



Building a More Reliable Transportation Network in Colorado

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AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS





COLORADO Department of Transportation

- 5 Engineering Regions
- 9 Maintenance Sections
- Numerous Divisions & Branches
- Approx. 3,300 staff
- \$1.1 billion dollar annual budget
- Over 9,000 centerline miles of state highways
- 28 billion vehicle miles of travel annually
- 3,437 bridges on state highway system





About CDOT

- 28 billion miles of vehicle travel annually
- Plows about 6 million lane miles each year
- Spends \$69 million annually on snow removal
- Keeps over 35 mountains passes open year-round
- Monitors 278 of 522 avalanche paths





Presentation Overview

- Costs of congestion
- Emphasis on Systems Management and Operations
- CDOT Culture Change
- Role of SHRP2's Organizing for Reliability efforts

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Why TSM&O for CDOT?

- 486 traffic fatalities in Colorado in 2014
- 3,326 serious injury crashes in Colorado in 2014
- 45 hours of annual delay for Denver commuters
- 59% of our system's lane miles are congested
- \$1.6 Billion annual cost of congestion
- **\$3** Billion annual economic cost of crashes
- **17** minutes of average daily delay, **44** minutes in 2022
- Incredible impacts to health, the environment, and the economy

Fixing these problems with only traditional methods is cost and time prohibitive.







Traditional Approach to Managing Transportation

- Predict future (long-range) traffic volumes
- Fund major capital projects to provide additional capacity

This only addresses 40% of the congestion problem.

• Also becoming more and more difficult to provide new capacity



Causes of Congestion (Source: FHWA, 2005)

Operations Can Help Address These Challenges

Leverage Technology

- Preserve and maximize existing capacity
- Enhance safety
- Promote mobility and customer outreach
- Improve reliability for commuters and freight
- Manage bottlenecks
- Monitor performance
- Implement quickly at relatively low cost





Why is TSMO a Solution?

Because it seeks solutions other than building new capacity, TSMO has to analyze the underlying causes of crashes and congestion to identify targeted solutions

Surgical mitigation...





= measurable results for less money

Using the SHRP2 Solution

Organizing for Reliability Tools

- Case studies and guidance on best practices
- Self-assessment, either online for in-person
- Customizable presentation for mid- to seniorlevel management on key elements and how to get there

Critical Dimensions for Improved Operations in a DOT

Business Processes

Systems & Technology

Performance

Culture

Organization / Staffing

Collaboration

- All (6) dimensions are:
 - o Essential
 - o Interrelated
- Requires executive support and leadership
- Objective is continuous improvement of operations and reliability

CDOT's Experience – Business Processes

Statewide TSMO Plan

- Region annual work plans completed
- Region 1 TSMO Implementation Plan
- Corridor Operations Plans
- Managed Lanes Guidance for Policy Directive
- TSMO Evaluation Process for All Projects
- New Bottleneck Mitigation Program and Criteria
- Hired Planning, Performance and TDM Manager
 Improved coordination with MPOs and TPRs

CDOT's Experience – Systems & Technology

- Situational Awareness System for improved traffic management and incident response
- Connected Vehicle Pilot proposal
- Testing new/existing technology for traffic management
 Aerostat surveillance balloon
 - o Unmanned Aerial Vehicles
- Managed Roadways study and potential pilot
- Development of Traffic Signal Management Plan that addresses
 standardization & consistency
- Working Closely with IT agency on fiber expansion







CDOT's Experience – Performance

- Performance measures –statewide, region, corridor and program level
 - Identification of measures
 - o Monthly report
- I-70 Mountain Corridor
 - o Integration with maintenance & operations
 - End of season performance report
- Use of INRIX Data
 - Validation of existing
 - o Integration with volume, incident and crash data







CDOT's Experience – Culture

- Regional Operations Forum in Denver and sending key stakeholders to Operations academy
- TIM Train-the-Trainer sessions held in Colorado
- Marketing materials on TSMO
- Consistent use of performance metrics & data-driven decisions
- Changing role of TMCs, Incident Management & other activities
- Use of process to effect culture change
- TSMO awards and recognition



CDOT's Experience – Organization & Staffing

- **TSMO Director** on the Executive Management Team
- Career Mapping to TSMO
 - Maintenance Training Academy Course
- New **positions** that support operations
 - Corridor Operations Managers
 - Highway Incident Commanders
 - Region 1 TSMO Deputy Director
 - Planning, Performance & TDM Manager
- More TSMO interface with Traffic Engineers' meetings



CDOT's Experience – Collaboration

Coalitions

I-70 Mountain Corridor
I-25 Coalition development



- Working closely with internal and external stakeholders
- Integration into planning
- Integration into project development



CDOT's Experience – Challenges We Are Overcoming

- Temptation of "Big Ticket" or "High Profile" Capacity Projects
- Consistent use of performance metrics & data driven decisions
- Ability to focus on **priorities**
- Organizational boundaries
- Dearth of consultant resources



Questions and Contacts

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