Field Study of Heavy-Vehicle Crash Avoidance Systems

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Overview

- Background
- Locations of Trucks in Study
- Data Collection
- Videos of Safety Critical Events
- Next Steps
Background

• Field Operational Test (FOT) on Heavy Vehicle Collision Avoidance and Mitigation Systems
• Conducted by Virginia Tech Transportation Institute (VTTI)
  • 7 Small to Medium Sized Fleets Participating.
  • 150 - Class 8 Tractors Instrumented (including video data) for Approximately 1 year.
• Collision Avoidance Systems (CAS) Tested:
  • Automatic Emergency Braking/Forward Collision Warning (AEB/FCW)
  • Lane Departure Warning (LDW)

<table>
<thead>
<tr>
<th>CAS</th>
<th>Bendix</th>
<th>Meritor WABCO</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>AEB/FCW</td>
<td>54/54</td>
<td>96/96</td>
<td>150/150</td>
</tr>
<tr>
<td>LDW</td>
<td>6/54</td>
<td>80/96</td>
<td>86/150</td>
</tr>
</tbody>
</table>
Locations of Trucks in Study
Data Collection

- Types of Alerts
  - Automatic Emergency Braking (AEB)
  - Impact Alert (IA)
  - Stopped Object Alert (SOA)
  - Following Distance Alert (FDA)
  - Lane Departure Warning (LDW)
  - Study Measure - Adaptive Cruise Control (ACC) Activation

Data collected from FOT:
- 3.2 Million Miles of Driving
- 109,000 Hours of Driving
Alerts and System Activations

<table>
<thead>
<tr>
<th>CAS Activations and Alerts</th>
<th>Count</th>
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</thead>
<tbody>
<tr>
<td>AEB Activations</td>
<td>264</td>
</tr>
<tr>
<td>IA</td>
<td>1,965</td>
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<tr>
<td>SOA</td>
<td>8,604</td>
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<tr>
<td>LDW Alerts</td>
<td>410,590</td>
</tr>
<tr>
<td>FDA</td>
<td>463,818</td>
</tr>
<tr>
<td>ACC Activations</td>
<td>547,095</td>
</tr>
</tbody>
</table>

Videos of Safety Critical Events

• AEB Activations were rare events - drivers in the study received them at a rate of 0.005/hour.
• Study investigated a sample of 6,000 safety critical events including all AEB activations.

Naturalistic Video Examples:

1. Braking Lead Vehicle
2. Turning Lead Vehicle
3. Truck in Passing Maneuver
4. Lane Change by Vehicle Ahead
5. Multiple Lane Change by Vehicle Ahead
6. Truck Passing a Turning Vehicle Ahead
7. Hard Braking Event - Distraction
Braking Lead Vehicle
Turning Lead Vehicle
Truck in Passing Maneuver
Lane Change by Vehicle Ahead
Multiple Lane Change by Vehicle Ahead
Truck Passing a Turning Vehicle Ahead
Hard Braking Event - Distraction
Next Steps

• NHTSA is continuing research with a follow on study, Field Study of Newer Generation Heavy Vehicle AEB Systems.
  – Awarded to VTTI - Project kickoff was in November 2016.
  – 2+ Year naturalistic study of AEB systems installed in 150 trucks.
  – Examine real-world performance of newest generation of:
    • Bendix® Wingman® Fusion™
    • Detroit Assurance™ 4.0
    • Meritor WABCO OnGuardACTIVE™

• Final Report available now at www.nhtsa.gov:
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