2016 ANNUAL REPORT ON TRAFFIC CONGESTION IN THE DENVER REGION

Presented by:
Robert Spotts

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Topics

1. Daily Vehicle Miles of Travel (VMT)
2. Measuring traffic congestion
3. Impacts of crashes on traffic congestion
DRCOG Congestion Management Process

- DRCOG is federally required to monitor roadway traffic congestion
  - Database of roadway network segments (freeways and arterials)
    - Traffic volumes
    - Operating speed and travel time
    - Vehicle and person travel delay
  - Results used in project evaluation for Regional Transportation Plan and Transportation Improvement Program
DRCOG Congestion Management Process

- DRCOG Annual Reports on Traffic Congestion since 2006
  - Regional VMT change
  - System system performance measures (person and vehicle delay)
  - Key congested locations
  - Special subjects

- Reporting to FHWA
  - FAST-Act federal performance measures (2018)
    - Work with CDOT
- Coordination with CDOT, RTD, Local Governments, TMAs, etc
1. VMT Trends

Average Daily VMT in the Denver Region (2000 - 2016)

2040 Metro Vision Target
23 VMT/Capita
Why is VMT Increasing?

• Booming economy
• Consistently low fuel costs
• Population growth

VMT Annual change data sources: FHWA Monthly VMT Reports; State HPMS (Highway Performance Management System); CDOT continuous traffic counter results; DRCOG traffic count database.
2. MEASURING CONGESTION
Congestion Mobility Score – 5 measures

- Grades based on total score from 0-20 (5 pt. scale per measure)

<table>
<thead>
<tr>
<th>Grade</th>
<th>Total Score</th>
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<tbody>
<tr>
<td>A</td>
<td>0 to 1</td>
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<td>B</td>
<td>2 to 6</td>
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<td>7 to 10</td>
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<td>11 to 16</td>
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<td>17 to 20</td>
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- **Duration**: How long does the congestion last? *(number of hours per day congested)*
- **Severity**: How much of driving time is in delayed conditions? *(percent of travel time in delay in peak hour)*
- **Magnitude**: What is the total amount of delay for all travelers at that location? *(total daily delay time per mile)*
- **Variation**: What is the variation in travel time between off-peak and rush hour?
- **Reliability**: How often do crashes or incidents occur? *(crashes per mile per year)*
New Methodology for Freeways- INRIX Data

• INRIX collects minute by minute speed observations on roadways, 24 hours a day, 365 days a year
  • Available through CDOT – Thanks!

• Real world speed observations
  • Previously used calculated speeds
  • Still used for arterial roadways

• Used for FHWA performance measures – CDOT & DRCOG in 2018
Estimating Future 2040 Conditions

- Use the DRCOG Focus Travel Model to estimate the future change in traffic volumes, person volumes, operating speed, and travel delay on every segment

- Assume 2040 MVRTP roadway network and transit system
  - Includes future projects

- Changing demographics of population

- Household and employment growth

- New INRIX methodology predicts less delay in 2040 than previous methodology
Change in Households
2015-2040

2040 Metro Vision
Regional Transportation Plan

High Household Growth
Low Household Growth

Grand Total Change: 545,000
2016 and 2040 - Most Congested Roadways

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### Congestion Performance Measures
- **Regional Roadway System**

<table>
<thead>
<tr>
<th>Vehicle Measures:</th>
<th>2016</th>
<th>2040 (RTP)</th>
<th>Percent Change Between 2016 and 2040</th>
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<tbody>
<tr>
<td></td>
<td>Average Weekday</td>
<td>Annual Total Estimate (1)</td>
<td>Average Weekday</td>
</tr>
<tr>
<td>Vehicle Miles of Travel</td>
<td>62,550,000</td>
<td>21,141,937,000</td>
<td>85,697,000</td>
</tr>
<tr>
<td>Vehicle Hours of Travel</td>
<td>1,405,000</td>
<td>475,050,000</td>
<td>1,995,000</td>
</tr>
<tr>
<td>Vehicle Hours of Delay</td>
<td>218,000</td>
<td>73,822,000</td>
<td>399,000</td>
</tr>
<tr>
<td>Travel Delay Per Driven Registered Vehicle (2)</td>
<td>7 minutes</td>
<td>40 hours</td>
<td>9 minutes</td>
</tr>
<tr>
<td>Travel Delay Per Household</td>
<td>10 minutes</td>
<td>57 hours</td>
<td>13 minutes</td>
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| Person Measures:                     |                        |                         |                      |                          |                                      |
|                                       | Average Weekday | Average Weekday | Annual Total Estimate (1) | Annual Total Estimate (1) | Percent Change Between 2016 and 2040 |
| Person Miles of Travel                | 85,260,000        | 116,578,000          | 28,817,831,000        | 39,403,397,000            | 37%                                   |
| Person Hours of Travel                | 1,948,000         | 2,727,000            | 658,399,000           | 921,683,000               | 40%                                   |
| Person Hours of Delay                 | 301,000           | 550,000              | 101,900,000           | 185,798,000               | 82%                                   |
| Travel Delay Per Resident             | 5m 30s            | 7m 30s               | 34 hours              | 42 hours                  | 36%                                   |

| Other:                                |                        |                         |                      |                          |                                      |
|                                       | Percent of Travel Time in Delayed Conditions | n.a. | 20% | n.a. | 30% |
| Travel Time Variation (Peak vs. Off-Peak) | 1.21             | n.a.                   | 1.38                  | n.a. | 14% |
| Lane Miles of Roads Congested for Three or More Hours | 1,373          | n.a.                   | 2,820                 | n.a. | 105% |
| (Percent of Total Lane Miles)         | 20%                   | n.a.                   | 38%                   | n.a. | n.a. |

| Economic Travel Delay Costs:          |                        |                         |                      |                          |                                      |
|                                       | Commercial Vehicles (3) | Passenger Vehicle Persons (3) | Total Cost of Delay | Commercial Vehicles (3) | Passenger Vehicle Persons (3) | Total Cost of Delay | Percent Change |
|                                       | $1,500,000              | $3,000,000               | $4,500,000            | $504,700,000              | $1,025,100,000              | $1,529,800,000              | $2,200,000      | $1,471,100,000 | $2,213,400,000 | 47%  | 43%   | 45%   |

| Transit and Other Regionwide Measures: |                        |                         |                      |                          |                                      |
|                                        | Total RTD Transit Boardings | Rail Transit Boardings | RTD Park-n-Ride Parking Space Utilization (Out of 32,011 Spaces) | Modeled Bicycle and Pedestrian Trips | Traffic Crashes (2014) |
|                                        | 332,000                  | 91,200                 | 62%                   | 1,409,700                 | 207                     |
|                                        | N/A                      | N/A                    | N/A                   | N/A                       | N/A                     | 75%                          | 119%            | 48%   | 48%   |
|                                        | N/A                      | N/A                    | N/A                   | N/A                       | 69,831                 | 207                          | N/A             | N/A   | N/A   |

- Commercial Vehicles (3) costs have increased by 47%.
- Passenger Vehicle Persons (3) costs have increased by 43%.
- Total Cost of Delay has increased by 45%.
- Economic Travel Delay Costs have increased significantly.
3. IMPACTS OF CRASHES
Impacts of Crashes

- 69,800 “Reported” crashes in 2014 in the region (200/day)
- Fatalities and serious injuries biggest concern
- Reduce and mitigate impacts of crashes
  - Incident Management Plans, Traveler alerts
  - Clearing of crash and incident scenes (e.g. CDOT Motorist Patrol)
  - Roadway design elements
- Freeways experience greatest impact of crashes
Examining an individual crash with INRIX data

- DRCOG maintains a database of reported crashes in the region
- Using INRIX, we can examine the duration and severity of congestion associated with a crash
Example Crash in June 2016
Westbound I-70 near W. US-6 at 4:00 pm

Day before crash
Day of Crash
Day after crash

W.B. Direction of travel

5 Mile Backup Queues

4 Hours to Clear Out
Effects on surrounding area

Average Day

Day of Incident

7:30 pm
Mitigating Congestion – DRCOG & Partners

How to Mitigate Congestion

Avoid it
Real-Time Information
Extra Night in Mountains
Flexible Work Hours
Telework

Adapt to it
Mobility Choices:
- Alternative modes
- Transit, Walk, Bicycle
- Car/Vanpool
Real-Time Information
Efficient Land Use Designs

Alleviate it
Add Lanes / Capacity
Improve Operations:
- Traffic Signals
- Signing and Striping
- Access Management
- Incident Management
Expand Transit Facilities
QUESTIONS? COMMENTS?