OR 217 ATM Project

Galen McGill
RWM Stakeholder Meeting
July 2013
OR217 Overview

- Oregon Route 217:
  - 7.52 miles
  - 2-3 lane freeway
  - 122,000 ADT
  - <5% heavy vehicles
High Crash Frequency on OR217

- 200 crashes per year
- 70% rear-end crashes
- Most during peak periods
Planned Solution (2004)

Add lanes, braid ramps

$1 billion for 7.5 miles
New Planning Goals (2011)

- Find a lower cost strategy to improve conditions now
- Not replace the previously established long term needs of the corridor
- Be consistent with the long term corridor plan
Targeted Safety Improvements

Affordable improvements we can build today, with immediate driver benefits:

• Traveler information system
• Queue warning system
• Variable advisory speeds
• Curve warning system
• Updated adaptive ramp metering
• Shoulder Widening

Total Cost: 1% of $1 Billion
**ITS Equipment**

- 28 variable advisory speed signs
- Six mainline VMS
- Six arterial VMS (one existing)
- Four RWIS grip factor sensors
- Five radar traffic sensors (three existing)
- 12 Bluetooth sensors
- 20 mainline dual-loop stations
Traveler Information System

- Travel Information System combines data from vehicle induction loops, radar traffic sensors, and Bluetooth sensors.
- Travel times will be displayed during peak times.
Queue Warning System

- Aim to reduce sudden braking and rear-end collisions
- Provide details on distance to queue, and if applicable, location
- No message if already congested
Congestion Responsive

- Each subzone’s speed determined by the lower of:
  - Local 85\textsuperscript{th} percentile speed
  - Downstream speed + step (5-10 mph)
- Speeds measured by dual loops and radar
- Speeds < 30 mph display “SLOW”
Weather Responsive

• Goal is to notify drivers of adverse weather conditions by:
  • Providing advised speeds for different adverse weather events (including visibility)
  • Using applicable messages on VMS during adverse weather events
• Four RWIS grip factor sensors installed in corridor
• Worst weather condition will control whole corridor
# Weather Responsive

## Weather Speed Lookup Table

<table>
<thead>
<tr>
<th>Visibility</th>
<th>Grip Factor</th>
<th>Chain Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 500'</td>
<td>Speed Limit</td>
<td>Chain Speed</td>
</tr>
<tr>
<td>&lt; 500'</td>
<td>Speed Limit - 10 MPH</td>
<td>Chain Speed</td>
</tr>
</tbody>
</table>

## Weather VMS Message Lookup Table

<table>
<thead>
<tr>
<th>Visibility</th>
<th>Classification</th>
<th>Grip Factor</th>
<th>Chain Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 500'</td>
<td>Moist or Wet</td>
<td>(None)</td>
<td>(None)*</td>
</tr>
<tr>
<td>Frosty, Snowy, Icy, or Slushy</td>
<td>N/A</td>
<td>ICE USE CAUTION</td>
<td>(None)*</td>
</tr>
<tr>
<td>&lt; 500'</td>
<td>Moist or Wet</td>
<td>LOW VISIBILITY USE CAUTION</td>
<td>(None)*</td>
</tr>
<tr>
<td>Frosty, Snowy, Icy, or Slushy</td>
<td>LOW VISIBILITY USE CAUTION</td>
<td>ICE USE CAUTION</td>
<td>(None)*</td>
</tr>
</tbody>
</table>

*Snow zone chain requirement messages for VMS will come from ATMS/TOCS
Operator Control

- Control either “Absolute” or “Recommended”
  - Absolute speeds ignore all other speeds being generated by other subsystems
  - Recommended speeds display the slowest speed from any of the subsystems
- Messages include duration and location
- Guidance being developed for different scenarios/conditions
## Manual Activation

<table>
<thead>
<tr>
<th>Condition</th>
<th>Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crash/Lanes closed</td>
<td>Posted speed - 10 MPH</td>
</tr>
<tr>
<td>Standing water/spots of ice</td>
<td>Posted speed - 10 MPH</td>
</tr>
<tr>
<td>Level 1 - Black Ice/Packed snow w/significant traction problems</td>
<td>Posted speed - 20 MPH</td>
</tr>
<tr>
<td>Level 2 – Black Ice/Packed snow w/significant traction problems not resolved by Level 1</td>
<td>Minimum slow speed</td>
</tr>
<tr>
<td>Ice/Packed snow plus low visibility</td>
<td>Minimum slow speed</td>
</tr>
<tr>
<td>Condition B or B1 Chain Requirement in effect</td>
<td>45 MPH</td>
</tr>
<tr>
<td>Condition C Chain Requirement in effect</td>
<td>35 MPH</td>
</tr>
<tr>
<td>Visibility less than 500 feet</td>
<td>Posted speed – 10 MPH</td>
</tr>
<tr>
<td>Work Zone</td>
<td>Specified in temporary speed zone order</td>
</tr>
<tr>
<td>Sensor Failure</td>
<td>Posted speed</td>
</tr>
</tbody>
</table>
Curve Warning System

- Activates at similar grip factor thresholds as the weather responsive variable speed system
Oregon Department of Transportation: A Century of Service

- **Ramp Meter Release 1**: April 22
- **Test ODOT**: May 18
- **ATC Integration and Test**: June 24
- **Test Bed TSSU**: Eugene
- **Eugene Const. and Approval**: June 25
- **Communications ATC's and Other 217**: July 8
- **217 Active Traffic Management (Signs +)**: July 25
- **Blue Tooth T.T. And DCU**: August 25
- **Variable Speed**: September 25
- **Queue Warning**: October 25
- **Weather**: November 25
- **DMS Project**: Delcan Contract Ends/Warranty Begins
- **Pilot Code**: December 25
- **Ready to Deploy**: January 25
- **Region Deployment**: February 25

**ATM Project**

- **Travel Time**: February 1
- **Queue Warning**: March 1
- **Weather**: April 1

**ATC HW and Firmware**

- **Test Bed TSSU**: May 2
- **Eugene Const. and Approval**: June 2
- **ATC 20 Units?**
- **Portand 217 Ramp Meter**
- **Communictions ATC's and Other 217**
- **217 Active Traffic Management (Signs +)**
- **Blue Tooth T.T. And DCU**
- **Variable Speed**
- **Queue Warning**
- **Weather**

**DMS Project**

- **MQM**: March 1
- **Sign Types Tested**: April 1
- **Message Library**: May 1
- **Vanguard (Sign Control)**
- **Ready to Deploy**: June 1

**Additional Scope?**

- **Delcan Contract Ends/Warranty Begins**
- **Test ODOT**: July 1
- **Testing ODOT**: August 1
- **ATC Acceptance**: September 1
- **ATC to field**: October 1
- **Go Live**: November 1
- **Eugene Ramp Normal Operation**: December 1

**ATC Acceptance**

- **ATC to field**: May 25
- **Go Live**: June 3
- **Eugene Ramp Normal Operation**: July 8

**Travel Time**

- **Travel Time**: January 22
- **Travel Time**: February 22
- **Travel Time**: March 22
- **Travel Time**: April 22
- **Travel Time**: May 22
- **Travel Time**: June 22
- **Travel Time**: July 22
- **Travel Time**: August 22
- **Travel Time**: September 22
- **Travel Time**: October 22
- **Travel Time**: November 22
- **Travel Time**: December 22

**Queue Warning**

- **Queue Warning**: January 22
- **Queue Warning**: February 22
- **Queue Warning**: March 22
- **Queue Warning**: April 22
- **Queue Warning**: May 22
- **Queue Warning**: June 22
- **Queue Warning**: July 22
- **Queue Warning**: August 22
- **Queue Warning**: September 22
- **Queue Warning**: October 22
- **Queue Warning**: November 22
- **Queue Warning**: December 22

**Weather**

- **Weather**: January 22
- **Weather**: February 22
- **Weather**: March 22
- **Weather**: April 22
- **Weather**: May 22
- **Weather**: June 22
- **Weather**: July 22
- **Weather**: August 22
- **Weather**: September 22
- **Weather**: October 22
- **Weather**: November 22
- **Weather**: December 22

**Sign Types Tested**

- **Sign Types Tested**: January 22
- **Sign Types Tested**: February 22
- **Sign Types Tested**: March 22
- **Sign Types Tested**: April 22
- **Sign Types Tested**: May 22
- **Sign Types Tested**: June 22
- **Sign Types Tested**: July 22
- **Sign Types Tested**: August 22
- **Sign Types Tested**: September 22
- **Sign Types Tested**: October 22
- **Sign Types Tested**: November 22
- **Sign Types Tested**: December 22

**Message Library**

- **Message Library**: January 22
- **Message Library**: February 22
- **Message Library**: March 22
- **Message Library**: April 22
- **Message Library**: May 22
- **Message Library**: June 22
- **Message Library**: July 22
- **Message Library**: August 22
- **Message Library**: September 22
- **Message Library**: October 22
- **Message Library**: November 22
- **Message Library**: December 22
Weather Responsive Evaluation Plan

Evaluation Objectives:

1. Measure impact on mean speeds and speed distribution
2. Measure impact on incident rates
3. Measure driver compliance
4. Compare weather based speeds to congestion based recommended speeds
5. Measure impact on reliability
6. Document lessons learned