

Programs of the Federal Motor Carrier Safety Administration (FMCSA) encompass a range of issues and disciplines, all related to motor carrier and bus safety and security. FMCSA's Office of Research and Analysis, which includes the Research, Technology, and Analysis Divisions, defines a "research program" as any systematic study directed toward fuller scientific discovery, knowledge, or understanding that will improve safety, and reduce the number and severity of commercial motor vehicle crashes. Similarly, a "technology program" is a program that adopts, develops, tests, and/or deploys innovative driver and/or vehicle best safety practices and technologies that will improve safety and reduce the number and severity of commercial motor vehicle crashes. An "analysis program" is defined as economic and environmental analyses done for the agency's rulemakings, as well as program effectiveness studies, state-reported data quality initiatives, and special crash and other motor carrier safety performance-related analyses. A "large truck" is any truck with a Gross Vehicle Weight rating or Gross Combination Weight rating of 10,001 pounds or greater.

Currently, FMCSA's Analysis, Research and Technology Divisions are conducting programs in order to produce safer drivers, improve safety of commercial motor vehicles, produce safer carriers, advance safety through information-based initiatives, and improve security through safety initiatives. The study described in this Tech Brief was designed and developed to support the Research and Technology Divisions' strategic objective to produce safer drivers. The primary goals of this initiative are to ensure that commercial drivers are physically qualified, trained to perform safely, and mentally alert.



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# Training of Commercial Motor Vehicle Drivers—A Synthesis of Safety Practice

## Background

In 2004, large trucks accounted for 3% of the nation's registered vehicles, 8% of traffic volume, and 12% of all fatal crashes (Federal Highway Administration [FHWA], 2004, and Fatality Analysis Reporting System [FARS] 2004). To reduce the incidence of preventable crashes, training programs are offered as a countermeasure to improve fleet safety by improving the skills and knowledge of commercial drivers. There are many schools – some operated commercially, and some operated privately by large carriers – with differing objectives, facilities, and staff orientation. FHWA provides a list of discriminating factors in its Commercial Vehicle Preventable Accident Manual: A Guide to Countermeasures (Uzgiris et al., 1991): curriculum content, adequacy of facilities, compatibility of training vehicles with company fleet, staff qualifications and experience, certification, referrals, and hours of actual driving instruction and practice.

This synthesis focuses upon similarities and differences in training strategies and curricula among existing driver training programs, with a goal of identifying those commercial motor vehicle (CMV) driver training tools and techniques that hold the greatest potential to improve CMV safety. In particular, the need to ensure adequate knowledge and skills for entry-level drivers guided this research effort.

## Sources of Trained Drivers

There are three primary sources of trained drivers: private schools that charge tuition and may receive some funding through government programs; public junior colleges and community colleges that offer transportation programs that include truck driver training; and the carriers themselves, who provide training either in place of, or to augment, what is provided by schools. Traditionally, formal training programs include three components: classroom instruction, skills training in a restricted (off-road) area, and on-the-road instruction. No Federal entry-level standards for commercial driver training exist, with the exception of the recently passed minimum requirements (Federal Register, 2004) for training in four topics, estimated to require 10 hours of training for heavy truck and motorcoach drivers. However, a *de facto* curriculum standard for the training of new truck drivers is published by the Professional Truck Driving Institute (PTDI). This evolved from an earlier curriculum published by FHWA in 1985.

## Standards for Instructors

There also are no standards for the instructors who deliver training materials (outside of those for instructors at PTDI-certified institutions). Based on observations by those with lengthy industry experience, that instructor knowledge

and skill are at least as important to both the instructional process and a student's subsequent safety record as curriculum content. Once drivers have obtained a commercial driver's license (CDL), any additional training they receive will most likely be provided by their employers and is typically reactive rather than proactive. That is, aside from an orientation to company policies and procedures, only drivers identified as "high risk" will receive supplemental vehicular training over the minimum needed to qualify for the CDL. Most drivers do not drive for major carriers that conduct this level of training, and those who do may not stay long enough to complete supplemental programs.

Unfortunately, as the need for trained drivers has increased, recent trends show a decline in the number of formal programs offering commercial driving instruction. Identifying and documenting best practices for commercial driver training will help ensure that the most effective methods are applied, for the health of the industry and for the safety of the driving public.

### Objectives and Scope

The objectives of this research were to identify and document CMV driver training programs and practices, with a focus on large trucks and buses, resulting in a synthesis of practices that will be useful to truck and bus carriers as well as State departments of transportation (DOTs) and departments of motor vehicles (DMVs).

The scope of the study included a comprehensive literature review, complemented by a survey of selected truck and bus companies, industry associations, and public and private driving schools. The information sought in the literature review and survey permitted the research team to identify and examine (1) similarities and differences in training strategies among existing driver training programs, (2) similarities and differences in the curricula applied in selected training programs, and (3) the extent to which simulator- and computer-based technologies can be used to enhance the effectiveness of commercial driver training programs.



A driver is being tested in a truck simulator.

### Research Methods

An exhaustive technical information search was conducted to pinpoint knowledge domains used in driver training programs delivered by truck driving schools and the commercial vehicle industry. Journal articles, government research publications and study reports, and trade papers were identified and acquired to meet this need from the following sources: electronic information and abstracting database services; State DOT library and information centers; and professional organizations devoted to driver training and education, highway safety, and commercial driver issues (e.g., the American Driver and Traffic Safety Education Association, the American Association of Motor Vehicle Administrators, the Insurance Institute for Highway Safety, and the AAA Foundation for Traffic

Safety). The electronic index and abstract databases on transportation and highway safety topics that were searched included Transportation Research Information Services (TRIS) online; SilverPlatter's TRANSPORT CD-ROM (database includes bibliographic information from TRIS, the Organization for Economic Cooperation and Development, and the European Conference of Ministers of Transport); other transportation and education databases from DIALOG (e.g., Compendex, ERIC, and NTIS); and the internet (using various search engines, such as Yahoo, Google, and Lycos). Search terms included *commercial motor vehicles, CMV, bus, truck, training, driver education, skills programs, driving performance, commercial driver license requirements, and operator needs and deficiencies*. Based on the project team's review of abstracts for all candidates, 28 technical documents were prioritized for review and synthesis.

A key element in the project was to gain the perspective of experts regarding what works (and what does not work) in training entry-level CMV drivers to perform safely under a full range of operating conditions. To this end, lists of potential survey contacts were drafted, reviewed by project consultants with close ties to the trucking industry, and augmented to reflect the consultants' input. The preliminary list of truck driving schools was narrowed to focus on vocational/technical school and community college programs that have received PTDI certification, highlighting those that have been recognized as an "Editor's Pick" by the All-American Truck Driving School Guide. A total of 24 schools were selected to receive surveys in this research. Similarly, a list of 42 truck and bus companies that received a safety-related reward or recognition in 2002 – such as a National Industrial Safety Contest winner or National Truck Safety Contest winner – or that were identified by project consultants as having exemplary training practices, were selected as candidate information sources. Finally, 23 organizations were identified as potentially useful survey respondents in this project, including government safety organizations, professional and trade associations, and insurers of commercial carriers. Bus, truck, Canadian, and U.S. interests were all represented in the final list of survey recipients.

A 12-question survey was developed based on the information gleaned from the literature review, then revised in accordance with suggestions by the project consultants. The survey was sent to the groups described above, and five schools, three trucking companies, and one bus company responded. Interestingly, over one quarter of the truck and bus companies that were contacted but did not complete the survey advised that they neither hire entry-level drivers nor provide additional in-house training; instead these companies require new hires to have a minimum of 2 years (or 100,000 hours) of verifiable experience and a clean record. Information obtained from the survey respondents was used to (1) augment the results of the literature review in characterizing current training practices, and (2) support inferences about the effectiveness of specific, enhanced training practices and approaches for entry-level CMV drivers.

Because respondents were assured that their individual responses would remain anonymous, schools and companies that participated in the data collection activity are not identified in the summary. While the survey return rate in this project was disappointing, many comments about training needs for entry-level CMV drivers were generated by schools, associations, and carriers in response to the Notice of Proposed Rulemaking by the FMCSA, posted in the Federal Register on August 4, 2003, and earlier in an Advance Notice of Proposed Rulemaking, posted on June 21, 1993.

Availability: The synthesis report "Training of Commercial Motor Vehicle Drivers-A Synthesis of Safety Practice" is available at the Transportation Research Board and can be found at [www.trb.org](http://www.trb.org).

Key Words: Bus, CMV, carrier safety, commercial motor vehicle, heavy vehicle, intelligent transportation systems, motorcoach, truck

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## Conclusions

A number of recommended practices for improving training effectiveness for entry-level CMV drivers are supported by this synthesis:

- Industry-wide acceptance of, and adherence to, standards put forward by the PTDI as a minimum requirement for entry-level (2nd seat) drivers and for the certification of driver trainers.
- Finishing training for 1st seat (solo) drivers. (This may be accomplished through Partnerships between schools and industry to provide the PTDI-recommended externship experience or by carriers who provide over-the-road, one-on-one training using certified company driver-finishing trainers for a number of miles or hours that are specified in advance and tied to performance-based criteria.)
- Substitution of multimedia instructional materials, delivered via CD/DVD-ROM, for traditional classroom presentations relying on printed materials.
- Introduction or expansion of appropriate uses of affordable simulation options.
- Expansion of the use of skid pads to train beginning drivers 1) about stopping distances under different load configurations, 2) how to use different brake systems (including all antilock braking systems [ABS], mixed ABS, and non-ABS), and 3) how to handle and stop a vehicle on a wet surface (including skid control).
- Employment of videos, in concert with testimonials by experienced drivers, to give entry-level trainees a realistic orientation to health, wellness, and lifestyle issues and to provide fitness-to-drive instruction.