

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

This synthesis is a review and survey of Effective Commercial Truck and Bus Safety Management Techniques. Motor carrier safety management involves a number of diverse practices ranging from equipment management (e.g., preventive maintenance) to driver-safety incentive programs. This synthesis study identifies major safety management problems of concern to motor carrier safety managers and other industry experts. More important, it describes available approaches to enhanced safety, cites evidence for their effectiveness, and generates hypotheses for new R&D on commercial truck and bus fleet safety management practices.

A rich body of scientific literature exists regarding military and industrial safety management practices. In the U.S. military, these practices have been formalized as various military standards. In industry, there is a major discipline called “system safety.” Unfortunately, such an extensive body of literature does not exist relating to the management of CMV operations and drivers, even though truck driving is the most hazardous U.S. occupation, more than 5,000 fatalities occur annually in truck crashes, and per-vehicle crash costs for tractor-trailers are more than four times those of other vehicle types.

Most CMV safety managers are former drivers who have come up “through the ranks” to a management position. Many progressed from being independent owner-operators to owning and managing their own fleet. Safety, proficiency, and productivity as a driver are likely to be factors that enable these individuals to progress to fleet ownership or a management position. The lessons they have learned on the job are applied to their management of others. However, most CMV safety managers have not had formal training in management, system safety, or the human factors of driving safety. Thus, their effectiveness as safety managers is likely to vary widely, with gaps in their knowledge of various safety problems or available management solutions. A necessary step toward making such knowledge available to carrier safety managers is the systematic compilation of information relating to CMV safety management and the establishment of a common body of knowledge that would serve as the basis for improved training for managers or other means of disseminating safety management information to them.

A strategic goal identified by the FMCSA in its strategic planning process conducted in 2000 was to “facilitate improvement in the overall safety performance of the motor carrier industry through refined and enhanced safety management systems.” Accordingly, FMCSA’s Research and Technology (R&T) program includes a focus area on “Carrier Compliance and Safety” (FMCSA, 2001). A major goal of this R&T area, in addition to supporting the agency’s enforcement program, is to improve carrier safety by applying principles of safety management from other industries and by compiling best management practices from the motor carrier and other industries and communicating these to motor carrier managers. In a recent FMCSA R&T study called “Driver, Vehicle, and Roadside Strategies for 2010” (FMCSA, 2002), lack of adequate managerial oversight by carriers was cited as one of five high-priority safety problem areas. This synthesis, in addition to directly supporting CMV fleets and industry segments, is intended to assist FMCSA by providing a review of the literature and best practices relating to safety management. The synthesis summarizes various safety management approaches and practices applicable to the management of drivers and vehicles, and generates hypotheses for new research on CMV fleet safety management practices.

1.2 SCOPE

Appendix B contains the Statement of Work (SOW) for the research project. According to this SOW, this research project focuses on safety management issues and approaches applicable to CMV—truck and bus—transportation.

The research project focuses on the “what” and the “how” of CMV safety management. “What” refers to the principal safety issues, problems, or sources of crash risk that must be addressed by CMV safety management practices. This includes deficiencies in driver skill, knowledge, or safety behavior; fatigue and other sources of impairment; physical and medical problems, attitudes, morale, and turnover; vehicle inspection and maintenance; and the problem of high-risk drivers associated with any of these problem areas.

“How” refers to the techniques and approaches employed. Major safety management approaches to be addressed include those relating to driver recruitment, selection, carrier-based training, management-driver communications, driver safety-

performance evaluation, safety incentives, BBS, OBSM, event-data recorders, accident investigation, improved driver scheduling and dispatching, fatigue management, carrier-based medical programs, preventive maintenance and vehicle inspection, advanced safety technologies, and industry-based safety standards and certification. In some cases, there is a one-to-one correspondence between problems and approaches; thus, for example, CMV driver fatigue is addressed as an issue, and fatigue management programs are addressed as safety management approaches. In most cases, however, the techniques and approaches apply to more than one specific safety issue.

Principally, this research project relates to CMV operations that transport cargo or passengers in interstate commerce, and to which the FMCSRs are applicable. However, the synthesis does not primarily address the management of *compliance* with federal and other motor carrier safety regulations. In the research project, regulatory compliance has been viewed as an essential *prerequisite* for safe commercial vehicle operations, but not as sufficient to ensure safe operations. It is assumed that active safety management approaches going *beyond compliance* are necessary to achieve high operational safety.

CMV safety management is a broad and loosely defined topic. This research project is not intended to address the broad spectrum of motor carrier safety issues. In particular, the research project does *not* address government or industry policy issues. Moreover, the following topics are not addressed:

- FMCSA or other federal, state, or local government policy or regulations (beyond discussions of how carriers can achieve better compliance with these regulations).
- Government enforcement programs or other safety programs implemented by government as opposed to being implemented at the carrier level. This includes public information campaigns and roadway design and operational practices.
- The conduct of driver alcohol and/or drug testing or any similar government-mandated safety requirements.
- The technical details of CMV design or vehicle-based safety technologies. Technologies are addressed as tools of safety management, but there are no detailed discussions of the mechanisms or application of specific vehicle design features or technologies.
- Advanced communication and information systems. These technologies are relevant, indeed important, to fleet safety management but involve too many technical and operational issues to address in this research project.
- Commercial driver training, except as may be practiced by a carrier as an adjunct to driver safety management. Thus, carrier-based apprentice and “finishing” approaches are discussed, but entry-level or other school-based CMV driver training is not. A future research project will address best practices for training CMV drivers.

- Non-transportation related operational safety issues, in particular injuries related to cargo loading and unloading, or other loading dock safety or security issues not involving moving vehicles.

1.3 APPROACH

Information on CMV safety problems and solutions was obtained through several major approaches. The primary vehicle for obtaining information was project surveys. Two parallel survey forms were employed: (a) one for current CMV fleet safety managers and (b) one for other experts in motor carrier safety. This synthesis is structured primarily around the survey findings and their implications. Interviews and focus groups were also conducted with key individuals and groups involved in motor carrier safety, including FMCSA and major trade associations.

Supporting the survey and interview findings is information obtained from literature reviews relating to the various topics of CMV safety management. The literature review employed Transportation Research Information System (TRIS) and other reference systems to identify relevant publications in the transportation literature. Also reviewed were FMCSA research publications; American Trucking Associations (ATA) and other industry trade association publications; the traffic safety research literature (e.g., journals such as *Accident Analysis & Prevention*); the industrial safety management literature (e.g., *Journal of Safety Research*, *Journal of Organizational Behavior Management*, *Professional Safety*, *Occupational Health & Safety*); the applied behavioral science literature (e.g., *Journal of Applied Behavior Analysis*, *Journal of Applied Psychology*); proceedings of recent conferences focusing on truck and bus safety (e.g., April 2002 International Truck & Bus Safety Symposium in Knoxville); and the web pages of safety services vendors. A few specific information sources providing extensive information to the project are described below in Section 1.4.

In addition to reporting results from the surveys, literature review, and other information sources, the project team selected four safety issues for more detailed discussion in Chapter 5. The four selected topics are (1) driver health, wellness, and lifestyle; (2) high-risk drivers; (3) behavioral safety management; and (4) safety management professionalism.

These four areas were not necessarily the highest-rated in the surveys, but rather were selected by the project team based on overall consideration of available information. In particular, these areas have received relatively little attention in relation to their apparent importance or potential benefits to the CMV industry. Chapter 5 summarizes project evidence and other literature relating to these areas and offers recommendations for future government, industry, and academic initiatives relating to them.

This synthesis concludes with recommendations for R&D that might be performed to create new knowledge and tools to address specific issues and safety opportunities identified

in the synthesis. Both “research” and “development” are conceived broadly and may include many different types of initiatives undertaken by various parties and stakeholders involved in motor carrier safety.

Appendixes to the report include TRB’s CTBSSP program description and the SOW for this research project. In addition, the two project survey forms are provided. Finally, there is an appendix containing 16 safety management job aids (for managers and drivers) developed by the CMV industry, including trade associations, insurance companies, and fleets. These do not represent a comprehensive set of such job aids needed by carrier safety managers, but they are excellent examples of practical tools that managers can use to enhance the safety of their fleet operations.

1.4 SUMMARY OF SELECTED MAJOR SOURCES

Although the scientific literature relating to CMV safety management is not extensive, there have been several other recent projects that have compiled information on the topic; in particular, on various safety management practices of motor carrier fleets. The following specific information sources relate directly to carrier safety management and are cited frequently in this synthesis. All are recommended to individuals seeking additional information on CMV safety management.

1.4.1 SafeReturns

In 1999, the American Trucking Associations Foundation (ATAF), in conjunction with the Parker-Young Company, published *SafeReturns: A Compendium of Injury Reduction and Safety Management Practices of Award Winning Carriers*. The study (ATAF 1999a, Olsgard 1999) employed case studies, workshops, and surveys involving safety managers. Analysis of the surveys included some comparisons of the responses of safety managers of outstanding fleets to those of a more general sample to identify critical practices. The report reviewed various management “tools for success” (management practices); methods to minimize loading/unloading injury risks (an area not covered by this synthesis); highlights of survey findings; and examples of various safety management tools, such as interview guides and questions relating to fleet safety management programs.

1.4.2 Truck Driver Risk Assessment Guide

The ATAF, in collaboration with the Driver Training and Development Alliance, produced this document (ATAF 1999b) as an aid to carrier safety managers. The FMCSA (then the FHWA Office of Motor Carrier and Highway Safety) supported the project. The full report title is: *Truck*

Driver Risk Assessment Guide and Effective Countermeasures; Recommended Management Practices. The guide is organized into three major parts: Driver Selection, In-Service Performance, and Personal Issues (including at-risk behaviors and health/wellness). Appendixes provide specific tools for improved management, including a structured driver interview form, driving performance standards by driving task, trainee evaluation form, pre- and post-trip vehicle inspection checklists, templates for evaluation letters (positive and corrective) to drivers, employee appraisal form, driver performance evaluation form, summary of an example driver reward/incentive program, sample company policies for accidents and traffic violations, accident reporting and investigation procedures, a summary of BBS principles, fleet guidelines and checklist for alcohol/drug testing, alcohol/drug testing Qs & As, alcohol/drug testing release for information from previous employer, and a sample fleet drug/alcohol policy.

1.4.3 I-95 Corridor Coalition: Best Practices in Motor Carrier Safety Management

The Pennsylvania Department of Transportation, through the Pennsylvania Transportation Institute of Pennsylvania State University conducted several studies on carrier safety management which were completed in August 2001. Two related studies were especially relevant to this research project.

Volume I of the series (Stock, 2001) addressed best practices in motor carrier safety management by conducting a survey of state motor carrier association members in several Northeastern states. The nearly 600 respondents to the survey were considered to represent a sample of the best safety performers. The survey addressed the importance of various safety programs to overall fleet safety; examples included driver hiring criteria, driver retention, in-house and outside training, top management commitment, safety meetings and awareness programs, safety incentive programs, driver monitoring, and accident review.

Volume IV of the series (Stock, Rood, and Hammer 2001) developed, pilot tested, and evaluated motor carrier safety education/outreach materials for safety managers. Specific products developed included a 3-hour seminar, a brochure highlighting frequently-used management practices of safe carriers, and an interactive, web-based “safety toolbox” (<http://safetytoolbox.uconn.edu>) to allow motor carriers to benchmark their safety management practices against the 600 survey respondents, who generally represented top carriers.

1.4.4 FMCSA/UM Survey of Safest Motor Carriers

Under the sponsorship of the FMCSA, the University of Maryland (UM) Supply Chain Management Center of The

Robert H. Smith School of Business conducted a survey of “best safety performers” to identify and define their safety management programs and policies (Corsi and Barnard 2003). The survey was conducted in 2002, concurrently with the present research project. The study addressed many of the same safety management practices addressed in this report, and its findings are cited extensively in Chapter 4 of this synthesis. Corsi and Barnard identified safety performance leaders through a two-step process, which included review of Safe-Stat performance data and recommendations from FMCSA State Safety Directors. An extensive survey was completed by 148 safe carriers and formed the basis for their report. Their study will be used by FMCSA to support various motor carrier safety programs, including the “Safety is Good Busi-

ness” outreach program to carriers, which is currently under development.

The FMCSA/UM study included some general questions on the importance carriers place on safety management issues. Many of their respondents believed, for example that carrier safety management involves more than just compliance with public safety regulations. The majority agreed (at various levels of agreement) with the statement that “Cost is no issue when it comes to highway safety decisions at our company.” There was strong agreement with the idea that “customer service and highway safety performance go hand-in-hand.” These core safety values are reflected in various specific safe carrier management practices identified in their report and also addressed in the research project.
