Truck Rollover Warning System

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SEH Inc.
Agenda

• Project Purpose
• Scope Review
• Location
• Design
• Operation
• Questions
Project Purpose

To use weigh-in-motion (WIM) and road surface condition detection to reduce truck rollover crashes.
Scope

- Quality Management Plan
- Concept of Operations
- System Requirements
- Design
- Testing
- Operation
- Evaluation
- Removal / Turnover
## Truck Rollover Crash Locations – 2001-2009

*ATRI – May 2012*

<table>
<thead>
<tr>
<th>Location</th>
<th>Number of Rollovers</th>
</tr>
</thead>
<tbody>
<tr>
<td>I-94 and US 52/Lafayette Bridge</td>
<td>17</td>
</tr>
<tr>
<td>I-94, I-494, and I-694</td>
<td>13</td>
</tr>
<tr>
<td>I-90 and I-35</td>
<td>12</td>
</tr>
<tr>
<td>I-494 and US 52</td>
<td>12</td>
</tr>
<tr>
<td>US 52 and US 63</td>
<td>9</td>
</tr>
<tr>
<td>I-35W and US 10</td>
<td>9</td>
</tr>
<tr>
<td>I-90 near Exit 242/CR 29</td>
<td>8</td>
</tr>
<tr>
<td>I-35W and I-494</td>
<td>8</td>
</tr>
<tr>
<td>I-35W and I-694</td>
<td>7</td>
</tr>
</tbody>
</table>
Rollover Crashes

01/01/07 - 05/03/12

I-94/694/494 Interchange
Existing Advance Signing
Existing Signing
Existing Signing at Exit
System Components

• Road side WIM electronics
• Piezoelectric WIM sensors and inductive loops
• Warning signs and flashers
• Road surface condition detector
Design

• Source of Power
• Detector Locations (off bridge)
• Signs / Messages
• Factory Testing
• Shadow Testing
Design

• Combine 2 Systems
  – Too fast
  – Slippery roadway
PRELIMINARY

LEGEND:

- Inductive Loop
- Preselecting Sensor
- Temperature Sensor
- Electronic Enclosure
- Sign with Beacons
- Contact Circuit
- Power Coax
- Note

NOTES: (This sheet only)

- Sign not supplied by IRD.

ZONE DETAILS:

<table>
<thead>
<tr>
<th>LOOP</th>
<th>SIZE</th>
<th>NUMBER OF TURNS</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1-L6</td>
<td>0' x 0'</td>
<td>4</td>
</tr>
<tr>
<td>L1-L6</td>
<td>0' x 14'</td>
<td>4</td>
</tr>
<tr>
<td>L7-L9</td>
<td>0' x 14'</td>
<td>8</td>
</tr>
</tbody>
</table>

GENERAL NOTES:

- Separate conduit and pull boxes must be used for AC power and low voltage signal.
- Sensor spacing shown is typical spacing requirement. Actual sensor spacing may be altered to suit site conditions by the IRD field representative.
- All connections between sensors and lead cables are done in pull box and are sealed, then sealed for waterproofing. Number and placement of pull boxes not shown.
- Road surface pavement conditions must meet current ASTM E1428 requirements to achieve optimal system performance.
- Cables must be protected by PVC sleeves where they cross pavement joints/cracks.
- IRD recommends that pull boxes be no further than 20' [6.1m] apart.
- IRD recommends the minimum size for pull boxes is 18" [45.7cm] x 18" [45.7cm] x 12" [30.5cm].
- Exact routing of conduit to be determined on site.
- Drawing not to scale.
TRUCK REDUCE SPEED WHEN FLASHING

REDUCE SPEED ICE POSSIBLE WHEN FLASHING
Signing

20 MPH

CONTINUOUS STAINLESS STEEL HINGE

HIGH OUTPUT AM

STAR 1/4-TURN

1/125" THK. E DOOR F

1/125" THK. ANTI-GRADE POLYCARBONATE FACE

(2) DRAIN HOLES LOCAT THE BOTTOM CORNE
Detection

- Entry/Classification
- Activation Point
- Shut Off Point
- Sign
Operation
## Sign Activation

<table>
<thead>
<tr>
<th>30 Day Time Period</th>
<th># of Trucks</th>
<th># of Sign Activations</th>
<th>% Trucks Activating Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shadow Test</td>
<td>78,224</td>
<td>58,479</td>
<td>75%</td>
</tr>
<tr>
<td>Sept. 2014</td>
<td>84,915</td>
<td>60,219</td>
<td>71%</td>
</tr>
<tr>
<td>Oct. 2014</td>
<td>85,730</td>
<td>59,981</td>
<td>70%</td>
</tr>
</tbody>
</table>
## Truck Speed Data

<table>
<thead>
<tr>
<th>30 Day Time Period</th>
<th>Entry Average Speed</th>
<th>85th Percentile Speed</th>
<th>Activation Point Average Speed</th>
<th>85th Percentile Speed</th>
<th>Shut Off Point Average Speed</th>
<th>85th Percentile Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shadow Test</td>
<td>29</td>
<td>36</td>
<td>24</td>
<td>30</td>
<td>23</td>
<td>28</td>
</tr>
<tr>
<td>Sept. 2014</td>
<td>29</td>
<td>37</td>
<td>24</td>
<td>29</td>
<td>23</td>
<td>28</td>
</tr>
<tr>
<td>Oct. 2014</td>
<td>29</td>
<td>37</td>
<td>24</td>
<td>29</td>
<td>24</td>
<td>28</td>
</tr>
</tbody>
</table>
Questions?