Inspecting CMVs with Automated Driving Systems

September 2019
The Commercial Vehicle Safety Alliance (CVSA) is a nonprofit association comprised of local, state, provincial, territorial and federal commercial motor vehicle safety officials and industry representatives. The Alliance aims to achieve uniformity, compatibility and reciprocity of commercial motor vehicle inspections and enforcement activities by certified inspectors dedicated to driver and vehicle safety.
NAS Inspection Program Today

Overview

• 13,000+ CVSA-certified Inspectors
  • 800,000+ Law Enforcement Personnel
• Over 1,400 Fixed Facilities
• Mobile Patrols
• 4 Million Roadside* Inspections Annually

*Roadside = vehicle, driver or both; fixed facility, traffic enforcement stop, ports of entry, points-of-origin/destination combined
NAS Inspection Process

Location → Inspection Level → Data Upload

Motor Carrier Management Information System (MCMIS)

Data Processing
NAS Inspection Levels

• Level I – Driver/Vehicle Inspection
• Level II – Walk-Around Driver/Vehicle Inspection
• Level III – Driver Only Inspection
• Level IV – Special Studies Inspection
• Level V – Vehicle Only Inspection
• Level VI – Select Radiological Activities Inspection
• Level VII – Jurisdictional Mandated Inspection
• Level VIII – Electronic Inspection
Committees

• Crash Data and Investigation Standards
• Driver-Traffic Enforcement
• **Enforcement and Industry Modernization**
• Hazardous Materials
• Information Systems
• Passenger Carrier
• Policy and Regulatory Affairs
• Size and Weight
• Training
• Vehicle
• In April 2016, the CVSA Enforcement and Industry Modernization (EIM) committee held its first meeting, after being created by CVSA Board to address emerging vehicle technologies and latest in enforcement tools
A brief history…

- Summer 2016 – 120 mile highway demonstration of OTTO self-driving truck in Colorado helped bring new questions to the table.

- April 2017, EIM committee approved an electronic Level VIII inspection.

- In September 2018 CVSA EIM committee appointed an Automated Commercial Motor Vehicle working group of regional jurisdictions, associates and federal participants to develop first phase concept of inspection of a vehicle with an automated driving system.
Automated CMV Working Group

- **Representation**
  - 5 enforcement member region representatives
  - CVSA associates
  - CVSA local agencies
  - Federal Partners

- **FMCSA support contract** providing technical support from MaineWay, Cambridge Systematics.

- **Meeting monthly**
- **Conducting interviews** among companies in the automated truck space
- **Phase 1 inspection approaches** to be considered at CVSA Annual Conference Sept. 23-26
Critical Vehicle Inspection Items

- Brake Systems
- Cargo Securement
- Coupling Devices
- Driveline/Driveshaft
- Exhaust Systems
- Frames
- Fuel Systems
- Lighting Devices
  - Turn Signals, Brake/Tail/Headlamps, Lamps on Projecting Loads
- Steering Mechanisms
- Suspensions
- Tires
- Van and Open-Top Trailer Bodies
- Wheels, Rims and Hubs
- Buses, Motorcoaches, Passenger Vans or Other Passenger Carrying Vehicles
  - Windshield Wipers and Emergency Exits and/or Electrical Cables/Systems in Engine/Battery Compartments/Seating
SAE J3016 Levels of Automation

<table>
<thead>
<tr>
<th>Level</th>
<th>Automation Type</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>0</td>
<td>No Automation</td>
<td>Zero autonomy; the driver performs all driving tasks.</td>
</tr>
<tr>
<td>1</td>
<td>Driver Assistance</td>
<td>Vehicle is controlled by the driver, but some driving assist features may be included in the vehicle design.</td>
</tr>
<tr>
<td>2</td>
<td>Partial Automation</td>
<td>Vehicle has combined automated functions, like acceleration and steering, but the driver must remain engaged with the driving task and monitor the environment at all times.</td>
</tr>
<tr>
<td>3</td>
<td>Conditional Automation</td>
<td>Driver is a necessity, but is not required to monitor the environment. The driver must be ready to take control of the vehicle at all times with notice.</td>
</tr>
<tr>
<td>4</td>
<td>High Automation</td>
<td>The vehicle is capable of performing all driving functions under certain conditions. The driver may have the option to control the vehicle.</td>
</tr>
<tr>
<td>5</td>
<td>Full Automation</td>
<td>The vehicle is capable of performing all driving functions under all conditions. The driver may have the option to control the vehicle.</td>
</tr>
</tbody>
</table>
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Whether an automated driving system is a critical inspection item suddenly depends heavily on what level of automation is at hand!

Is there still a driver onboard? Is there a remote driver?
Preview of Phase I Recommendations to CVSA EIM Committee Sept.25 (not yet finalized)

- **Process:**
  - Researched current and planned ADS deployments and technology, policy, and legislation
  - Reviewed existing enforcement procedures
  - Interviewed industry stakeholders

- **Recommendations**
  - Keep it simple – don’t make enforcement personnel become engineers
  - SAE Level 1-3 – Require an ADS malfunction indicator
  - SAE Level 4-5 – Require vehicle to report electronically that it has passed an origin/destination (terminal) inspection while en-route. Limit roadside inspections

- **Next Steps**
  - Accept Working Group recommendations and advance within CVSA
  - Will eventually necessitate NHTSA/FMCSA involvement
Meanwhile, possible components of the inspection methodologies needed for automated vehicles may already be in our vocabulary:

- Smart Roadside Initiative
- Wireless Roadside Inspection
- Dedicated Short Range Communications (DSRC) and 5.9 GHz
- Universal Electronic Vehicle ID
- Updated MMUCC (future edition)
- CVSA Level VIII inspection concept
Approved CVSA Level VIII Inspection Elements...

- Location, including GPS coordinates,
- Electronic validation of who is operating the vehicle;
- Appropriate driver’s license class and endorsement(s)
- License status,
- Valid medical examiner’s certificate,
- Skill Performance Evaluation (SPE) Certificate;

- Current driver’s record of duty status;
- Hours of service compliance;
- DOT or NSC number,
- Power unit registration;
- Operating Authority;
- Unified Carrier Registration (UCR) compliance;
- Federal Out-of-Service Orders.
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