OR 217 ATM Project

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WRTM Workshop
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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
• 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>
<tr>
<td></td>
<td>Speed Limit - 20 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></td>
<td>Frosty, Snowy, Icy, or Slushy</td>
<td>N/A</td>
<td>(None)*</td>
</tr>
<tr>
<td></td>
<td>Moist or Wet</td>
<td>LOW VISIBILITY USE CAUTION</td>
<td>(None)*</td>
</tr>
<tr>
<td>&lt; 500’</td>
<td>Moist or Wet</td>
<td>USE CAUTION</td>
<td>(None)*</td>
</tr>
<tr>
<td></td>
<td>Frosty, Snowy, Icy, or Slushy</td>
<td>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
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