its organization and the project and program lifecycle to advance and mainstream TSMO.
- *Webinars* show how policies and processes could be used to mainstream TSMO in an agency, and how using operations data for decisionmaking can advance and integrate TSMO.
- *Brochures* highlight aspects of mainstreaming TSMO with agency culture and with the development of a business case that communicates the benefits of TSMO.
- *Case Studies* of experiences from State DOTs show how they worked with key stakeholders to advance operations practice and mainstream TSMO. Five case studies: (1) experiences from Washington State and Iowa; (2) mainstreaming TSMO through the project lifecycle; (3) communication strategies for mainstreaming TSMO; (4) mainstreaming TSMO through collaboration on information technology in Pennsylvania; (5) how a business case for TSMO can support mainstreaming.
- *White Papers* describe aspects of mainstreaming TSMO and how they can help agencies strengthen their TSMO programs. The programs include four white papers on (1) policies and processes that support mainstreaming TSMO; (2) role of agency culture in mainstreaming TSMO; (3) use of decisionmaking and information management systems in mainstreaming TSMO; and (4) value of a business case in mainstreaming TSMO.

Available at: https://ops.fhwa.dot.gov/plan4ops/focus_areas/mainstreaming.htm

Asset Management for Operations

This updated FHWA website includes links to current Transportation Asset Management Plans (TAMP), which include TSMO assets, and a sampling of links to TSMO plans that include asset management elements.

Available at: https://ops.fhwa.dot.gov/resources/news/news_detail.asp?ID=1207



Source: FHWA.

Technical Reports, Training, Websites, and Tools

Case Studies on the Implementation of the Second Strategic Highway Research Program (SHRP2)

Reliability Data and Analysis Tools

These case studies highlight findings from 18 State DOTs that implemented reliability data and analysis tools developed under the SHRP2.

Available at: https://ops.fhwa.dot.gov/trafficanalysistools/case_studies.htm

Incorporating Reliability Performance Measures in Operations and Planning Modeling Tools

This report details pilot projects applying two tools developed under SHRP2, called Scenario Manager and Vehicle Trajectory Processor, to evaluate reliability performance measures at the planning level. The report includes results from test sites in Portland, OR, and Phoenix, AZ, and provides recommendations for conducting similar analyses.

Available at: <https://ops.fhwa.dot.gov/publications/fhwahop20042/fhwahop20042.pdf>

Traffic Analysis Capability Maturity Framework

Agencies can use these tools to assess and advance their traffic analysis capabilities. Modern traffic analyses require capabilities and resources that are not always available. Building on the success of the TSMO capability maturity model (CMM), there is now a traffic analysis capability maturity framework (CMF) to support agency advancement.

Available at: <https://ops.fhwa.dot.gov/publications/fhwahop21061/fhwahop21061.pdf>

Providing a 5-Minute Pickup Priority for Ridehail Users Agreeing To Pool: Potential Impacts on Curtailing Bus Delays and Enhancing Equity

This report summarizes a study that explored the potential to enhance equity and reduce congestion experienced by city bus riders due to transportation network company (TNC) operations through select policy measures. The study analyzed data from a survey conducted by a large TNC, coupled with appended demographic and trip data, to ascertain the impacts of changing private party and shared party TNC pricing and trip times to encourage TNC customers to choose a shared instead of a ride-alone trip.

Available at: <https://ops.fhwa.dot.gov/publications/fhwahop23013/fhwahop23013.pdf>

Parking Cruising Analysis Methodology: Final Project Report

This report documents a methodology and tool that can be used to understand cruising for parking and the effects of policy interventions on parking search behaviors. It includes case analyses from four U.S. cities, identifying cruising hot spots by time of day and location and assessing policy impacts. The report also documents lessons learned relating to data quality, tool implementation, and the analyses results.

Available at: <https://ops.fhwa.dot.gov/publications/fhwahop23004/index.htm>

An Assessment of the Expected Impacts of City-Level Parking Cash-Out and Commuter Benefits Ordinances

This report summarizes the results of an analysis of the impact city-level parking cash-out ordinances could have on vehicle travel, congestion, greenhouse gas emissions, crashes, and equity externalities for a sample of nine cities and five distinct scenarios. The final report describes the scenarios studied; the analysis approach, including inputs, outputs, methodology, limitations, and assumptions; data sources; and results for the sample of cities.

Available at: <https://ops.fhwa.dot.gov/publications/fhwahop23023/index.htm>

Identification of National Work Zone Safety Objectives and Activities: Summary Report

This report describes 11 specific strategic objectives to enhance work zone safety that resulted from a national effort to develop a list of needs, objectives, and activities for safety in and around work zones. The report aims to assist potential stakeholders with prioritizing work zone safety activities and implementing targeted work zone safety strategies.

Available at: <https://ops.fhwa.dot.gov/publications/fhwahop22059/fhwahop22059.pdf>

Work Zone Intelligent Transportation Systems—Technology Supplement

This technology supplement is a companion to the 2014 *Work Zone Intelligent Transportation Systems (WZITS) Implementation Guide* (Report No. FHWA-HOP-14-008). The guide forms the foundational framework, concepts, and methods for establishing a WZITS program. This supplement provides fact sheets and specification sheets for nine WZITS technology applications, such as dynamic lane merge and queue warning.

Available at: <https://ops.fhwa.dot.gov/publications/fhwahop21021/fhwahop21021.pdf>

Planning for Operations Web-Based and Web-Conference Training

These three virtual training courses address planning for TSMO to enhance the ability of agencies to further integrate TSMO into transportation planning and project development and ongoing TSMO programs:

NHI-133131: Planning for TSMO—Introduction, Web-based, independent, asynchronous:

https://www.nhi.fhwa.dot.gov/course-search?tab=0&key=planning+for+tsmo&sf=0&course_no=133131

NHI-133132: Planning for TSMO—Concepts and Applications, Web-based, independent, asynchronous:

https://www.nhi.fhwa.dot.gov/course-search?tab=0&key=planning+for+tsmo&sf=0&course_no=133132

NHI-133133: Planning for TSMO—Putting Concepts into Action, Web conference, facilitator-led, training:

https://www.nhi.fhwa.dot.gov/course-search?tab=0&key=Planning+for+tsmo&sf=0&course_no=133133

Approaches to Forecasting the Third Performance Management Rulemaking (PM3) Measures for Target Setting

This step-by-step calculation guide describes three forecasting methods that support target setting for the third performance management rulemaking (PM3) travel time-based performance measures.

Available at: <https://ops.fhwa.dot.gov/publications/fhwahop21014/>

Approaches for Communicating PM3 Measures, Metrics, and Targets

This report highlights communication approaches agencies can use when discussing or presenting the PM3 measures, metrics, and targets to various audiences.

Available at: <https://ops.fhwa.dot.gov/publications/fhwahop22069/fhwahop22069.pdf>

Urban Congestion Trends Reports (2021 and 2022)

Reports for 2021 and 2022 on congestion and reliability measure trends in the 52 largest urban areas in the United States, along with information on data tools and an operational strategy evaluation (2021 on optimized traffic signal timing, 2022 on crowdsourced data).

Available at:

2021 Report: <https://ops.fhwa.dot.gov/publications/fhwahop22028/index.htm>

2022 Report: <https://ops.fhwa.dot.gov/publications/fhwahop23010/fhwahop23010.pdf>

Advancing TSMO Through Organizational Structures

This report applies concepts of organizational theory and analysis, specifically related to organizational structure, to explore how organizational models and structural mechanisms can be used to advance TSMO within DOTs. It includes several case studies of organizational structures in DOTs across the Nation and looks at how DOTs have used their structures to mainstream TSMO.

Available at: https://ops.fhwa.dot.gov/plan4ops/focus_areas/fhwahop22035.pdf

Application of Travel Time Data and Statistics to Travel Time Reliability Analyses

A Handbook and supporting materials describe working with travel time data in the development of travel time reliability performance assessment and reporting. The intent of the handbook is twofold: to provide practitioners with the ability to understand the differences in reliability measures derived from the different data sources and to document the steps needed to turn high-resolution travel time data into reliability performance measures.

Report: <https://ops.fhwa.dot.gov/publications/fhwahop21058/>

Fact Sheet: <https://ops.fhwa.dot.gov/publications/fhwahop22086/>

Travel Time Reliability Reference Guide

This guide describes key elements for including travel time reliability evaluation within traffic analysis approaches. It includes information on observing the system; defining the problem; collecting and preparing data for analysis; creating the model; verifying, calibrating, and validating; and data processing, analysis, and presentation, as well as some examples.

Available at: <https://ops.fhwa.dot.gov/publications/fhwahop21015/fhwahop21015.pdf>

Planning For TSMO Practitioner Reference

This Reference document enables transportation planners, operators, and others to plan for Transportation Systems Management and Operations (TSMO) by identifying operations objectives, performance measures, strategies, implementation, and management considerations. It also features excerpts from an example transportation plan includes brief discussions of important topics in planning for TSMO such as project prioritization and sustaining TSMO over the long term.

Available at: <https://ops.fhwa.dot.gov/publications/fhwahop22019/fhwahop22019.pdf>

Highlights From the Third Performance Management Regulation (PM3) Peer Exchange Series for State Departments of Transportation (DOTs)

This fact sheet reports on highlights from the Peer Exchange for State DOTs on the third performance management rulemaking, or PM3, held in 2021. The report includes highlights of the topics discussed as well as a list of potential research and technical assistance topics.

Available at: <https://ops.fhwa.dot.gov/publications/fhwahop22079/fhwahop22079.pdf>

Resources Coming Soon

- *How Pavement and Bridge Conditions Affect Transportation System Performance*
- Three videos on mainstreaming TSMO
- *Performance Measures and Health Index of Intelligent Transportation Systems (ITS) Assets*
- *TSMO Strategy Toolkit*
- *Operations Performance Management Primer: From Performance Measures to Performance Management Report*
- *Influence of Operational Strategies on the PM3 and Other Travel Time-Based Measures:*
 - *Part 1—Recurring Congestion Strategies Report*
 - *Part 2—Non-Recurring Congestion Strategies Report*
- *Regional Operations Leadership Forums Final Report*
- *Travel Time Reliability Compendium Guide*
- *Estimation of Travel Time Distributions Applications Guide*

Non-Binding Contents

Except for the statutes and regulations cited, the contents of this document do not have the force and effect of law and are not meant to bind the States or the public in any way. This document is intended only to provide information regarding existing requirements under the law or agency policies.