NHTSA Heavy Truck Research

- Braking
- Stability Control
- Tire Safety
- Vision Enhancement
- Advanced Technologies

Brake Research: Stopping Distance Program

Technical Goals:

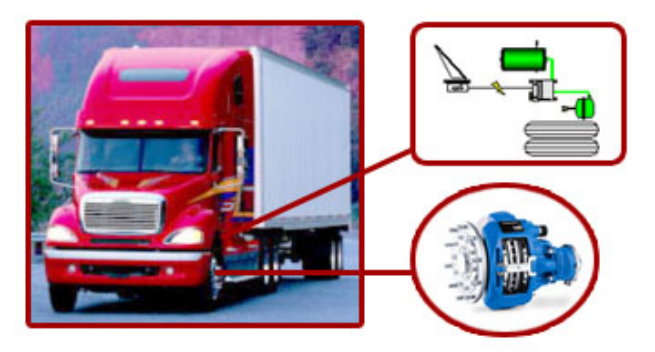
Vehicle Type	Stopping Distance from 60 mph LLVW	Stopping Distance from 60 mph GVWR
Truck Tractors	335 ft => 235 ft	355 => 249 ft
Single Unit Trucks (except buses)		
GVWR > 10k lbs.	335 => 235 ft.	310 => 217
Buses GVWR > 10k lbs	280 => 216	280 => 216 ft
(including school buses)		
Semitrailers, trailers, &	Dynamometer requirement	
converter dollies		

Research mechanisms:

- Test Track (VRTC)
- Simulation (Trucksim, National Advanced Driving Simulator - NADS)
- Dynamometer

Brake Research: Stopping Distance Program

- **Status:**
  - Truck tractor research
    - Successful program/final rule soon
    - Estimate 260 lives saved annually
  - Single Unit Trucks (SUT) & Buses
    - Testing completed:
      - Improved braking assessed for 1 SUT & 1 School Bus
      - Baseline data gathered on 8 additional vehicles (7 SUTs, 1 bus)
    - 1 Additional Class 8 SUT test planned (2008 completion)
  - Trailers: Develop upgraded requirements
  - SUTs, Bus, & Trailer research supports agency rulemaking decisions on FMVSS 121 upgrades



Additional Brake Research Areas

- **Develop an ABS Test for semi-trailers**
  - Required in 1998, but no test defined
  - Rulemaking support research
- **Brake-by-wire research**
  - Field Operational Test completing in 2007.
- **Potential new project areas**
  - Brake-by-wire requirements for FMVSS 121
  - Aftermarket brake linings
    - Use of poor performing replacement linings could reduce effectiveness of new stopping distance rule
  - Motorcoach brake safety (fire safety)

Stability Control Research

- Combination vehicles (tractor semi-trailer)
  - Determine the performance and capabilities of currently available ESC systems
  - Estimate Safety Benefits
  - Develop an objective test(s)

- Straight Trucks & Buses
  - Preliminary benefits assessment (Volpe)

Stability Control Research: Combination Vehicles

- UMTRI / Meritor Wabco Study
  - Safety Problem Definition
  - System Effectiveness Evaluation using hardware-in-the-loop simulation
- NADS Study
  - Evaluate driver performance using HV RSC/ESC
- VRTC Test Track Program
  - Phase 1 - Understand how well HV RSC/ESC works in various maneuvers (2007)
  - Phase 2 – Develop Objective Test (2008-09)

Stability Control Research

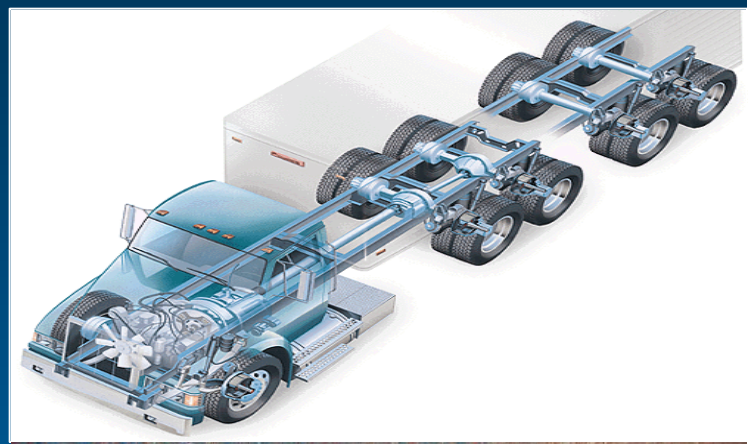
- **National Advanced Driving Simulator RSC/ESC Study**
  - 60+ participant truck drivers
  - Curves, exit ramps, avoidance maneuvers
  - Dry and snow covered road conditions
  - Mid-2008 completion
- **Objective:**
  - Evaluate Human Performance during critical stability "events" with and without RSC/ESC

Stability Control Research

- **VRTC Research:**
  - Phase 1: Understand how these systems perform and their limitations under various maneuvers
    - Testing initiated in 2006
  - Systems being evaluated
    - Tractor Based Systems
      - RSC - Roll Stability Control
      - ESC - Yaw Stability Control + Roll Stability Control
    - Trailer Based Systems
      - Roll Stability Control
  - Phase 2: Objective test development (2008-09)

Tire Safety

- **FMVSS 119 upgrade**
  - New Tires: endurance and high speed testing
  - Retreads:
    - UMTRI Truck Tire Debris Study
      - Crash data analysis of truck tire failures
      - Field collection and analysis of tire debris and failed tires to assess real world tire issues
      - Describe/quantify the retread safety problem
      - Early 2008 completion

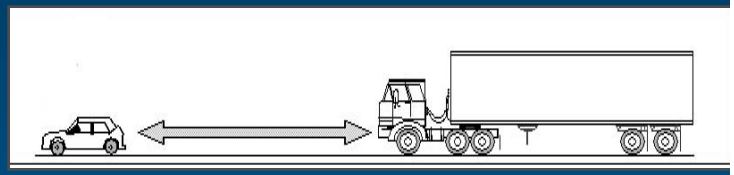


Vision Enhancement

- **Video mirrors to eliminate truck blind spots**
  - Lane change/merge: The largest crash problem for trucks
  - Potential for camera/video imaging technology to replace and/or enhance current rear-view mirror systems (FMVSS 111)
  - Program phases:
    - Performance specification development
      - Sept 2007 completion
    - Development and assessment of a 360 vision system/all weather capability
      - Sept 2008 completion
    - Potential next step – Field Operational Test
  - Collaborative program with FMCSA

Advanced Technology Research

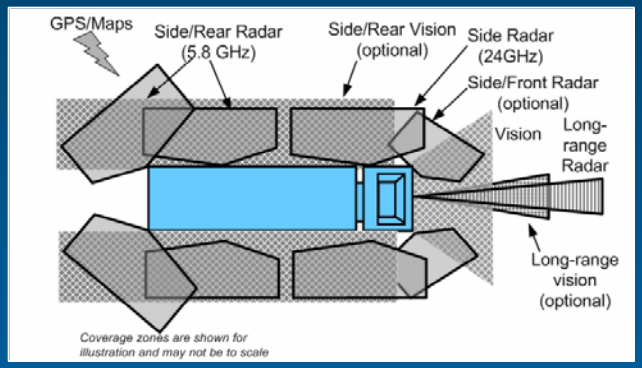
- **Rear Collision Prevention**
  - Rear Collision Warning FOT completed
    - 28% crash reduction estimated
    - System cost still an issue
  - Follow-on work underway to augment safety benefits estimates



- **Lane Tracking**
  - Lane Departure Warning FOT completed (FMCSA managed)
    - 20% crash reduction estimated
  - Follow-on work to augment safety benefits estimates
- **Drowsy Driver Monitoring**
  - Drowsy Driver Warning System FOT
    - Test completed
    - Data analysis ongoing (2008 completion)

Additional Large Truck Safety Research

- **Systems Integration**
  - Integrated Vehicle-Based Safety Systems (IVBSS)
    - Rear-end, road departure, lane change
    - Light vehicle and heavy truck programs
    - Status – on schedule (system design, build prototype vehicles, conduct FOT)
    - Late 2009 completion



- **Wireless Communications for Safety**
  - Develop and test wireless communications for veh-veh and veh-to-infrastructure data transfer, enabling safety and other applications