U.S. Department of Transportation
**Federal Highway Administration**

# CONSTRUCTION

## ENHANCING TRANSPORTATION:
# CONNECTING TSMO AND CONSTRUCTION

Source: Getty Images

As our existing transportation infrastructure ages and demand for travel and moving goods increases, more major rehabilitation and new capacity projects are required. This means that there are more work zones that trigger network disruptions and unexpected travel delays. These delays reduce the reliability of travel and can have a major impact on emergency responders and freight mobility.

Source: Getty Images

TSMO is integral to effective work zone management. For example, TSMO strategies can encourage travelers to use alternate routes during construction, enhancing the safety and efficiency of construction crews by reducing the number of vehicles traveling through an active work zone. More specifically, TSMO strategies can:

- Provide road users with more "up front" information about planned work that will reduce capacity awhile offering mobility alternatives to help drivers avoid delays due to work zones (e.g., alternate routes, modes, or travel times).
- Improve traffic flow through work zones by using dynamic traffic management technologies and providing real-time data and traveler information to transportation agencies and system users.
- Assist construction crews, heavy equipment operators, and delivery vehicles to enter and exit construction sites safely and efficiently.

Construction staff also need to consider TSMO both when a project includes the installation of intelligent transportation systems (ITS) or when ITS is already installed and needs to be kept operational during construction.

TSMO can increase the available capacity of transportation facilities though better management of demand and flow disruptions. This can delay the need to construct new lanes or roadways. While these decisions are generally made during planning, construction personnel should be aware of this important connection to TSMO.

### TRAVELER INFORMATION AND PUBLIC INFORMATION CAMPAIGNS

Encountering an active work zone with no prior warning about travel delays is a major cause of driver frustration. Timely and accurate traveler information is a core function of TSMO programs. Information campaigns include notifying and engaging those who might be affected by route diversions, such as business districts and nearby neighborhoods. Transportation management centers (TMC) send lane closure information

### *WHAT IS TSMO?*

*Transportation systems management and operations (TSMO) is the use of strategies, technologies, mobility services, and programs to optimize the safety, mobility, and reliability of the existing and planned transportation system. A significant cause of congestion and unreliable travel is non-recurring events, such as crashes, and transportation network disruptions, such as bad weather, and special events. TSMO enables agencies to target the underlying operational causes of congestion and unreliable travel through innovative solutions that typically cost less and are quicker to implement than adding capacity. TSMO expands the range of mobility choices available to system users, including shared mobility and non-motorized options.*

*This Fact Sheet is part of a series that explains how TSMO relates to other State and local transportation agency functions and offices. Other Fact Sheets focus on how TSMO relates to: asset management, performance management, maintenance, design, environment, planning, human resources, and safety.*

through multiple channels to warn travelers ahead of time and provide routing guidance to travelers prior to and during construction activities.

## MANAGING WORK ZONES FOR SAFETY, MOBILITY, AND EFFICIENCY

TSMO offers several important benefits to construction departments in State and local transportation agencies and to contractors working in work zones:

- TSMO strategies support accelerated construction methods that reduce construction time. For example, full closures (in one or both directions) can lead to more efficient project delivery while minimizing extended disruptions to the public. TSMO analytical tools can help assess the feasibility of full closure and evaluate alternate routing.
- TMCs can remotely monitor construction activity and travel mobility through multiple work zones simultaneously. This allows TMC operators to quickly and efficiently identify and address incidents or other issues.
- Arterial work zones can benefit from adjusted signal timing during construction to reduce impacts to automobiles, pedestrians, and bicyclists.
- Traffic incident management (TIM) strategies can provide benefits during construction through expanded motorists assistance patrols, pre-positioned tow and recovery vehicles, and rapid response to incidents near or in the work zone. TIM works to safely and quickly clear incidents and return traffic to its normal flow, reducing congestion and the risks of secondary incidents.
- Strategies such as speed monitoring, speed control, and traveler information in a work zone can improve driver awareness, increasing worker safety.
- TSMO strategies can increase mobility and safety by detecting current traffic conditions and dynamically adjusting to them using real-time traffic control methods such as queue warning systems, dynamic lane merge systems, variable speed limits, lane control signs, and real-time traveler information systems, which have proven highly effective in work zones.[1]

## ITS SYSTEMS IN CONSTRUCTION

ITS are part of many TSMO strategies. Construction projects often include building and deploying ITS infrastructure, which presents a unique set of challenges to the construction crews that integrate power and communications into the facility and connect ITS field components to a TMC or other facilities. These systems require extensive testing, and the equipment must be field-hardened for weather and maintenance and protected from theft, vandalism, and misuse. Installation crews will need specialized knowledge of TSMO strategies to ensure that they understand the importance of this equipment for managing traffic on new or improved facilities and the potential for disruption if devices fail or are misused. Some equipment may be used for managing reversible lanes, variable speed limits, dynamic message signs, and ramp meters, which can directly affect the mobility and safety of travelers.

## HOW HAS THIS WORKED IN PRACTICE?

- The **Texas Department of Transportation (DOT)** used an end-of-queue warning system that reduced crashes up to 45 percent on a construction project to widen 96 miles of an interstate highway.[2]
- The **Minnesota DOT** successfully used dynamic late merge systems to help minimize the queue length in traffic work zones.[3]
- The **Transportation Operations Coordinating Committee (TRANSCOM)** is a coalition of 16 transportation and public safety agencies in the New York/New Jersey/Connecticut region that was founded in 1986 to facilitate coordination of construction projects on a regional basis. TRANSCOM has expanded its role and now its 24/7 operations information center collects and disseminates real-time incident, construction, and special event information to member and non-member agencies.[4]

1 Federal Highway Administration, Active Transportation and Demand Management (ATDM) Program Brief: ATDM and Work Zones, FHWA-HOP-16-015, 2016. Available at: https://ops.fhwa.dot.gov/publications/fhwahop16015/index.htm.

2 Innovative End-of-queue Warning System Reduces Crashes up to 45 %, ARTBA, 2015. Available at https://www.workzonesafety.org/files/documents/training/courses_programs/rsa_program/RSP_Guidance_Documents_Download/RSP_EndOfQueueWarning_Guidance_Download.pdf.

3 Evaluation of 2004 Dynamic Late Merge System for the Minnesota Department of Transportation, Minnesota Department of Transportation, 2004. Available at: www.dot.state.mn.us/trafficeng/workzone/doc/2004DLMS-Evaluation.pdf.

4 Federal Highway Administration, Transportation Systems Management and Operations in Action, 2017, FHWA-HOP-17-025. Available at: https://ops.fhwa.dot.gov/publications/fhwa-hop17025/.

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