Session 11: ITS Research in the U.S. and Abroad

Update on FMCSA ITS Research

Presentation to:
ITS America 2007 Annual Meeting

Jeff Secrist
June 4, 2007
The Mission of FMCSA

- Reduce crashes, injuries, and fatalities involving large trucks & commercial buses
Scope of the Motor Carrier Industry

- 700,000 + Interstate Motor Carriers
- 7 Million Commercial Drivers
- 8.2 Million Large Trucks
- 227 Billion Miles Traveled by Trucks
Scope of the Large Truck Problem

5,200 Fatalities

110,000 Injured Persons

400,000 Police Reported Crashes

$35 Billion Cost to Society
Large Truck Fatalities

<table>
<thead>
<tr>
<th>Year</th>
<th>Fatalities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>4,900</td>
</tr>
<tr>
<td>1996</td>
<td>5,100</td>
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<tr>
<td>1997</td>
<td>5,400</td>
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<tr>
<td>1998</td>
<td>5,500</td>
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<td>1999</td>
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<td>2000</td>
<td>5,400</td>
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<td>2001</td>
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<td>2002</td>
<td>4,900</td>
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<tr>
<td>2003</td>
<td>4,800</td>
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<tr>
<td>2004</td>
<td>5,100</td>
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<tr>
<td>2005</td>
<td>5,400</td>
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During the past several years, FMCSA has tested, evaluated, and encouraged the deployment of on-board safety systems to improve safety.

1. Lane Departure Warning Systems
2. Roll Stability Systems and Electronic Stability Systems
3. Forward Collision Warning Systems with Adaptive Cruise Control
Lane Departure Warning Systems

- Camera watches road ahead – not driver
- Tracks road and vehicle position in lane
- Monitors for weaving and lane drifts
- Alerts driver before road departure
- Blocks warning automatically if:
  - Turn signal is used
  - Speed is less than threshold
- Mack Field Operational Test Results
## Stability Control Systems

<table>
<thead>
<tr>
<th>Road Surface Coefficient of Friction</th>
<th>Ice Low</th>
<th>Wet Asphalt</th>
<th>Dry concrete High</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Driving Scenario Example</strong></td>
<td>• Driving speed exceeds the threshold&lt;br&gt;• Lateral force exceeds surface friction&lt;br&gt;• Vehicle begins to slide/jackknife</td>
<td>• Driving speed exceeds the threshold&lt;br&gt;• Surface friction sufficient to resist&lt;br&gt;• Vehicle prone to roll over</td>
<td>System applies individual brakes to:&lt;br&gt;• Reduce speed / correct orientation&lt;br&gt;• Reducing tendency to jackknife/slide</td>
</tr>
<tr>
<td><strong>Stability System Action</strong></td>
<td>System applies individual brakes to:&lt;br&gt;• Reduce speed / correct orientation&lt;br&gt;• Reducing tendency to jackknife/slide</td>
<td></td>
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</tbody>
</table>
Forward Collision Warning Systems

- Detection within 500 ft.
  - Lead vehicle within 3 seconds following distance; no tones, yellow light
  - Lead vehicle within 2 seconds following distance; distance closing = tone, orange light
  - Lead vehicle within 1 second following distance; distance closing = tone, red light
  - Lead vehicle within ½ second following distance; continuous tone, red light
Adaptive Cruise Control

- Use data from the CWS and truck through SAE J 1939
- Work to maintain separation of $2\frac{1}{4}$ to $3\frac{1}{4}$ seconds behind followed vehicle
- Decelerates truck by de-fueling the engine, engaging the engine retarder, allowing an automatic transmission to downshift
Deployment Planning

- Work in partnership opportunities
- Support decision-making by providing additional information and data
  - Voluntary functional specifications
  - Technology and Maintenance Council Recommended Practices
  - FMCSA Website Safety and Security System Technology Product Guides
- ATRI/FMCSA On-Board Safety Technology Webinars
What’s Next?

- Assess integration issues
- Continue industry collaboration and information sharing
- Compute costs and benefits for industry
- Future testing for more rigorous evaluations

Safety is Good Business
National Commercial Motor Vehicle Technology Corridor

Tennessee I-40/ I-81/ I-26 Corridor:

Fixed and mobile state-of-the-art facilities for testing and evaluation of CMV enforcement technologies
Benefits

- National Showcase for CMV Enforcement Technologies
- Builds on TDOS’ recent 2006 Motor Carrier Safety Leadership Award
- Venue to test and prove technologies in an actual roadside environment
- Ready location for future field operational tests and implementation
Overview of Projects

◆ Wireless Truck and Bus Inspections

◆ Performance-Based Brake Tester

◆ Smart Infrared Inspection System
CMV Roadside Technology
Corridor Ribbon-Cutting Event

◆ **Date:** August 7, 2007

◆ **Technologies**
  - WRI
  - PBBT
  - SIRIS
  - CVISN
  - Current inspection tools

◆ **Invited Participants**
  - DOT and FMCSA Senior Staff
  - TDOS and TDOT Commissioners Senior Staff
  - Congressional Staff
Motor Carrier Efficiency Study (SAFETEA-LU, 5503)

- Study to identify freight inefficiencies; evaluate the safety and productivity benefits of wireless technologies and conduct, as appropriate, field tests

- Program Elements
  - Fuel monitoring and management systems
  - Radio frequency identification technology
  - Electronic manifest systems
  - Cargo theft prevention
  - Roadside inspection systems

- Phase I, Freight Study, awarded in September 2006
- Phase II, Field Operational Tests, December 2007
Enhanced Rear Signaling for Commercial Motor Vehicles

- Rear-end crashes are one of the most frequent accident configurations in heavy vehicles
- Countermeasures will be evaluated by installing them on a test truck and observing driver behavior
- Final report (November 2006)
SmartPark: Real-Time Truck Parking Information

- Demonstrate technology to provide information on parking availability in real time to truckers
  - Disseminating parking availability information
  - Forecasting availability based on history
  - Diverting truckers from filled parking areas to parking areas with available capacity along a corridor or within a region

- FMCSA awarded contract in late Spring
Tire Pressure Monitoring Systems

**Goals**
- Update/expand previous market research study
- Design/conduct field operational test
- Hold a symposium and public meeting (late 2007)

**Outcomes**
- Determine effectiveness of system in real-world
- Document costs and benefits
- Encourage deployment of systems
Driver Related Projects

- **Employer Notification Service**
  - Burden to discover driver history is on motor carriers
  - Design and prototype national ENS System
  - Started pilot test in Colorado and Minnesota (Dec. 2006)

- **Commercial Drivers’ License 3rd Party Testing Anti-Fraud**
  - Goal – reduce fraud in CDL process
  - Develop IT-based strategies to monitor testing
  - Pilot test software (Summer 2006)
  - Finished final report (Dec. 2006)
CVISN Deployment Program

CVISN is a nationwide initiative managed by FMCSA designed to:

- Improve safety and productivity of commercial vehicles and drivers
- Improve efficiency and effectiveness of commercial vehicle safety programs through targeted enforcement
- Improve commercial vehicle data sharing within states and between states and FMCSA
- Reduce state and industry regulatory costs
CVISN Deployment Program

Funding

- SAFETEA-LU provides FMCSA $25 million/year
- Deploy “Core” capabilities nationwide
  - States must have accepted CVISN Program Plan
  - Receive no more than $2.5 million
- Define, develop, and implement “Expanded” capabilities
  - Certified by FMCSA as completing Core deployment
  - Receive no more than $1 million
- FY’06: $24.75 million
- FY’07: $25 million
Smart Roadside for Commercial Vehicle Operations – Vision

◆ Through the application of vehicle- and infrastructure-based technologies:
  ▼ Commercial motor vehicles operate more safely, efficiently, and securely
  ▼ Roadside enforcement and compliance operations are streamlined and/or improved
  ▼ Commercial vehicles/freight moves efficiently across domestic and international boundaries, as well as into, out of, and through freight facilities
  ▼ Infrastructure is preserved and construction resources are targeted more effectively
Smart Roadside Initiative
Logical Approach

- Commercial Vehicle Operations
  - Safety
  - Security
  - Mobility
- Key Factors Affecting Safety, Security, and Mobility
- Guiding Principles
- Roadmap
- Countermeasures
  - Prototype, Test, and Evaluate
  - Select Concepts
  - Deployment Strategies
  - Deploy Proven Concepts

Outreach/Education and Stakeholder Coordination
Future Projects

- Advance FMCSA’s safety mission
- Adopt, test, and deploy technologies and best practices
- Focus on driver, commercial vehicle, and motor carrier operations
- Contribute to a safe and secure commercial transportation system
Thanks for your attention!

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