Advancing the Next Generation in Transportation Operations Using the Strategic Highway Research Program (SHRP2)

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What is TSMO? Why is it important?
Changing Transportation Environment

• Challenging fiscal and physical environment limits opportunities for increasing road capacity.

• Emerging technology offers opportunities to enhance operations

• Increased reliance on information and technology.

• Increasing customer expectations.

• Growing emphasis on measurable outcomes.

• The Moving Ahead for Progress in the 21st Century Act (MAP-21) requirements.
Transportation Systems Management and Operations

“A set of] integrated strategies to optimize the performance of existing infrastructure through the implementation of multimodal and intermodal, cross-jurisdictional systems, services, and projects” (MAP-21, Section 1103, a, 30).

“Integrated strategies” means:
- Regional integration
- Intermodal coordination
- Interagency collaboration
- Technical integration
Travel-Time Reliability

- Increasing variability and severity of congestion.
- Customers care about predictability of travel.
- Agencies need tools to better understand and identify strategies to improve travel-time reliability.

**What travelers experience**

**What they remember**

Travel times vary greatly day-to-day

[Diagram showing travel times for Jan., July, and Dec.]

[Graph showing probability distribution of travel time]

Past Focus on Average Travel Time

Now Focus is on Variability
Example TSMO Strategies and Solutions

- Work Zone Management
- Traffic Incident Management
- Special Event Management
- Road Weather Management
- Transit Management
- Freight Management
- Traffic Signal Coordination
- Traveler Information
- Ramp Management
- Managed Lanes
- Active Traffic Management
- Integrated Corridor Management

Implemented and operated by transportation agencies (State DOT, transit agency, local DOT) on a day-to-day basis.
Genesis of Strategic Highway Research

1984 2001 2003 2012
SHRP2 Focus Areas

**Safety**: Fostering safer driving through analysis of driver, roadway, and vehicle factors in crashes, near crashes, and ordinary driving.

**Renewal**: Rapid maintenance and repair of deteriorating infrastructure using already-available resources, innovations, and technologies.

**Reliability**: Reducing congestion and creating more predictable travel times through better operations.

**Capacity**: Planning and designing a highway system that offers minimum disruption and meets the environmental and economic needs of the community.
**Deployment**

**SHRP2 RELIABILITY PRODUCTS HAVE BEEN IMPLEMENTED NATIONWIDE**

[Map showing regional implementations across the United States with a legend indicating the number of products implemented.]

**# OF PRODUCTS IMPLEMENTED**

1 2 3 4 5 6 7 8

[Logos and branding from U.S. Department of Transportation, Federal Highway Administration, American Association of State Highway and Transportation Officials, TRB, and SHRP2Solutions.]
SHRP2 Reliability Product “Bundles”

- TSMO Organizational Capabilities
- Reliability Analysis Tools (TSMO Decision Support)
- National TSMO Community
- Advanced Operations Strategies
What is the key factor for explaining the success, or lack of success, of TSMO strategies at transportation agencies?

• It’s not all about $$$$ or technology deployment.

• It’s about whether effective TSMO processes and organizational capabilities are in place.
### Characteristics of Effective TSMO

<table>
<thead>
<tr>
<th><strong>Formal Program</strong></th>
<th><strong>Typical TSMO Activities</strong></th>
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</thead>
<tbody>
<tr>
<td>• Clear mission</td>
<td>• Fuzzy mission</td>
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<tr>
<td>• Program/plan/budget</td>
<td>• No formal program budget</td>
</tr>
<tr>
<td>• Processes standardized</td>
<td>• Ad-hoc processes depend on champions</td>
</tr>
<tr>
<td>• Stable technology</td>
<td>• Changing technology</td>
</tr>
<tr>
<td>• Clear performance metrics</td>
<td>• Lack of outcome-based metrics</td>
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<tr>
<td>• Clear roles &amp; responsibilities</td>
<td>• Stovepiping</td>
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<tr>
<td>• Effective external coordination</td>
<td>• Lack of effective coordination</td>
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</tbody>
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Dimensions of TSMO Capability

Effective TSMO Strategies

- Business Processes
- Systems and Technology
- Performance Measurement

Collaboration

Organization and Staffing

Culture

{ Business and technical processes

{ Organization and relationships
Levels of Capability Maturity

MOST AGENCIES TODAY

LEVEL 1
Performed
- Relationships & activities ad hoc
- Champion-driven

LEVEL 2
Managed
- Processes developing
- Staff training
- Limited accountability

LEVEL 3
Integrated
- Processes documented
- Performance measured
- Organization aligned
- Program budgeted

ULTIMATE GOAL FOR THE FUTURE

LEVEL 4
Optimized
- Performance-based improvement
- Formal program
- Formal partnerships
Organizing for Reliability Results

- Focused efforts on strategic planning for TSMO
  - TSMO Plan, PM Plan, TIM Plan, Task Forces
- Success in gaining buy-in for TSMO from senior leadership and key stakeholders
  - Outreach, Business Case, Task Forces
- State DOTs reorganizing to make TSMO a higher priority
  - Some have created positions to lead TSMO efforts that report directly to senior leadership
- Re-evaluating existing partnerships
The average condition is not the typical condition

Everything else flows from this.

- Data revolution.
- Current tools are useful—more is needed.
- Substantial modeling and analysis advancements.
- Requires a change in thinking and decision-making.
- Nascent integration into business practices.
Reliability Data & Analysis Tools (RDAT): From Data to Decisions

Data Collection
- Establishing a Travel Time Reliability Monitoring System

Analysis
- Effects of Designs
- Highway Capacity Manual
- Benefit-Cost Analysis
- Reliability in Simulation
- Economic Benefits
- Work Zones

Decision
- Reliability in Planning and Programming
Regional Operations Forums allow managers and program leaders at public agencies to build expertise in the emerging field of TSMO.

New training to core staff in 49 States, DC, PR to:

- Mainstream TSMO into Culture
- Strengthen TSMO Programs
- Develop a Multi-state Regional Community of Practice
- Enable Intergenerational TSMO Leadership
- Accelerate TSMO Research (SHRP2) Implementation
Launched Jan. 2015

- Collaboration of AASHTO, ITE, ITSA with support from FHWA
- Website & Technical Services
  - Technical resources
  - Calendar of events
  - Discussion forums
  - Peer exchanges
  - Webinars
  - Newsletter, and more
TIM Training is an interactive, hands on training bringing together police, firefighters, tow operators, medical personnel and other incident responders.

- Over 267,000 responders trained (22.7% of 1.2 M).
- Established a national network of TIM training champions.
- Foster relationship building both in-State and State-to-State.
- Institutionalizing the training - Public safety academies in 20 States have adopted training.
With raising the visibility of TSMO and relying on it more:

- Are you ready to communicate the value of Operations?
- Can you effectively make the case for TSMO investments?
- Does your agency have a readily identifiable TSMO program?
- Are you positioned to provide TSMO capabilities to your DOT customers to fill the gap?
- Have you built the necessary partnerships?
FHWA Planning and Organizing for Operations
https://ops.fhwa.dot.gov/plan4ops/

Introduction

The U.S. Department of Transportation’s Planning for Operations Program supports the integration of transportation systems management and operations strategies into the planning process for the purpose of improving transportation system efficiency, reliability, and options. This program is led by the Office of Operations and Office of Planning, Environment, & Realty of the Federal Highway Administration (FHWA) in coordination with the Federal Transit Administration (FTA), which work with metropolitan planning organizations, State and local departments of transportation, transit agencies, and other organizations to maximize the performance of existing infrastructure through multimodal and multi-agency programs and projects. Learn more about planning for operations.
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