Federal Motor Carrier Safety Administration
Office of Analysis, Research and Technology

Overview of FMCSA's Research Program

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Research Division

Mission: Conducts systematic studies directed toward fuller scientific discovery, knowledge, or understanding that will improve safety, and reduce the number and severity of commercial motor vehicle (CMV) crashes.

Federal Motor Carrier Safety Administration

Research Division

Research priorities focus on 26 studies in six strategic areas to help the FMCSA achieve its safety goals:

- *Produce Safer Drivers (PSD)* – 15 studies
- *Improve Safety of CMVs* – 5 studies
- *Produce Safer Carriers* – 4 studies
- *Advance Safety through Information-Based Initiatives* – 1 study
- *Improve Security through Safety Initiatives* – presently, no studies
- *Enable and Motivate Internal Excellence* – 1 study

PSD – Driver Fatigue Research

Eight initiatives aimed at reducing fatigue-related crashes.

- **North American Fatigue Management Program (FMP)**
  - FMCSA & Transport Canada are working together to develop a FMP.
  - Components of FMP: sleep apnea screening; training for managers, schedulers, drivers, and drivers' families.
  - Phase III pilot test – evaluating the cost/safety effectiveness of implementing full FMP program in three motor carriers for 1 year.
- **Driver Fatigue Warning System (Phase II – SBIR)**
  - Develop and test prototype system that unobtrusively detects and alerts drowsy drivers to avoid hazardous conditions.
  - The goal is to develop and commercialize a multi-measure fatigue monitoring and warning system in 2013.

PSD – Driver Fatigue Research

- **Impact of Split Sleep of Driver Alertness and Health**
  - This study will examine and evaluate the effects of various split sleep regimens on driver alertness and health.
  - Study will be completed in 2011.
- **Driver Recovery and Napping**
  - FMCSA & Transport Canada are working together to evaluate recovery periods and napping strategies for CMV drivers.
  - Study will investigate and make recommendations regarding the minimum duration of off-duty periods required for CMV drivers to recover from the effects of cumulative fatigue resulting from various work shift conditions.
  - Study will be completed in September 2010.

PSD – Driver Fatigue Research

- **Advanced Fatigue Modeling for Individual Differences (Phase I – SBIR)**
  - The goal of this project is to improve the state-of-the-art in fatigue modeling that could greatly improve driver scheduling and reduce fatigue in CMV drivers.
  - This project will further develop fatigue models to take into account individual differences in fatigue and performance.
  - Request for proposals is out and study will be completed mid-2012.
- **Motorcoach Fatigue Study**
  - This research examines operating practices and driver schedules to develop an authoritative study upon which to support improved regulatory policy.
  - Study will be completed mid-2010.

PSD – Driver Fatigue Research

- **Crash Risk and Driver Operations and Schedules**
  - Study will evaluate Electronic on Board Recorders (EOBR) (logbooks) by operational type and examine the relationship of each to the probability of a crash.
  - Study will examine fatigue-related crash risk by hours of driving on the probability of a crash.
  - Study will be completed in October 2010.
- **Investigation into Motor Carrier Practices to Achieve Optimal CMV Driver Performance**
  - Study will examine the effectiveness of the current restart provision under best/worst case conditions.
  - First phase will be completed in September 2009.

PSD – Driver Risk and Mitigation

Three different driver risk studies and one study that provides drivers with defensive driving tips to mitigate crash risk.

- **Case-Control Driver Individual Differences Study**
  - Study will identify the most critical driver risk factors through a case-control study approach and will collect data on 20,000 drivers.
  - Factors include demographic characteristics, medical conditions, personality traits, attitudes, work environment, and behavioral history.
  - Study will be completed in May 2012.
- **Crash Analysis using Naturalistic & Large Truck Crash Causation Study (LTCCS) Data**
  - Study provides an opportunity to learn about crash causation by analyzing and comparing the LTCCS and naturalistic driving data.
  - Study will be completed in December 2010.

PSD – Driver Risk and Mitigation

- **Driver Distraction Study in CMV**
  - Study is characterizing 20,000 safety-critical events and baseline events recorded in naturalistic driving data.
  - The characterization of these events will focus on identifying secondary tasks and other activities that drivers engaged in prior to the event occurrence. The goal is to assess the frequency and percentage of various distraction types.
  - Study will be completed in April 2009.
- **Defensive Driving Tips for Fleet Safety Managers and Drivers**
  - Study synthesized literature on defensive driving safety and used the LTCCS critical reason framework to organize defensive driving tips.
  - The website provides video examples of “do’s” and “don’ts” for CMV drivers to provide ideas and tips to fleet safety managers and CMV drivers.
  - Study completed in January; webpage launched in February 2009.

PSD – Performance Improvements

Three different studies to improve performance.

- **Simulator Validation for Training CMV Drivers Study**
  - Study is evaluating conventional CMV training vs. simulator-supported training vs. CDL focused training vs. no formal training.
  - "Showcase" the advanced capabilities of simulators to replicate emergency situations and emergency maneuvers and tankers.
  - Study will be completed in September 2010.
- **DriveCam Pilot Test**
  - System integrates in-vehicle video, driving performance management software, and driver counseling. Involved 2 carriers (local and long haul) and a total of 100 vehicles participated in the 16-week pilot test.
  - Preliminary results suggest that training based on information gathered from the system reduced driver errors by nearly 50 percent.
  - Study will be completed in July 2009.

PSD – Performance Improvements

- **Onboard Monitoring System Field Operational Test (FOT)**
  - Goal of this study is to develop and evaluate an onboard monitoring system that measures a set of driving characteristics that are indicators of unsafe driving behavior.
  - Five "core behavioral categories," served as the basis for monitoring:
    1. Speed selection,
    2. Following behavior,
    3. Attention/inattention,
    4. Fatigue, and
    5. General safety (good driving practices).
  - FOT will involve 200 trucks with as many as 1,000 CMV drivers. Received letters of commitment from two large motor carriers.
  - Study will be the largest naturalistic driving study ever conducted.
  - Study will be completed in May 2012.

Improve Safety of CMVs

Five different studies to improve safety of CMVs.

- **Assessing Exposure Risks of Trucking Occupations**
  - This study simultaneously measured air pollution concentrations, noise, and vibration inside truck cabs and sleeping berths while driving in different speeds and idling at a truck stop.
  - Study will be completed in May 2009.
- **Factors that Affect the Service Life of Cargo Tanks**
  - Study will identify factors that affect the service life of cargo tanks
  - Develop guidelines for testing, inspection, assembly and repair of cargo tanks, and develop information needed to propose changes to regulations involving cargo tanks.
  - Study will be completed in June 2009.

Improve Safety of CMVs

- **Engineering and Root Cause Analysis of Motorcoach Fires**
  - Multimodal (NHTSA, FMCSA) root cause analysis investigating, categorizing, and eliminating causes of fires.
  - The findings of the analyses may lead DOT to generate specific, recommendations for preventing future fire incidents.
  - Study will be completed in September 2013.
- **Test and Recommend Improvements to Nurse Tank Safety**
  - Study will measure the stresses on a number of nurse tanks in high failure rate areas of the tanks.
  - Develop an algorithm for predicting which tanks should be taken out of service and make recommendations on proper maintenance.
  - Study will be completed in July 2012.

Improve Safety of CMVs

- **Development of a Low-Cost Device to Increase Safety Belt Use (Phase II – SBIR)**
  - Ongoing research initiative will enter Phase II in FY09 and will explore a low-cost, easily installed device to increase the use of safety belts by CMV drivers.
  - This project will pursue the development of a technology identified in the Safety Belt Technology Countermeasures Study (published Dec 2006).
  - Study will be completed in Jun 2011.

Produce Safer Carriers

Four different studies to produce safer carriers.

- **Safety Impacts of Speed Limiter Devices**
  - The study will collect data to evaluate the impacts of speed limiters. Impacts can be safety as well as economic, through increased fuel economy and reduced maintenance.
  - Study will be completed in July 2010.
- **Effectiveness of Fostering Safety Culture in Motor Carriers**
  - Evaluate effectiveness of proactive business training in partnership with the Service Corps of Retired Executives (SCORE), and regulation training by an accredited third party educator for new entrants.
  - Study will be completed in March 2012.

Produce Safer Carriers

- **Efficacy of Web-Based Instruction (WBI) for Training Motor Carrier Regulations and Best Practices**
  - The study will examine the efficacy of WBI for Training Motor Carrier Regulations.
  - Study will be completed in November 2009.
- **Synthesis of Literature & Operating Safety Practices Relating to Cell Phone/PDAs Use in CMVs**
  - Study will synthesize research literature and identify current cell phone practices (including limitations on the use of PDAs) of carrier operations to identify the magnitude of the use.
  - Study will be completed in February 2010.

Advance Safety Through Information-Based Initiatives

One study to advance safety through information-based initiatives

- **FMCSA/Nlets Research Demonstration**
  - This study will determine the safety benefits and costs of providing more accurate Commercial Driver License Information System (CDLIS) data via Nlets to law enforcement officers.
  - Law enforcement officers need simple status to alert them when to call Motor Carrier Safety Assistance Program (MCSAP)-trained officers to deal with CMV/drivers they have stopped for traffic violations or for other problems indicated by FMCSA's safety data (e.g., carrier out-of-service, no operating authority, etc).
  - Study will be completed in June 2011.

* NLETS: National Law Enforcement Teletype System

Enable & Motivate Internal Excellence

The Research Division is always working to improve its performance and its approach to more effectively and more economically serve its customers within U.S. DOT, at State agencies, and in the industry.

- **Development of the ART Office 5-year Strategic Plan**
  - This effort will update 5-year Strategic Plan, including a crosswalk to the FMCSA's Strategic Plan and the development of performance metrics.
  - Study will be completed in Nov 2010.
- **Conference Support**
  - International Fatigue in Transportation Operations Conference
    - Boston, MA — March 24–26, 2009
  - Human Factors in Driver Assessment, Training, and Vehicle Design
    - Big Sky, MT — June 22–25, 2009
  - Planning for FMCSA/NIOSH/TRB CMV Driver Health & Wellness Conference

Summary

- Research Program provides a balance of research that supports agency and industry.
- Through Strategic Roadmaps and REB process, Research Program is forward looking, taking into account future trends, stakeholder input, and agency needs.
- New partnerships are continuously forged that are key to developing innovative tools to improve safety—from fatigue-alerting technologies to naturalistic driving.
- Research Program has achieved considerable accomplishments given limited staffing resources

Research without Action is Time Wasted,

Action without Research just Passes Time.

Research with Action can Change the World!

Albert Einstein