# Recommendations from the 2004 Research and Technology Stakeholder Forums

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**Office of Research and Technology**

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# Recommendations from the 2004 Research and Technology Stakeholder Forums

The Federal Motor Carrier Safety Administration's (FMCSA) Office of Research and Technology (R&T) conducted two stakeholder forums in the fall of 2004, as part of its ongoing effort to solicit stakeholders' input on the key factors affecting commercial vehicle safety and to identify new research initiatives that stakeholders believe FMCSA should conduct in order to improve commercial vehicle safety. The forums were held on:

- November 17, 2004 – Crystal City, Virginia; and
- November 30, 2004 – Phoenix, Arizona.

The sessions were attended by more than 110 stakeholders, representing motor carriers, safety advocates, academia, state enforcement agencies, insurance companies, the medical community, and vendors/consultants.

The stakeholders recommended approximately 150 specific research projects for FMCSA's consideration. The recommendations were garnered through facilitated break-out sessions. One break-out session at each forum focused on driver and carrier issues; a second break-out session focused on vehicle and environmental issues. The context for the breakout sessions was set at the beginning of each listening session through a kickoff address by FMCSA's senior management (John Hill, FMCSA Chief Safety Officer in Crystal City; and Warren Hoemann, FMCSA Deputy Administrator in Phoenix), a presentation of the preliminary findings from FMCSA's Large Truck Crash Causation Study, and an overview of the new R&T five-year strategic plan.

This summary documents the stakeholders' recommendations captured during the forums. The recommendations are organized into five areas, including:

- Driver-Related Recommendations;
- Vehicle-Related Recommendations;
- Carrier-Related Recommendations;
- Environmental-Related Recommendations; and
- Organizational Recommendations.

## Driver-Related Research Recommendations

Stakeholders at both forums suggested that driver-related research should remain a priority for FMCSA. Due to the importance of the issue and the stakeholders' acute interest in driver-related research, nearly half of the listening session recommendations address driver-related issues. The stakeholders' recommendations focused on eight key areas. These areas include:

1. **Age –** Documenting the safety impact of an aging commercial driver population;

2. **Compensation/Work Environment** – Analyzing the impact of compensation models and work environments on commercial drivers;

3. **Driver Licensing –** Researching the impact of differing state implementations of the commercial driver license (CDL) regulations, the need for equipment-specific CDL endorsements, and the differing standards for interstate and intrastate commercial drivers;

4. **Driver Management –** Investigating new means to improve the monitoring of commercial drivers at their time of hiring and throughout their driving careers;

5. **Medical Qualifications/Health/Fitness –** Analyzing the sufficiency of current medical standards, developing new medical standards as appropriate, strengthening the medical examination process, and documenting the long-term health impacts of driving a commercial vehicle;

6. **Noncommercial Drivers –** Researching alternate means to educate noncommercial drivers who are perceived to be a key cause of commercial vehicle crashes; documenting the public's perception of the trucking industry and its willingness to pay increased consumer prices to support a safer trucking industry;

7. **Operations –** Investigating specific operational issues (e.g., route familiarity, route hazards, construction, vehicle weight) that may impact commercial vehicle safety; and

8. **Training –** Developing new training courses and evaluating the effectiveness of existing training courses/methods. This is viewed as a key component to improving safety.

Table 1 summarizes the stakeholders' specific research recommendations related to commercial and noncommercial drivers.

## Table 1. Driver-Related Research Recommendations

| Recommended Research Focus | Specific Research Recommendation |
|---|---|
| Age | • Study the impact that age has on a commercial driver's performance<br>• Investigate the safety impact of older drivers entering commercial driving as a second career<br>• Investigate the impact of driving experience and determine if experience offsets any deterioration of skills by older commercial drivers |
| Compensation/ Work Environment | • Analyze the safety impact of different commercial driver compensation models<br>• If appropriate, research/identify a new compensation model for commercial drivers that promotes and rewards the safe operation of commercial vehicles<br>• Analyze safety impact of work/life balance (e.g., is working weekends more dangerous, do drivers about to return home operate less safely in order to expedite their return) |
| Driver Licensing | • Investigate the safety impact of differing state regulations/state interpretations of Federal regulations (e.g., state implementation of CDL tests/standards)<br>• Analyze the safety impact of states' implementations of graduated CDLs<br>• Analyze whether airbrakes should require an additional CDL endorsement<br>• Investigate the safety performance of intrastate drivers, especially seasonal and farm drivers<br>• Identify means to make commercial driving a more appealing job option to younger job seekers<br>• Research whether "high-risk" interstate drivers often become intrastate drivers in order to be subject to fewer regulations |
| Driver Management | • Identify skills/performance-based measures to evaluate a commercial driver's proficiency/performance at the time of recertification<br>• Analyze the employment history of "high-risk" drivers and determine if they remain in industry after being dismissed from a company for performance reasons<br>• Review the driver history checks conducted at the point of hiring, and (if necessary) streamline and improve the process |

## Table 1. Driver-Related Research Recommendations (continued)

| Recommended Research Focus | Specific Research Recommendation |
|---|---|
| Driver Management (continued) | • Quantify the safety impact of driver turnover for a carrier<br>• Develop on-board driver monitoring systems to observe driver complacency (e.g., failing to properly check mirrors, being distracted in the cab) |
| Medical Qualifications/Health/Fitness | • Review existing medical criteria for commercial drivers license and ensure that they sufficiently address an individual's ability to operate a commercial vehicle<br>• Develop a methodology to identify commercial drivers that are high risk for medical-related issues<br>• Identify prescription and over-the-counter medications that are most likely to increase a commercial driver's risk of being involved in a crash<br>• Research drug interactions and assess the potential impact on a commercial driver's ability to operate a commercial vehicle<br>• Research the safety impact/risk of commercial drivers afflicted with kidney disease<br>• Study the benefits of developing a clearinghouse for commercial driver medical information from all relevant sources (e.g., FMCSA, National Transportation Safety Board, American Medical Association)<br>• Research the safety impact of states' exemptions to medical standards for commercial drivers (e.g., allowing drivers with certain types of diabetes to operate commercial vehicles)<br>• Identify the most common health/medical conditions affecting the commercial driver population<br>• Develop an information system to track the health condition/medical status of drivers<br>• Investigate the long-term health impacts of being a commercial driver<br>• Develop tests to identify commercial drivers more susceptible to fatigue and recommend appropriate countermeasures (e.g., rescheduling, medication)<br>• Analyze whether commercial drivers are best suited for a particular type of driving (e.g., regularly scheduled day shift driving) based on specific medical criteria (e.g., susceptibility to fatigue, age) |

## Table 1. Driver-Related Research Recommendations (continued)

| Recommended Research Focus | Specific Research Recommendation |
|---|---|
| Medical Qualifications/ Health/Fitness (continued) | • Develop sleep apnea guidelines, including a means to certify that drivers are being treated for sleep apnea and are safe to return to duty, for motor carriers, commercial drivers, and medical professionals<br>• Evaluate existing state models for reporting drug and alcohol positive tests and revoking CDLs based on test results<br>• Evaluate the safety impact of driver health/wellness programs<br>• Develop physical fitness standards for commercial drivers<br>• Assess the safety impact of non-licensed doctors conducting CDL medical exams<br>• Identify best practices in delivering updated and accurate medical qualification information to medical examiners and carriers<br>• Evaluate the impact of the Americans with Disabilities Act (ADA) on commercial vehicle safety |
| Noncommercial Drivers | • Analyze the public's perception of commercial drivers and determine if an outreach campaign would improve public perception/safety<br>• Analyze the economic impact and consumers' willingness to pay increased prices to accommodate the costs associated with making the necessary changes to improve commercial vehicle safety<br>• Investigate "best practices" for outreach to noncommercial drivers<br>• Analyze the effectiveness of disseminating information about driving around commercial vehicles through medical professionals<br>• Investigate the costs, benefits, and feasibility of using alternate delivery mechanisms (i.e., movie trailers, videos in departments of motor vehicles waiting areas, and trailer-side advertising) to communicate safety lessons to noncommercial vehicle drivers<br>• Evaluate programs that provide noncommercial drivers an opportunity to observe the operation of commercial vehicles (e.g., State of Washington's "Step Up and Ride" program) |

## Table 1. Driver-Related Research Recommendations (continued)

| Recommended Research Focus | Specific Research Recommendation |
|---|---|
| Operations | • Research the varying regulations related to drivers operating commercial vehicles enacted by FMCSA and Federal Transit Administration<br>• Analyze the safety impact of a commercial driver's familiarity with his/her route<br>• Analyze the safety impact of operating a commercial vehicle in potentially dangerous environments (e.g., congestion, mountains)<br>• Research the safety impact of nighttime construction and reduced lane widths on commercial vehicles<br>• Study the safety performance of commercial vehicles weighing between 10,000 pounds and 26,000 pounds |
| Training | • Identify "best practices" (e.g., incentives, enhanced monitoring, training) to modify a commercial driver's behavior/safety performance<br>• Identify technology/vehicle-based methods for evaluating a commercial driver's performance/driving personality (e.g., hard-braking may be indicative of aggressive driving or of following too closely)<br>• Research the best training methods/media (e.g., simulators, self-paced training) for specific types of commercial drivers (e.g., older versus younger drivers, experienced versus new drivers, male versus female drivers)<br>• Identify performance-based measures/metrics that can be used to evaluate the effectiveness of a commercial driver training program<br>• Assess the safety impact of ongoing and formalized training programs<br>• Develop training course to teach commercial drivers situational awareness (e.g., proper way to conduct a pre-trip inspection, driving on congested roadways) in order to improve safety and security<br>• Analyze the safety performance of commercial drivers that are trained by schools versus those trained via other means (e.g., military, carriers)<br>• Evaluate the safety benefits of carrier-based certification/driver recognition programs |

**Table 1. Driver-Related Research Recommendations (continued)**

| Recommended Research Focus | Specific Research Recommendation |
|---|---|
| Training (continued) | • Evaluate the suitability of video training, which currently is used by the Federal Transit Administration, for training commercial drivers<br>• Analyze the costs and benefits associated with training commercial drivers using simulators<br>• Research the impact of developing standard personality (e.g., aggressiveness) testing for commercial drivers<br>• Evaluate current programs to train commercial driver trainers to ensure that the trainers' background and experience are sufficient and that the appropriate skills are being tested<br>• Develop training course related to cargo/load securement and impact on safety/operational performance<br>• Develop training course/module that makes safety more "understandable" to commercial drivers<br>• Research the cost/benefits associated with live skid pad training for commercial drivers<br>• Research the benefits of in-cab training versus classroom-based training<br>• Analyze the safety impact of exempting drivers from the required CDL road test |

## Vehicle-Related Research Recommendations

There was a great deal of interest and discussion at this year's forums regarding vehicle-related factors and the range of proposed research topics was much more diverse than in past years. Stakeholders focused their discussions on improving/simplifying the design of commercial vehicles and ensuring that commercial vehicles are operated safely. Based on the stakeholders' discussion, recommendations in the vehicle-related area are organized into two areas:

1. **Design –** Researching how to limit driver information overload, investigating the safety performance of equipment, and studying the redesign of commercial vehicles and its components to improve safety; and

2. **Operations –** Documenting the safest operating conditions/environment for commercial vehicles, researching the commercial drivers' understanding of their vehicles, and investigating how to integrate new applications into existing on-board technologies.

Table 2 summarizes the stakeholders' specific recommendations related to commercial vehicles.

## Table 2. Vehicle-Related Research Recommendations

| Recommended Research Focus | Specific Research Recommendation |
|---|---|
| Design | • Conduct human factors research to assess the current design of commercial vehicle dashboards, reduce the likelihood of information overload, and enhance the display of information to the driver<br>• Evaluate Federal Aviation Administration's "Crew Resource Management" program to identify potential cross-over with commercial driver information overload<br>• Investigate the safety impact of deploying Automatic Intervention Systems to assume control of a commercial vehicle when necessary/appropriate<br>• Analyze the performance of replacement parts versus original equipment. Develop appropriate standards for replacement parts, if necessary<br>• Research means to eliminate the blind spot on the right-front corner of a commercial vehicle<br>• Support the development of fault tolerant brake systems that will compensate for an abnormal occurrence (e.g., failure of one brake, cargo movement in a tank truck)<br>• Investigate safety devices on both passenger and commercial vehicles to reduce the number of commercial vehicles rear-ended in crashes<br>• Investigate whether manufacturers need to know the likely operating speed of a commercial vehicle before effectively designing a brake system for the vehicle<br>• Analyze whether tire spray from commercial vehicle tractors without mud flaps poses a safety risk to other vehicles. Identify countermeasures to issue, if appropriate<br>• Evaluate safety impact of aerodynamic trailers<br>• Analyze the potential safety benefits of lowering a tanker truck's center of gravity<br>• Conduct a safety analysis of vehicle configurations (e.g., dump truck, garbage truck) by roadway type (e.g., urban, rural, congested)<br>• Consider safety impacts when developing new energy efficient commercial vehicles<br>• Research what a redesigned commercial vehicle would look like if it was designed to focus exclusively on safety |

**Table 2. Vehicle-Related Research Recommendations (continued)**

| Recommended Research Focus | Specific Research Recommendation |
|---|---|
| Operations | • Determine what is the safest operational speed for commercial motor vehicles to operate under varying operational scenarios/configurations<br>• Evaluate feasibility of developing a standard pre-trip checklist for commercial vehicles, similar to those used for airplanes<br>• Analyze the safety impact of commercial drivers who are unfamiliar with the vehicles/configurations that they operate from day-to-day<br>• Analyze the safety performance of vehicles equipped with different braking systems<br>• Analyze costs/benefits of Canadian permitting system for longer combination commercial vehicles<br>• Analyze the safety impact of over-the-road equipment (i.e., trailers) being used as storage equipment and being allowed to sit for extended periods of time<br>• Research means to identify the specific parts currently installed on a vehicle for maintenance and enforcement purposes<br>• Investigate whether commercial drivers understand how their vehicle's systems interact (e.g., ABS, automatic transmission) and how to operate the vehicle properly with these systems on-board<br>• Integrate electronic screening systems with existing satellite communication systems<br>• Integrate electronic on-board recorders with existing communication and monitoring systems<br>• Investigate the operational benefits of interoperable transponders and support the interoperability of electronic screening systems |

## Carrier-Related Research Recommendations

Stakeholder discussions related to carriers continued to focus on addressing the role of shippers in commercial vehicle safety and providing "best practice" information to the carrier community. This year's discussions also addressed the carrier community's concerns

about conducting safety research/analysis for fear that the results could be used against them in a legal proceeding. Recommendations in the carrier area are organized around the following areas:

- **Incentives –** Identifying means to encourage carriers to adopt proven safety technologies;
- **Legal –** Studying a carrier's liability in analyzing its internal safety data;
- **Operations –** Researching how to improve the carrier's safety performance, analyzing the impact of outsourced logistics on commercial vehicle safety, and enhancing the current enforcement programs;
- **Outreach –** Identifying improved means of providing information regarding regulations and "best practices" to motor carriers; and
- **Shippers/Shared Liability –** Investigating how best to address the shippers' role in commercial vehicle safety.

Table 3 summarizes the stakeholders' carrier-related research recommendations.

### Table 3. Carrier-Related Research Recommendations

| Recommended Research Focus | Specific Research Recommendation |
|---|---|
| Incentives | • Analyze the most effective means to encourage carriers' adoption of proven safety technologies (e.g., exemption from Federal excise tax, tax credits for conducting internal safety-related research activities, exemptions from inspections and/or compliance reviews)<br>• Coordinate with the insurance industry to determine the feasibility of offering reduced insurance rates for carriers that deploy proven safety technologies<br>• Coordinate with the insurance industry to identify the type of evaluation data that would be required to make a safety technology qualify for a reduced rate<br>• Provide cost/benefit data related to adoption of safety technology to motor carriers<br>• Develop and disseminate a motor carrier business case illustrating the economic and productivity benefits of operating safely |
| Legal | • Study whether legal safeguards need to be enacted to ensure that carriers cannot be held liable for data collected during an internal safety study |

## Table 3. Carrier-Related Research Recommendations (continued)

| Recommended Research Focus | Specific Research Recommendation |
|---|---|
| Operations | • Analyze the safety impact of outsourcing and using third-party carriers to carry freight<br>• Identify the "best practice" from carriers in other countries<br>• Identify the "best" motor carrier regulations from other countries<br>• Analyze the safety impact of increasing the fee for a hazardous material (HM) endorsement for a CDL, which may result in experienced and qualified drivers opting not to retain their HM endorsement<br>• Analyze the security impact of using third-party/outsourced resources to haul freight<br>• Identify and disseminate the "best practices" related to security-related issues (e.g., security plans, driver alertness training)<br>• Analyze the effectiveness/applicability of implementing a program similar to OSHA's Voluntary Protection Plan (VPP), which reduces the number of regulatory interactions for enrolled/safe participants<br>• Identify safety impacts of fleet-based maximum speed limits for commercial vehicles<br>• Analyze the safety impact and economic feasibility of carriers employing safety surcharges for operating in higher-risk (e.g., congested) areas |
| Outreach | • Identify carrier-based "best practices" for driver hiring criteria, driver management, maintenance, work life balance, in-vehicle tools, compensation)<br>• Develop an outreach program focused on what a carrier needs to do to be safe and compliant.<br>• Review state "best practices" for interacting with motor carriers and supporting their compliance with regulations (e.g., Missouri's "How to Survive a Compliance Review," California's Industry Education Program)<br>• Review safety impact of requiring new entrants to pass a safety audit prior to being given final operating authority |

**Table 3. Carrier-Related Research Recommendations (continued)**

| Recommended Research Focus | Specific Research Recommendation |
|---|---|
| Shippers/Shared Liability | • Analyze safety impact of "hold harmless" agreements (which push all responsibility for a shipment to the carrier) on commercial vehicle safety<br>• Investigate the costs, benefits and feasibility of shared liability for carriers, shippers, and commercial drivers<br>• Identify and disseminate the "best practices" for addressing shipper-related issues that affect commercial vehicle safety<br>• Quantitatively analyze the safety impact of pressure to accept loads with unreasonable delivery schedules<br>• Analyze FMCSA's authority regarding the regulation of shippers that load/secure cargo. If necessary, petition Congress for authorization to regulate these entities<br>• Evaluate the Federal government's regulation of shipments via commercial airlines to identify parallels that may assist FMCSA regulate shippers of interstate freight via truck |

## Environment-Related Research Recommendations

Stakeholders indicated that the relationship between environmental factors and commercial vehicle safety was an area in need of additional FMCSA research. Discussions in this area focused on improved delivery of roadway condition information to motor carriers and commercial drivers, as well as the rest areas. Recommendations in this area are organized around the following areas:

- **Design –** Ensuring that the design of the nation's roadways support the safe operation of commercial vehicles;
- **Operations –** Identifying the best means for delivering real-time roadway condition information to commercial vehicle operators; and
- **Rest Areas –** Analyzing the sufficiency of the nation's rest areas, identifying alternate means of providing rest areas for commercial drivers, and investigating the impact of state and local statutes on commercial vehicles' use of rest areas.

Table 4 summarizes the stakeholders' recommendations related to environmental factors.

## Table 4. Environment-Related Research Recommendations

| Recommended Research Focus | Specific Research Recommendation |
|---|---|
| Design | • Analyze the safety impact of national roadway and signage design standards (e.g., height of street signs which are typically are in a commercial driver's line of sight) on commercial vehicle safety<br>• Develop a national database to capture the location of roadway crashes<br>• Analyze costs/benefits and deployment models for truck only lanes<br>• Investigate traffic control systems that consider approaching commercial vehicles in its decision to cycle the lights from green to yellow, which may cause the vehicle to stop abruptly |
| Operations | • Identify best means to communicate roadway conditions (e.g., moisture, temperature) to commercial drivers and carriers<br>• Identify "best practices" for notifying over-dimensional permitting authorities of construction/work zones, which may impact the routing of commercial vehicles<br>• Conduct a cost/benefit analysis of fixed versus virtual weigh stations |
| Rest Areas | • Determine whether the nation's rest area capacity is sufficient to accommodate commercial vehicles today and into the future, given the recent rest area closings due to state budget constraints<br>• Analyze alternate rest area designs (i.e., parking strips used in Wyoming)<br>• Analyze which scenario is safest for commercial drivers: a) park on a roadway shoulder to obtain necessary rest when rest areas are full or b) driving until the driver can find a legal place to park and rest<br>• Coordinate response to issues related to rest areas among FMCSA, FHWA, and state DOTs<br>• Investigate the use of currently available satellite imaging services to analyze the capacity of rest areas<br>• Investigate safety impact of state/local limits on parking time/limits on idling time in a rest area |

## Organizational Recommendations

Participants in the 2004 R&T Stakeholder Forums also recommended a series of organizational improvements for FMCSA. These recommendations were designed to make FMCSA a more effective agency and to improve commercial vehicle safety. The specific recommendations in this area include:

- Streamlining the FMCSA web site to make the information more easily accessible, as well as more accurate;
- Creating a "What do I need to do to comply" application (i.e., wizard) for motor carriers on the FMCSA web site to help carriers navigate Federal and state regulations;
- Providing more "hands-on"/operational experience for FMCSA staff, such as "ride-alongs" in commercial vehicles or requiring them to qualify for a CDL;
- Analyzing the benefits of FMCSA becoming more of an "advocate" for the motor carrier and motor coach industries, similar to FAA advocating for civil aviation;
- Analyzing the costs/benefits and feasibility of FMCSA endorsing products and stating that they meet Federal regulations/guidelines;
- Enhancing the dissemination of information related to results from safety technology evaluations;
- Organizing an industry advisory panel, similar to the Federal Railroad Administration's Rail Safety Advisory Committee (RSAC);
- Ensuring security-based regulations do not adversely affect commercial vehicle safety;
- Providing safety data (e.g., safety and cost/benefits) to Congress in advance of legislation being drafted, in an attempt to frame/scope new legislation before it becomes law;
- Analyzing the impact of different reporting/accuracy rates for state safety data on a carrier's SAFESTAT score;
- Analyzing the lack of "at fault" crash data in the SafeStat algorithm on a carrier's SafeStat score; and
- Supporting the development of collaborative industry initiatives (e.g., a safety consortium for small carriers) and/or act as a broker to foster sharing of resources within industry (e.g., sharing resources to purchase simulators, carriers allowing vehicles from other firms to use their parking lots).