



COLORADO

Department of Transportation

Transportation Systems
Management & Operations

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DATE: September 17, 2014

TO: Transportation Commission

FROM: Director, Division of Transportation Systems Management & Operations (TSM&O)

SUBJECT: Update on TSM&O Progress and Priority Corridor Planning

Purpose

To inform the Transportation Commission on the progress of the Division of TSM&O in FY2014 and provide an overview of its plan to reduce traffic congestion in priority corridors.

Action

This is information for the Commission on the strategic vision and direction of TSM&O.

Background

The Division of Transportation Systems Management & Operations is responsible for a statewide program designed to reduce congestion and improve the safety, security, mobility, and efficient utilization of Colorado's existing highway system.

Details

In FY14 the Division was primarily focused on reducing congestion in the I-70 Mountain Corridor from Vail to Golden. The first Winter Operations Plan and Performance Measures were developed for the 2014 ski season. This corridor saw a challenging winter with the corridor receiving 163% more snowfall in January and February. After the excessive delays that culminated on February 9, 2014 with a three hour delay on eastbound I-70 between Silverthorne and Eisenhower Tunnel (EJMT), TSM&O led the effort to quickly implement Plow Escorts from Silverthorne to EJMT (led by CDOT snow plows and State Patrol), and a series of other strategies, which were used to prevent the catastrophic results metering at EJMT during high volume periods in heavy snowfall.

Results of operational changes after February 9th on days where we otherwise would have metered EJMT (In other words due to operational changes, the tunnel did not have to be metered which yielded these positive results):

- 50% reduction in travel times Frisco to Georgetown
- 87% decrease in passenger vehicle spin-outs
- 95% decrease in CMV spin-outs
- 45% more EB volume through EJMT
- Only metered EJMT once after Feb 9th and it was in combination with Plow Escorts, compared to 8 times before Feb 9th that season (the three highest delays of the season were when EJMT was metered)

In FY15, TSM&O is developing comprehensive operations plans for I-70 Mountain Corridor and I-25 in Metro Denver.

Attachments

Attached is an overview of the Division of TSM&O and its strategies to reduce congestion in its priority corridors.





Transportation System Management and Operations Overview and Priority Corridors

The Division of Transportation Systems Management & Operations is responsible for a statewide program designed to reduce congestion and improve the safety, security, mobility, and efficient utilization of Colorado’s existing highway system.

Benefits of TSM&O

TSM&O provides cost effective solutions that can serve as alternatives to adding roadway capacity with superior returns on investment, substantially lower implementation costs, and long lasting and consistent benefits, even after a major capacity project. No single TSM&O strategy is a “silver bullet”, but layering multiple strategies together creates synergistic benefits that are unparalleled for their cost.

Example of historic TSM&O programs and projects are Highway Courtesy Patrols for quick clearance of traffic incidents; Traffic Management Centers for monitoring the system, distributing traveler information, and dispatching of resources; ramp metering to improve traffic flow and merging safety; hard shoulder running; traffic incident management strategies; and improved traffic signal timing.

Typically, TSM&O projects provide the following benefits:

- High-benefit cost ratios typically 10:1 and as much as 40:1
- Swift implementation (usually within 12 months)
- Low implementation costs

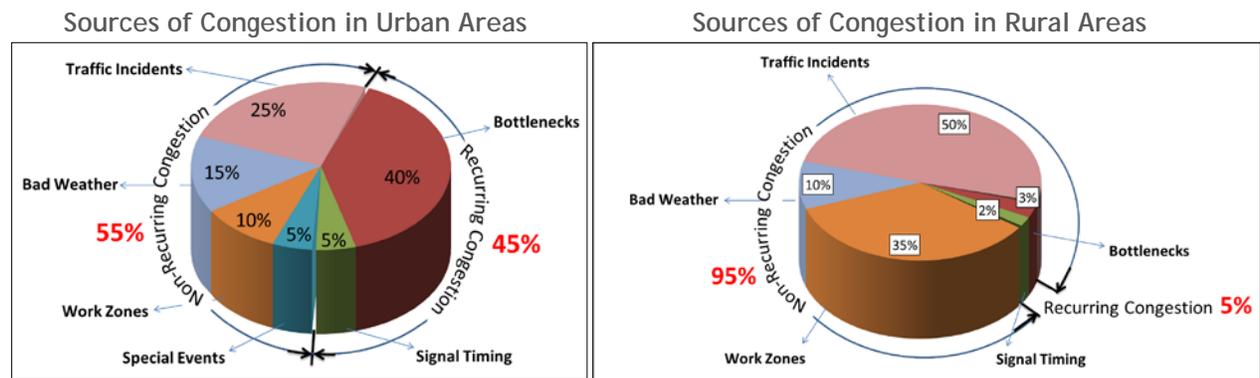
Costs of Congestion

In 2012 traffic congestion for the Denver-Aurora area resulted in:

- 76 million hours of total delay
- 34 million gallons of wasted fuel
- Total costs of delay and wasted fuel were \$1.6 billion.

Sources of Congestion

In Colorado, there are about 520 miles of congested roadway segments. The following charts show causes of congestion and its percentage of total congestion in urban and rural areas.



In urban areas, 40 percent of the congestion is caused by bottlenecks, which recur daily. Bottlenecks result from lane drops, geometric changes, lane changes, merging/exiting, and other related elements during high volume periods. The remaining 55 percent of congestion is caused by temporary disruptions that take away part of the roadway from use, which do not recur daily at the same locations. In rural areas, the main source of congestion is traffic incidents, which range from a flat tire to a semi rollover, as well as work zones and bad weather. Recurring congestion can also frequently occur along specific recreation-oriented corridors on weekends and holidays in rural areas.

Priority Corridors

The Division of TSM&O is focusing its efforts on two congested corridors in order to dedicate available resources where it is most needed and can have the greatest benefits in reducing traffic congestion.

- Eastbound I-70 from Vail to Golden: Critical to the State's economy and often has delays of 90 minutes or more on peak travel days
- Southbound I-25 from 48th Avenue to Colorado Boulevard: Ranked worst for congestion and reliability in Colorado by the Texas Transportation Institute

These corridors are receiving a comprehensive operations plan over the next six months to identify operational improvements to be implemented over the next 3 to 5 years. Summaries of the key strategies that address the key drivers of unreliable travel times in these corridors are listed below.

I-70 (Vail to Golden)

Goals: Improve travel time reliability

Key Strategies

Active Traffic Management

- Implement operational decision support system to automate preventative implementation of key operations strategies such as chain law, Eisenhower Tunnel metering mitigation strategies, and preventative safety closures based on real-time traffic and weather data
- Minimize occurrences of EJMT metering through use of Plow Escorts, ramp metering, and variable speed limits
- Improve the management of chain stations and chain law enforcement
- Restrict commercial vehicles during severe weather
- Improved real-time dispatching of snow plows to highest need areas

Traffic Incident Management

- Deploy Highway Incident Commander to actively patrol and conduct incident quick clearance and management of major closures
- Surge Heavy Tow and Courtesy Patrol units to areas with highest peak hour crash patterns and spin outs
- Improve incident clearance procedures with Colorado State Patrol and local partners and conduct routine training and performance evaluations

I-25 Metro Corridor (48th Ave to Colorado Blvd)

This section of southbound I-25 has the highest number of peak hour crashes out of all of I-25 in the Denver Metro area and has only 5 out of 14 on ramps metered.

Goal: Improve travel time reliability

Key Strategies

Reduce Peak Hour Traffic Incidents

- Aggressive campaigns to discourage distracted driving and encourage safe driving speeds



- Promotion of the “Move It” law to move crashes out of travel lanes to help reduce secondary crashes
- Improved winter maintenance operations
- Variable speed limits
- Advanced driver notification of stopped vehicles or crashes through VMS and state-of-the-art technology
- Operational safety projects to mitigate factors involved in crashes.

Active Traffic Management

- Develop an integrated corridor management plan for I-25 that synchronizes all networks in a corridor such as ramp meters, traffic signals, transit, and traveler information
- Expand ramp metering and implement Dynamic Ramp Metering to control the rate at which vehicles enter the freeway facility based on real-time traffic conditions
- Examine candidate locations for freeway-to-freeway metering
- Implement low cost mitigation strategies in bottleneck areas that reduce weaving between lanes, early merging, and other traffic issues

Traffic Incident Management

- Deploy Highway Incident Commander to actively patrol and conduct incident quick clearance and management of long-duration closures
- Surge Courtesy Patrol and other resources to areas with highest peak hour crash patterns
- Develop standard operating guidelines and operating agreements with local jurisdictions and measure performance

Performance Measures

TSM&O will be using performance measures to measure the effectiveness of specific strategies and programs and will use Planning Time Index (PTI) to measure the overall performance of the corridors. Planning Time Index is an effective measure of the reliability of a corridor. It represents the total travel time that should be planned for a trip to arrive on time 95% of the time. A PTI of 2.50 means that for a 30-minute trip in free-flow speeds, 75 minutes should be planned to arrive on time 95% of the time during congested periods (30 minutes x 2.50 = 75 minutes).

Segment	Measurement Period	PTI 2012-2013	PTI 2013-2014
EB I-70 from Vail to Golden	Winter peak periods	2.21	2.19
EB I-70 from Vail to Golden	Summer peak periods	2.38	2.38

Sunday Peak Period: 10AM to 8PM

Free-flow travel time: 82 minutes; Current High PTI: 195 minutes

Segment	Measurement Period	PTI 2013	PTI YTD 2014
SB I-25 from 48th Ave to CO Blvd	Weekday peak periods AM/PM	AM-4.02 PM-3.88	AM-3.53 PM-3.72

AM Peak: 7AM to 9AM, PM Peak: 4PM to 6PM

Free-flow travel time: 10 minutes; Current High PTI: 37 minutes



TSM&O is currently conducting an assessment of the performance in safety and mobility of other corridors, which will be prioritized to receive comprehensive operations plans to address traffic congestion. Other major TSM&O initiatives are improving Traffic Incident Management practices and resources Statewide; Innovative Bottleneck Mitigation to reduce delays at traffic bottleneck areas through high benefit, low cost solutions; and Connected Vehicle planning to develop a plan for a pilot deployment of vehicle-to-infrastructure applications.

