Commercial Motor Vehicle Carrier Safety Management Certification

Commercial Truck and Bus Safety

Synthesis 12

Commercial Motor Vehicle Carrier Safety Management Certification

A Synthesis of Safety Practice

Sponsored by the
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COMMERCIAL TRUCK AND BUS SAFETY SYNTHESIS PROGRAM

Safety is a principal focus of government agencies and private-sector organizations concerned with transportation. The Federal Motor Carrier Safety Administration (FMCSA) was established within the Department of Transportation on January 1, 2000, pursuant to the Motor Carrier Safety Improvement Act of 1999. Formerly a part of the Federal Highway Administration, the FMCSA's primary mission is to prevent commercial motor vehicle-related fatalities and injuries. Administration activities contribute to ensuring safety in motor carrier operations through strong enforcement of safety regulations, targeting high-risk carriers and commercial motor vehicle drivers; improving safety information systems and commercial motor vehicle technologies; strengthening commercial motor vehicle equipment and operating standards; and increasing safety awareness. To accomplish these activities, the Administration works with federal, state, and local enforcement agencies, the motor carrier industry, labor, safety interest groups, and others. In addition to safety, security-related issues are also receiving significant attention in light of the terrorist events of September 11, 2001.

Administrators, commercial truck and bus carriers, government regulators, and researchers often face problems for which information already exists, either in documented form or as undocumented experience and practice. This information may be fragmented, scattered, and underevaluated. As a consequence, full knowledge of what has been learned about a problem may not be brought to bear on its solution. Costly research findings may go unused, valuable experience may be overlooked, and due consideration may not be given to recommended practices for solving or alleviating the problem.

There is information available on nearly every subject of concern to commercial truck and bus safety. Much of it derives from research or from the work of practitioners faced with problems in their day-to-day work. To provide a systematic means for assembling and evaluating such useful information and to make it available to the commercial truck and bus industry, the Commercial Truck and Bus Safety Synthesis Program (CTBSSP) was established by the FMCSA to undertake a series of studies to search out and synthesize useful knowledge from all available sources and to prepare documented reports on current practices in the subject areas of concern. Reports from this endeavor constitute the CTBSSP Synthesis series, which collects and assembles the various forms of information into single concise documents pertaining to specific commercial truck and bus safety problems or sets of closely related problems.

The CTBSSP, administered by the Transportation Research Board, began in early 2002 in support of the FMCSA's safety research programs. The program initiates three to four synthesis studies annually that address concerns in the area of commercial truck and bus safety. A synthesis report is a document that summarizes existing practice in a specific technical area based typically on a literature search and a survey of relevant organizations (e.g., state DOTs, enforcement agencies, commercial truck and bus companies, or other organizations appropriate for the specific topic). The primary users of the syntheses are practitioners who work on issues or problems using diverse approaches in their individual settings. The program is modeled after the successful synthesis programs currently operated as part of the National Cooperative Highway Research Program (NCHRP) and the Transit Cooperative Research Program (TCRP).

This synthesis series reports on various practices, making recommendations where appropriate. Each document is a compendium of the best knowledge available on measures found to be successful in resolving specific problems. To develop these syntheses in a comprehensive manner and to ensure inclusion of significant knowledge, available information assembled from numerous sources, including a large number of relevant organizations, is analyzed.

For each topic, the project objectives are (1) to locate and assemble documented information; (2) to learn what practice has been used for solving or alleviating problems; (3) to identify all ongoing research; (4) to learn what problems remain largely unsolved; and (5) to organize, evaluate, and document the useful information that is acquired. Each synthesis is an immediately useful document that records practices that were acceptable within the limitations of the knowledge available at the time of its preparation.

The CTBSSP is governed by a Program Oversight Panel consisting of individuals knowledgeable in the area of commercial truck and bus safety from a number of perspectives—commercial truck and bus carriers, key industry trade associations, state regulatory agencies, safety organizations, academia, and related federal agencies. Major responsibilities of the panel are to (1) provide general oversight of the CTBSSP and its procedures, (2) annually select synthesis topics, (3) refine synthesis scopes, (4) select researchers to prepare each synthesis, (5) review products, and (6) make publication recommendations.

Each year, potential synthesis topics are solicited through a broad industry-wide process. Based on the topics received, the Program Oversight Panel selects new synthesis topics based on the level of funding provided by the FMCSA. In late 2002, the Program Oversight Panel selected two task-order contractor teams through a competitive process to conduct syntheses for Fiscal Years 2003 through 2005.

NOTICE

The project that is the subject of this report was a part of the Commercial Truck and Bus Safety Synthesis Program conducted by the Transportation Research Board with the approval of the Governing Board of the National Research Council. Such approval reflects the Governing Board's judgment that the program concerned is appropriate with respect to both the purposes and resources of the National Research Council.

The members of the technical committee selected to monitor this project and to review this report were chosen for recognized scholarly competence and with due consideration for the balance of disciplines appropriate to the project. The opinions and conclusions expressed or implied are those of the research agency that performed the research, and, while they have been accepted as appropriate by the technical panel, they are not necessarily those of the Transportation Research Board, the National Research Council, or the Federal Motor Carrier Safety Administration of the U.S. Department of Transportation.

Each report is reviewed and accepted for publication by the technical panel according to procedures established and monitored by the Transportation Research Board Executive Committee and the Governing Board of the National Research Council.

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COOPERATIVE RESEARCH PROGRAMS

FOREWORD

By Christopher W. Jenks
CTBSSP Manager
Transportation Research Board

This synthesis will be useful to federal and state agencies, commercial truck and bus operators, and others interested in improving commercial vehicle safety. The synthesis documents current information on existing commercial motor vehicle safety certification, self-evaluation, benchmarking, and best practices programs; identifies major common elements and protocols; and critically assesses evidence for the crash-reduction effectiveness of the programs. It includes a survey of truck carriers and other applicable industries and relevant organizations for their experiences. A literature review and case studies of innovative and successful practices are also included.

Administrators, commercial truck and bus carriers, government regulators, and researchers often face problems for which information already exists, either in documented form or as undocumented experience and practice. This information may be fragmented, scattered, and underevaluated. As a consequence, full knowledge of what has been learned about a problem may not be brought to bear on its solution. Costly research findings may go unused, valuable experience may be overlooked, and due consideration may not be given to recommended practices for solving or alleviating the problem.

There is information available on nearly every subject of concern to commercial truck and bus safety. Much of it derives from research or from the work of practitioners faced with problems in their day-to-day jobs. To provide a systematic means for assembling and evaluating such useful information and to make it available to the commercial truck and bus industry, the Commercial Truck and Bus Safety Synthesis Program (CTBSSP) was established by the Federal Motor Carrier Safety Administration (FMCSA) to undertake a series of studies to search out and synthesize useful knowledge from all available sources and to prepare documented reports on current practices in the subject areas of concern. Reports from this endeavor constitute the CTBSSP Synthesis series, which collects and assembles information into single concise documents pertaining to specific commercial truck and bus safety problems.

The CTBSSP, administered by the Transportation Research Board, was authorized in late 2001 and began in 2002 in support of the FMCSA's safety research programs. The program initiates several synthesis studies annually that address issues in the area of commercial truck and bus safety. A synthesis report is a document that summarizes existing practice in a specific technical area based typically on a literature search and a survey of relevant organizations (e.g., state DOTs, enforcement agencies, commercial truck and bus companies, or other organizations appropriate for the specific topic). The primary users of the syntheses are practitioners who work on issues or problems using diverse approaches in their individual settings.

This synthesis series reports on various practices; each document is a compendium of the best knowledge available on measures found to be successful in resolving specific problems. To develop these syntheses in a comprehensive manner and to ensure inclusion of significant knowledge, available information assembled from numerous sources is analyzed.

For each topic, the project objectives are (1) to locate and assemble documented information; (2) to learn what practices have been used for solving or alleviating problems; (3) to identify relevant, ongoing research; (4) to learn what problems remain largely unsolved; and (5) to organize, evaluate, and document the useful information that is acquired. Each synthesis is an immediately useful document that records practices that were acceptable within the limitations of the knowledge available at the time of its preparation.

CONTENTS

S U M M A R Y

Commercial Motor Vehicle Carrier Safety Management Certification

Approach. Management quality certification and other standards development approaches are used widely in business and industry and can be applied with an emphasis on safety management. *CTBSSP Synthesis 1* identified a number of situations where certification related to commercial vehicle safety and referred to ongoing studies and initiatives directly related to truck safety management. These included formal certification processes, industry-promulgated best practices programs and other approaches to carrier evaluation. Since publication of *CTBSSP Synthesis 1,* a number of additional initiatives have been launched.

As pointed out in *CTBSSP Synthesis 1,* information on the relative effectiveness of safety certification programs for truck and bus operation is limited. While a number of common elements and approaches to these programs are emerging, there is a need to bring together information on results and relative effectiveness of alternative strategies and approaches to certification and self-evaluation. This synthesis provides a foundation for further developments in this emerging commercial vehicle safety management discipline.

The objective of this synthesis is to (1) document current information on existing commercial motor vehicle (CMV) safety certification, self-evaluation, benchmarking, and best practices programs, (2) identify major common elements and protocols, and (3) critically assess evidence for the crash-reduction effectiveness of the programs. The synthesis includes the results of a survey of truck carriers and other applicable industries and organizations for their experiences. A literature review and case studies of innovative and successful practices are also included.

The synthesis identifies (1) common practices and protocols and (2) methods and systems to measure program effectiveness in crash reduction and improvement of other safety performance measures.

One of the potential applications of safety management certification and self-evaluation programs is as a supplement or alternative to governmental regulatory approaches to carrier safety management. The synthesis specifically examines the possible relationships between (a) results of certification and self-evaluation programs and (b) the more conventional compliance programs.

Literature Review. The literature review examines available information related to the motor carrier and motorcoach industries, covering formal certification programs, voluntary programs, and alternative compliance programs. General information on certification programs in other businesses and industries is also included.

Overview of Ongoing Programs. The overview of ongoing programs describes the full range of programs and activities that relate to CMV certification and best practices evaluation. For each program, the summary addresses, whenever applicable, the following elements:

- Objectives. These are the catalysts or driving factors leading to certification, self-evaluation or other programs.

- Focus. Examples are compliance, crash avoidance, best practices, human factors, risk rating, customer acceptance, public relations, or other.
- Development Process. This area includes whether baseline data was used and the degree of involvement of stakeholders.
- Program Costs. This includes costs borne both by certifying organizations and fleets.
- Pre and Post Attitudes. Where available, the question of satisfaction or perceived values is addressed.
- Continuity of Program. This includes use of on-going or periodic reviews to validate stakeholder status.
- Marketing and Public Relations. The summary examines how certified organizations use the information in promoting their status.
- Evaluation Processes. The summary examines any specific evaluation processes to gage effectiveness of certification in meeting initial program objectives, including use of baseline data and ongoing post program measurement of results.

To date, the literature does not yield an organized approach to classification of certification or self-evaluation programs. All programs appear to identify a range of management practices and procedures that are believed to reduce crash risk, commercial vehicle injury, or equipment damage incidents. The following "topology" or classification of certification and self-evaluation schemes is suggested to enable carriers and governmental entities to consider program options. This scheme is drawn from the research team's experience with the current and proposed program schemes and is suggested as a means to facilitate the discussions that follow.

A. Formal Certification Programs. These programs are those formal processes that are generally accepted within an industry setting or practice area. Standards or processes are developed within a formal set of procedures, involving significant peer review. Audits are generally involved, and businesses that are certified are permitted to hold out their certification status to the general public.
B. Mandated or Recommended Practice Standards. This involves requirements for fleets or organizations to meet prescribed standards as a condition for an accepted business relationship. The standards could be regulatory or industry promulgated.
C. Alternative Compliance Standards. This involves waiver of defined regulatory requirements in return for documented or proven adherence to defined standards or practice requirements.
D. Self-evaluation/Best Practices Standards. This includes those programs which set out industry defined best practices to enable fleets or business entities to strive toward a defined level of risk avoidance and hold themselves out as meeting state of the practice safety performance processes.

Formal certification programs covered in the summary include the results of an analysis of the relationships of International Organization of Standards (ISO) 9000 certification and motor carrier safety and an overview of the Canadian Standards Association Safety Management System's standards relating to motor carriers.

The mandated or recommended practice standards discussion covers the Surface Deployment and Distribution Command's (SDDC's) requirements for motor carriers and motorcoach operations involved in carrying military freight or personnel, the Responsible Care® program of the American Chemical Society, and a comprehensive look at motor carrier insurance practices applicable to certification principles. The elements of insurance practices provide an important framework for crafting potential best practices elements of any certification scheme.

Alternative compliance schemes discussed include the Australian Road Transport Council's National Heavy Vehicle Compliance program, the Canadian Alberta Province's Partners in

Compliance (PIC) program, and the PrePass and NorPass weigh station bypass programs in the United States.

Self-evaluation and best practices programs included here are the Australian Trucking Association's (ATA's) TruckSafe program, the National Private Truck Council's Best Practices program, and a number of other approaches to defining best safety practices.

The literature review did not produce any defined safety certification or self-evaluation programs within the motorcoach industry. A discussion of related programs and practices in the motorcoach industry is included to provide baseline information on potential applications in this industry.

The summary of ongoing programs also briefly describes safety manager certification programs offered by the North American Transportation Management Institute and the National Private Truck Council.

Carrier Safety Manager Survey Results.   The carrier safety manager survey was distributed to industry association members, such as the American Trucking Associations, State Trucking Association members and safety committees within such organizations. Twenty-five responses provided the basis for analysis of this convenience sample of the industry.

The respondents were generally familiar with evaluation and certification programs, especially insurance-related safety management processes and third party assessment programs. The survey population included a number of fleets that had participated in ongoing programs, and their motivations were predominantly to assure a safety discipline or culture in their organizations. Carriers participating in programs generally evaluated their participation by tracking accident, injury and incident information, insurance rates, and reduction in administrative burdens. When considering potential incentives for future participation in these programs, regulatory relief ranked high, followed by insurance company incentives. Suggested regulatory relief focused on roadside inspections and driver logs, as well as on compliance reviews and drug and alcohol testing. Potential factors that might deter participation in programs focused on increased paper work and audit requirements.

Evaluation Processes.   Each ongoing program review included a discussion of how the program was evaluated, if at all, and what criteria were used in the evaluation process. **In essence, there is sparse coverage or documentation of measurable program effectiveness of certification and self-evaluation programs in the motor carrier and motor coach industries.** Further, there is little evidence that programs have been designed with an evaluation process as an integral part or purpose.

The evaluation factors that were suggested in some programs related to accident and incident reduction, reduction of insurance rates, improved compliance, targeting of scarce enforcement resources, and productivity benefits.

Relationship of Certification Programs and Regulatory Regimes.   As a means of considering how certification programs might relate to motor carrier regulatory compliance efforts, the synthesis process included discussions with representatives of the FMCSA and the Commercial Vehicle Safety Alliance (CVSA). In a session with FMCSA officials, and through an informal survey of CVSA officers, several questions were posed as to how this relationship might occur. The general responses to these questions are included in this synthesis.

Conclusions and Recommended Developmental Approach.   In summary, this synthesis of certification and best practices and self-evaluation programs yields the following conclusions.

1. There is a rich and relatively settled set of best practices approaches and processes designed to improve motor carrier safety and reduce crashes and incidents.

2. Costs of implementation of best practices by motor carrier firms are generally borne as internal management costs, and the benefits are realized through productivity improvement and reduced safety incidents.
3. Although there is limited validation of crash reduction from best practices applications, there are significant indications of improved motor carrier safety performance through best practices applications.
4. Interest in use of certification and best practices in alternative compliance schemes is strong in North America and Australian enforcement communities.
5. Broad implementation of certification and best practice schemes will require better validation of the effectiveness of schemes and significant incentives from regulatory agencies.

These conclusions suggest further investigation of the effectiveness of certification and best practices schemes in achieving reduced crashes and safety incidents among motor carriers and of the potential relationship of the schemes to regulatory regimes. Summary conclusions and a suggested approach to this investigation are included.

A pilot effort to investigate the validity of relationships between certification and best practices and alternative compliance programs is suggested. This would involve establishing a steering committee, determining program elements relating to best practices components, auditing, measures of effectiveness, baseline measurements, regulatory exemptions, and then evaluating total program results.

The research team suggests that key stakeholders take further steps to investigate and validate effectiveness of certification and best practices schemes and how they can relate to regulatory regimes affecting the motor carrier community. The research team believes the pilot effort outlined can be an effective first step in this direction.

CHAPTER 1

Introduction

1.1 Background

In 2003, motor carrier safety managers were surveyed regarding major safety management problems and solutions for *CTBSSP Synthesis 1*. This analysis of safety management programs identified an interest in the use of certification and other standards based safety programs and presented a number of suggestions for further evaluation. This synthesis stems from those suggestions and provides a foundation for evaluation of the role of these programs in the overall scheme of carrier and regulatory safety management in North America.

Management quality certification and other standards development approaches are used widely in business and industry and can be applied with an emphasis on safety management. *CTBSSP Synthesis 1* identified a number of situations where certification was being related to commercial vehicle safety and referred to ongoing studies and initiatives directly related to truck safety management. These included formal certification processes such as the National Institute of Standard and Technology ISO 9000 quality process and a Canadian Standards Association Carrier Safety Management System. Industry-promulgated best practices programs were also examined, including the TruckSafe Accreditation program developed by the ATA. Other approaches to carrier evaluation, such as the Canadian Province of Alberta PIC program, chemical manufacturers' transportation audits, military transport carrier evaluations, safety manager certification, and insurance evaluation processes were also discussed in *CTBSSP Synthesis 1*.

Since publication of *CTBSSP Synthesis 1*, a number of additional initiatives have been launched. The National Private Truck Council has developed best practices and benchmarking approaches for member fleets, and the National Transport Commission in Australia has started a project for formal analysis of the safety benefits of heavy vehicle accreditation schemes.

As pointed out in *CTBSSP Synthesis 1*, information on the relative effectiveness of safety certification programs for truck and bus operation is limited. While a number of common elements and approaches to these programs are emerging, there is a need to bring together information on results and relative effectiveness of alternative strategies and approaches to certification and self-evaluation. This synthesis is a vehicle to provide a foundation for further developments in this emerging commercial vehicle safety management discipline.

1.2 Scope

The objective of this synthesis is to (1) document current information on existing CMV safety certification, self-evaluation, benchmarking, and best practices programs, (2) identify major common elements and protocols, and (3) critically assess evidence for the crash-reduction effectiveness of the programs. The study includes a survey of truck carriers and other applicable industries and relevant organizations for their experiences. A literature review and case studies of innovative and successful practices is also included.

This synthesis includes (1) formal certification processes, including ISO and other formal standards programs; (2) voluntary programs, including industry-promulgated best practices, safety accreditation, benchmarking and insurance evaluations, and (3) government/industry partnership efforts involving the relationship of accreditation, self-evaluation, or certification programs and regulatory practices.

The synthesis has sought to identify (1) common practices and protocols and (2) methods and systems to measure program effectiveness in crash reduction and improvement of other safety performance measures.

Identification of research and other actions needed to demonstrate the value of certification and self-evaluation programs and practices is also included.

One of the potential applications of safety management certification and self-evaluation programs is as a supplement or alternative to governmental regulatory approaches to carrier safety management. The synthesis specifically examines

the possible relationships between results of certification and self-evaluation programs, and the more conventional indices of fleet safety performance such as roadside violation rates (driver and vehicle), traffic violation rates, and crash rates.

1.3 Approach

Information available on the full range of commercial vehicle safety certification and self-evaluation programs, for both truck and bus operations, is summarized in this synthesis. In addition to widely available publications, the research team sought out administrative and other reports of agencies and organizations that have applied relevant programs. Information sources included journals, texts, trade publications, and web pages relating to management industrial safety and CMV transportation safety. The literature review sources included the following:

- Transportation Research Information System (TRIS)
- FMCSA research publications
- American Trucking Associations Foundation (ATAF) and other industry trade association publications
- Traffic safety research literature (e.g., *Accident Analysis & Prevention*)
- Industrial safety management literature (e.g., *Journal of Safety Research, Journal of Organizational Behavior Management, Professional Safety, Occupational Health & Safety*)
- Proceedings of the International Truck and Bus Safety Symposia (Knoxville 1997, 1999, 2002, 2005)
- Web pages of safety services vendors

- Published studies and articles relating to certification and self-evaluation programs in the trucking safety and other related industrial activities

A broad review of CMV stakeholders was conducted to elicit key information about past applications and programs involving CMV certification, accreditation, and self-evaluation. Through available reports and analyses, the research team gathered information on program approaches, target operations, program objectives, and evaluation techniques.

Additionally, the research team surveyed a convenience sample of fleet managers to gage attitudes and other factors related to implementation of certification and self-evaluation programs by these managers in their fleet operations. The research team coordinated the surveys for this synthesis with those conducted for *CTBSSP Synthesis 14*, "The Role of Safety Culture in Preventing Commercial Motor Vehicle Crashes." The intent was to take advantage of the synergies in the scope of both projects and to minimize the potential of survey "burn-out" among important stakeholders.

The research team also conducted interviews with key stakeholder representatives to gage the specific issues and individual assessments of past and ongoing program participants and to explore the approaches to evaluating program effectiveness. Interviews were also conducted with representatives of the CVSA and the FMCSA officials to identify current interests and perspectives on the potential role of CMV certification and self-evaluation programs in the overall safety management regimes used by federal and state enforcement officials.

This synthesis includes an overview of the nature of industry insurance and the potential relationship with CMV certification or self-evaluation programs.

CHAPTER 2

Principal Findings from the Literature Review

2.1 Overview

The following synthesis of literature represents an analysis of formal certification processes. It includes ISO and other standards and voluntary programs such as industry-promulgated best practices, safety accreditation, benchmarking and insurance evaluations, and government/industry partnership efforts involving the relationship of accreditation, self-evaluation, or certification programs and regulatory practices.

Throughout the research, there is a clear distinction between writings by program insiders and independent evaluators. The insiders typically work in industry or for organizations or government agencies that implement the safety programs discussed. Therefore, readers must be cautious regarding methods for determining program success and overall assessments from writings within such categories. A far smaller body of literature exists from the research community outside of the studied programs. This literature typically offers a discussion of program successes and inadequacies.

2.2 Formal Certification Programs

2.2.1 ISO 9000/9001

ISO 9000 and ISO 9001 are international industry quality management standards that were developed by the ISO. It should be noted that quality in this context is defined according to Chini and Valdez (2003) as "a measure of fitness for purpose, in the sense of meeting the needs of a customer, at a price commensurate with the extent of those needs." Quality is therefore a criterion by which to measure an organization's ability to deliver a satisfactory product based on client needs.

While the standards themselves are set by the ISO, certification is based on audits that typically occur twice per year and are conducted by authorized third party organizations. Like many of the programs described in this synthesis, ISO 9000 standards are related to general management concepts, and

are not strictly focused on safety; they cover areas such as product design, manufacturing, delivery, service, and support.

Motor carriers have been relatively late adopters of the ISO 9000 standards, which are more likely used in industrial and manufacturing environments. Naveh et al. (2003) analyzed the safety impacts of ISO 9000 on motor carrier safety performance. The research looked at 40 carriers that used ISO 9000 to improve quality to determine the impacts of such certification on motor carrier safety. The study found that ISO 9000-certified carriers had safety benefits that were significantly better than a similar sized non-ISO 9000 motor carrier group. The study also found that a carriers' profitability was the most highly correlated attribute associated with a good safety record and that profitability and safety both improved after a carrier became certified.

Naveh et al., however, discusses several key points regarding the reasons such a significantly safer group was found among ISO 9000 certified carriers.

One key question posed by the authors was why the carrier became certified in the first place. The 40 ISO 9000 carriers were admittedly the only ISO 9000 carriers that could be identified by the researchers at that time period (before 2003). The researchers also stated that many other factors existed, including that the sample ISO 9000 carriers tended to be automotive industry or hazmat carriers.

Naveh et al. indicated that safety and its relationship to ISO 9000 was dependent on the quality of auditors and the process by which certification was determined, as well as the type of motor carrier that was certified.

Similar findings to Naveh et al. (in terms of sample population) were found by Chini and Valdez. They, too, noticed the trend that the firms (in this case, construction) that had ISO 9000 certification were highly dependent on the automobile industry in their business, thus suggesting that it may be the customer that drives the need for ISO 9000 in industries such as trucking and construction, regardless of the value seen by the motor carrier industries.

Chini and Valdez found that ISO 9000 was applicable to the construction industry and was an effective tool for managing quality standards. But there were several drawbacks found in their research.

One ISO 9000 certification drawback concerns the documentation requirements and the internal assessment of procedures during the audit period. Such problems are likely related to the fact that construction, and for that matter trucking and motor coach businesses, operate in the field. Construction companies may have many sites and may move personnel to different sites with great frequency. Motor carrier operations have employees and processes that are even more dispersed into the external environment. As a result, documentation, as well as other requirements during the audit process, may be difficult to obtain.

Other more important drawbacks are the large cost of the certification process and the duration of the process for ISO 9000 certification among construction firms. These issues can translate directly to motor carriers as well, especially the trucking industry.

In terms of best practices in applications of ISO 9000 models for safety purposes, Dyjack et al. (1998) offer key factors that should be fully understood before integrating health and safety management and audit systems into an ISO 9000 model. The authors conducted a case study of two audit systems: a hypothetical American Industrial Hygiene Association Occupational Health and Safety (OHS) management system guidance document and a corporate model that was currently in use. They found that they were very similar models. Advantages taken from the systems include methods that determine productive occupational health and safety efforts, quantitative methods that determine and monitor priority issues, program flexibility, methods for determining the root of problems, employee participation, and emphasis on prevention of OHS problems. Disadvantages found within the two models include areas where employees did not participate in the process, areas where OHS issues were not prioritized, vertical structuring found within the models, and areas where root causes were not found.

2.2.2 Canadian Standards Association

The Safety Management System is a program that follows standards developed by the Canadian Standards Association (CSA). The Safety Management System is defined as "a management system within a company to manage safety risks" by an unpublished report prepared for Transport Canada. The Safety Management System consists of several components:

- Senior management commitment,
- Safety monitoring and reporting,
- Safety assessment process,
- Safety training,

- Periodic audits, and
- Documentation.

An additional component of the Safety Management System not included in the CSA standard is the safety promotion and communication among employees of a motor carrier.

There is limited literature relating to the Safety Management System. A paper presented at the International Truck and Bus Safety Research and Policy Symposium reported that a fleet participating in the CSA program effectively reduced incident rates by 19% since applying the CSA standard and has seen insurance rates decrease by 20% (although this could also be attributed to changing insurance companies) (Drew 2003). More detail on the CSA Safety Management Systems program is presented in Chapter 3.

2.3 Performance-Based Certification and Permitting

Two recent publications offer insight into innovative performance-based methods for allowing certain operating activities within the trucking industry.

Di Cristoforo et al. (2006) conducted a case study where Australia's performance-based system (PBS) is used to develop truck-trailer configurations that offered safety improvements (in an attempt to achieve zero rollovers) while at the same time increasing capacity. The PBS can offer such increases in safety and efficiency while at the same time overriding prescriptive size and weight regulations. This achievement by a truck carrier is accomplished when government set performance goals are demonstrated.

Fekpe et al. (2006) outline the concept of operations for a nationally administered performance-based permitting system for vehicles that are oversize and/or overweight and wish to use public roadways. The research found innovative practices in Australia and Canada that have been used to "approve vehicles that . . . have performance characteristics better than the vehicles they replace," indicating that central safety benefits are the results of decreased exposure (fewer trips) and also due to actual improvements in vehicle design (as seen in Di Cristoforo et al.).

A concept for consideration in the United States is outlined by the research. The overall administration of the performance-based system would be at the state DOT level under this concept, with federal oversight and possibly third party evaluators. Certification would be given to vehicles after a system of performance testing and evaluation. Two critical elements of the certification process on the administrative side are (1) to define performance standards and (2) to specify the methods by which performance is measured. After a carrier fulfills the standards, performance measures are collected over a specified duration of time, and a successful certification of an over-

weight/oversize configuration is achieved, it is assumed that the carrier would be able to use the exact methods on multiple vehicles throughout its operation without having to repeat performance testing.

Enforcement is central to the Fekpe et al. concept of operations. It is suggested that, to monitor carrier operations, "data would be collected from the transponder and recorded daily on an event-by-event basis by local law enforcement personnel." While the authors understand the challenge and criticality of enforcement, they recommend "periodic re-assessments of permitted vehicles" (i.e., recertification) and "continued roadside enforcement of operating conditions." On the enforcement side, such a concept of operations appears not to be feasible because of the potential administrative costs and possible training related to local enforcement.

2.4 Voluntary Self-Regulation

Many positives and negatives of self-regulation as a safety management tool are found throughout the literature. While many find that the efficiencies and effectiveness of industry as a regulator of its own operations are great, citing the expense of bureaucratic efforts such as certification (Yilmaz 1998), others view self-regulation as simply a method to avoid government oversight and new regulations and to possibly continue undesirable behavior. Commonly sighted causes for the undesirable behaviors are self-regulation programs that have weak rules and weak enforcement of rules (Gunningham 1995).

This subsection begins with a look at one of the largest self-regulation programs in the world, the Responsible Care program, which is supported by several trade associations including the American Chemistry Council (ACC) and the National Association of Chemical Distributors (American Chemistry Council 2005).

2.4.1 Responsible Care

The Responsible Care initiative is a voluntary program, with member companies from 90% of U.S. chemical manufacturing and participation that extends throughout the world. The goals of the program are to improve environmental, health and safety performance of member companies through (1) performance measurement and a transparent public reporting system of performance results, (2) the implementation of goal specific management systems, and (3) independent certification.[1] The program itself is stated as being the industry response

to a Union Carbide subsidiary's 1984 industrial accident in Bhopal, India (Yosie 2003).

Since 1995, Responsible Care reports that there has been a 44% decline in process safety incidents among Responsible Care members,[2] there has been a reduction in process safety incidents, and that their members are "twice as safe as the business of chemistry and four and a half times safer than the average of the U.S. manufacturing sector."[3]

Lotter (1998) describes Responsible Care as a successful program, with 1998 membership in 41 countries and participants making up 85% of the world's chemical industry. Intuitively, however, with such a large sample of the population, there will be program participants who are either above or below industry averages and such numbers may not allow for a clear differentiation between member and non-member companies.

Gunningham finds several problems, including those related to collective action and a "credibility obstacle," in aspects of the Responsible Care program.

The analysis indicates that industry characteristics play a critical role in the success of Responsible Care: the large, multinational chemical corporations that are the driving force behind Responsive Care are motivated and have the infrastructure to offer leadership for the entire industry. With regards to safety, this is similar to what is found in the U.S. motor carrier industries on the national scale. While there are several hundred thousand trucking companies in the United States, larger companies have the infrastructure (i.e., their safety departments) and the motivation (i.e., to be recognized as a safe company). But to continue the comparison between the chemical industry and motor carriers, one crash (or chemical spill) may tarnish the reputation of an entire industry, no matter which company is responsible.

Thus, using Gunningham's analysis, a collective action problem exists in both industries. While it may be optimal for an entire industry to collectively develop a self-regulation program such as Responsible Care, it is not always possible. Smaller firms within such industries, as well as larger ones, may look at the financial side of their organizations in the short-term (because they are judged, internally and externally, by short-run results). But the analysis of accident and environmental impact records within chemical companies, and in some cases among motor carriers, is a long-term issue. Therefore, in the chemical industry, Responsible Care may be undermined by smaller companies because

> *Small companies often have the worst safety, health and environmental problems, and they commonly lack both the means and the motivation to solve them . . . many of them will continue to inflict substantial environmental damage, which may well in itself defeat*

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[1]Responsible Care members have two certification options: (1) "RCMS" certification, which is a certification of Responsible Care Management System implementation and (2) RC14001 certification, a combination of RCMS and ISO 14001.

[2]http://reporting.responsiblecare-us.com/reports/psi_ia_rpt.aspx
[3]http://reporting.responsiblecare-us.com/reports/osha_ia_rpt.aspx

Responsible Care's attempt to improve the image of the industry as a whole. [If this happens], large companies lose much of the incentive to continue their own voluntary action. (Gunningham 1995, p. 57)

The credibility issue found in Responsible Care is one inherent to industry self-regulation. Why should the public trust industry to regulate itself? This obstacle can be overcome, according to Gunningham, through third party oversight that includes audits, corporate transparency, and a "national community advisory panel."

Finally, Gunningham offers a method to make Responsible Care work through "mutual coercion, mutually agreed upon," which in theory would alleviate both major problems. The method includes a three-fold approach: (1) Self-Policing by Industry Associations, (2) Shaming of Violators and Product Stewardship, and (3) Co-Regulation with Government.

King and Lenox (2000) offer an evaluation of the difficulties in self-regulation programs by their very nature, especially those that do not offer "explicit sanctions" for those who do not adhere to the rules of the program. If such sanctions do not exist, the problem of adverse selection will likely occur, where participation by firms that are not industry leaders occurs. Such firms will choose to be included in a self-regulation program only for the benefits of participation and will not hold themselves to program rules because penalties and punishment do not exist. The King and Lenox research concludes that because Responsible Care does not have explicit sanctions, many under-performing firms were able to participate and, overall, participating firms improved their environmental record at a slower pace than did non-participating firms.

Lenox and Nash (2003) compared four trade association self-regulation programs (including Responsible Care) that had oversight on safety related pollution practices, citing previous research that showed programs without specific punishments attracted those that break regulations. The research found that more polluting firms tended to be involved with Responsible Care, and this is explicitly because there is no punishment in the form of expulsion for those firms that do not follow Responsible Care rules.

Finally, a Dow Chemical Company case study describes the potential for application of Responsible Care to the trucking industry. In accordance with the principles of Responsible Care and the goal within the program to improve the safety of chemical transport, Dow recently piloted a project that may extend the concepts of the program to members of the trucking industry (Dow Chemical Company 2006). During the pilot program which consisted of testing with one trucking company, rear end collisions were targeted, and within a year such accidents were reduced by 82% after implementation of the Responsible Care related program. The case study, however, does not discuss other variables and neglects to report annual vehicle miles traveled or even the number of power units or driver hours involved in the study. Therefore, only anecdotal evidence supports such a program based on the Dow pilot.

In light of the potential benefits and pitfalls of Responsible Care and similar industry-promulgated self-regulation initiatives, there are two important characteristics that the trucking and motor coach industries should adhere to if developing such a program specifically for the industry: (1) safety standards for participating firms must be at the highest level and (2) requirements for continued participation should be strict.

2.4.2 Other Motor Carrier-Related Carrier Programs

Barnes (1999) offered the opinion to the trucking community that self-regulation could be an option for the industry after a truck-involved train derailment killed 11 in 1999. This opinion cites the barge industry's response to a barge-involved train derailment: the industry, through an association (American Waterways Operators [AWO]) "decided to seize the safety agenda before Congress heaped additional, onerous measures on it." Barnes admits, however, that for an industry association to follow through with an effort of industry self-regulation of safety, it is likely (and was the experience of AWO) that membership and revenue would be lost. He does, however, indicate that in the long run such an effort would increase safety through efficient self-regulation, which would in-turn be less expensive than greater government oversight while achieving the same results.

The initiative that resulted from AWO efforts is the Responsible Carrier Program (RCP), which is an industry-based initiative with a mission to improve marine safety for tugboats, towboats, and barge carriers. The standards were initially developed and adopted after a barge/train accident that killed 47 people in 1994, and a third party audit program was approved in 1997. In 1998, compliance with RCP became a condition of membership in the AWO, and by 2000, every member company was compliant.

The RCP establishes standards in three key areas of operations: management, equipment, and human factors. Although there are no independent, quantitative analyses on the effectiveness of the RCP, the National Transportation Safety Board (NTSB) noted that negative safety-related events could be prevented through participation in a program such as RCP (Hall 2000).

One key factor to RCP implementation success has been its un-homogenizing design. The RCP serves only as a template for participants; the template guides participants to adhere to current laws and regulations, best practices in safety management within operations, and other safety practices that are not currently required by laws or regulations. Because the barge, tugboat, and towboat industry is diverse in the same

way that the trucking industry is, with carrier size and operation type varying greatly, the template itself cannot be strict if participation is expected. Therefore, the template guides each unique carrier through the development of individually tailored safety programs.

2.5 Alternative Compliance

Australia has implemented a National Heavy Vehicle Accreditation Scheme (NHVAS), which allows motor carriers relief from more traditional regulatory compliance through participation with alternative compliance programs. The NHVAS was developed to ensure consistency among programs implemented in the different Australian jurisdictions. The enforcement benefit of implementing this type of program is that efforts can be targeted on those companies that do not participate. When the NHVAS accreditation was first implemented in 1999, it was completely voluntary. The program is described in detail in Section 3.2.3.

According to Economic Associates (2002), under the NHVAS, a pilot program called the Fatigue Management Program Pilot (FMPP) was conducted, beginning in 1994. This pilot program allowed carriers with accredited fatigue management systems relief from regulatory hours of service requirements. Thus, a shift from prescriptive, across the board hours of service to a regulatory scheme that addressed fatigue itself existed through the program. Findings of the program led to the conclusion that fatigue problems are better addressed under the FMPP for the following reasons:

- Driver involved scheduling,
- More accurate time provisions,
- Drivers were less likely to commence a trip while already tired,
- Drivers were less likely to be tired during a trip,
- Drivers were less likely to speed to meet hours of service deadlines, and
- Drivers are more knowledgeable of fatigue management.

While there is no independent literature on other alternative compliance programs, two additional programs—(1) PIC and (2) PrePass and NorPass Preclearance programs—are described in detail in Section 3.2.3.

2.6 Programs in Other Industries

The International Safety Management Code certification for the Safe Operation of Ships and for Pollution Prevention (ISM Code) addresses the responsibilities of the people who manage and operate ships and provides an international standard for the safe management and operation of ships and for pollution prevention. This certification was organized by the International Maritime Organization (IOM). The Code establishes safety management objectives and requires a safety management system to be established by "the Company," which is defined as the ship owner or any person, such as the manager or bareboat charterer, who has assumed responsibility for operating the ship. The Company is then required to establish and implement a policy for achieving these objectives. This includes providing the necessary resources and shore-based support.

According to the International Maritime Organization, a Company must develop, implement and maintain a safety management system, which includes the following functional requirements:

- A safety and environmental protection policy;
- Instructions and procedures to ensure safe operation of ships and protection of the environment in compliance with relevant international and flag state legislation;
- Defined levels of authority and lines of communication between shore and shipboard personnel;
- Procedures for reporting accidents and non-conformities with the provisions of this code;
- Procedures to prepare for and respond to emergency situations; and
- Procedures for internal audits and management reviews.

There must be documentation on board the ship that outlines these policies and procedures. The company is required to show the administration or recognized organization assessing verification with the code that the policies and procedures are being implemented in a practical way to gain the Safety Management Certificate (SMC) and Document of Compliance (DOC).

The Federal Transit Administration (FTA) relies on transit agency self-certification programs referred to as Safety and Security Certification (SSC) programs. Through this program, transit agencies develop risk prevention and management strategies regarding all aspects of a transit project, including design, construction, and operations. This program involves a thorough risk analysis of all new or expansion transit projects, development of project-specific risk mitigation strategies, testing, and inspections. By adhering to the SSC process, transit agencies are able to avoid expensive system modifications to correct safety hazards and generally improve system functionality and operational efficiency. In the event that a safety incident occurs, the SSC protects the transit agency by ensuring that the documentation of the system designs is accurate and that the agency has adhered to all the applicable standards. The SSC provides guidelines on how to document and manage the incident. It also ensures that personnel are properly trained to respond to the incident (Handbook for Transit Safety and Security Certification 2002).

Eng (1997) researches the Los Angeles Metropolitan Transportation Authority's (MTA's) experience with an internal safety certification process of new sections of light rail and heavy rail. Before opening the new rail capacity, the MTA safety certification program was implemented and covered eight key areas:

- Design: A checklist of safety-related design criteria requirements
- Construction: checklist of construction compliance to safety-related contract specifications
- Integrated testing: testing of interfacing capability of sub-systems
- Contractual training: training and certification of vendors
- Emergency response training drills
- Passenger vehicle: assessment of vehicle design compliance
- Fire/Life safety: certification of public safety community
- Operations: safety certification for operations and maintenance staff

Through a case study of this process during the certification of the new rail lines, several recommendations for future certification were made:

- Define the safety certification early in the project
- Make the certification program simple (ease of use) and effective
- Ensure that all participants of a certification program have full knowledge of the program
- Provide management support
- Monitor and provide feedback as part of the certification process
- Modify the process as a result of the long duration of such certification programs
- Create back-up plans

Underwriters Laboratories Inc. (UL) is a not-for-profit organization that certifies product safety. It originated in the United States, but has since been adopted internationally. UL develops standards and tests samples of products. If the protocol meets the safety criteria established by the UL, that product can carry the UL symbol provided that it continues to meet the standards and that the product does not differ from the sample tested. A manufacturer must also demonstrate that a program exists to ensure that each product will meet these requirements.

In Europe, manufacturers of certain products are required to mark their products with a CE symbol to demonstrate that the product meets safety criteria developed by the European legislature. Products that require the CE mark are put through rigorous testing to minimize the health and safety risks of the product for the consumer. For every product given the CE

marking, the manufacturer is required to provide instruction about the safe installation, use, maintenance and reparation of the product, which is to be included with each purchased product (European Commission 2000).

AISC (American Institute of Steel Construction, Inc.) quality certification represents high standards in the steel industry. AISC has seven separate certification standards for steel building structures: conventional steel building structures, simple steel bridges, complex steel building structures, major steel bridges, metal building systems, certified steel erector, and advanced certified steel erector. Companies that are AISC certified have been put through rigorous initial evaluation, and are subject to yearly reviews. AISC's independent auditing company, Quality Management Company and LLC, evaluates each product. The purpose of this certification is to ensure that companies have the personnel, organization, knowledge, experience, equipment, procedures, capability, and commitment to produce quality work for a given category, whether they are an erector, fabricating plant, or metal building company.

According to AISC, companies and products are evaluated on general management, engineering and drafting, procurement, operations, and quality control. Auditors spot check records, interview workers, and observe work and conditions in facilities to evaluate shops using quality criteria.

2.7 Best Practices and Benchmarking

2.7.1 Benchmarking

The goal of benchmarking is to "identify and emulate best practice" (Beattie 1997). Benchmarking allows companies and other organizations to take advantage of the best methods available for meeting safety and other goals.

Beattie indicates that benchmarking programs can fail if initiatives attempt to measure all possible parameters (instead of focusing on what is truly important) and if data that are inappropriate (because they are incompatible or incongruous) are used. The research suggests that structure and methodology are critical to successful benchmarking.

Gardner and Winder (1998) cite benchmarking data that is used by a company for such internal improvements as "products, services, or business practices and processes, of competitors or those organizations recognized as leaders, or specific (internal) business processes that [have been] chosen." Outlined in this research is a simple internal approach to benchmarking, whereby an audit is conducted on the processes to be treated, an analysis of the processes is conducted with attention to process strengths and weaknesses, and, finally, an overall evaluation is made with recommended improvements. Such a process does not depend on external data, though such data are useful.

Simmons (2000) outlines the Benchmarks in Quality and Safety (BIQS) developed in the healthcare industry by the Alliance of Community Health Plans (ACHP). The BIQS plan ties issues (such as heart disease) with community goals (such as fewer cases of heart disease). Under this model, a target issue is addressed by many organizations through the leadership of the ACHP. The ACHP determines the issue to be targeted, sets goals, and offers best practices and benchmarks to participant organizations to help the participants reach such goals. The process is conducted one target at a time (Alliance of Community Health Plans 2000).

Taggart and Carter (1999) discuss the role of the "value of safety" as seen from the perspective of safety professionals and from those who manage "the bottom line" financial aspects of companies. The authors offer performance measurement concepts, and methods by which to place tangible value on safety, through seven benchmarking programs. It is noted that each organization is different and approaches to using the benchmarking concepts should be tailored to the individual organization. The seven benchmarks are outlined as follows:

OSHA Rates: These are typically a measurement of n events per 200,000 employee hours. Change in performance based on these Numbers is said to indicate evidence of success or failures, but is not considered proof by the authors. The trucking and motor coach industries may use such a calculation in a number of ways, including a combination of employee hours and vehicle miles traveled to include the added exposure of moving freight in the external environment.

Experience Modification Rate (EMR): These measures go beyond OSHA rates by also demonstrating safety program cost effectiveness. Simply put, if an EMR calculation is conducted and the rate is less than 1, the safety program is more effective than average. The authors consider this benchmark good because it can be normalized to specific company demographics, and it is related to operational costs which can be easily understood by managers.

Insurance Loss Ratios: The loss ratio is calculated by incurred losses divided by earned premium. This helps tie the financial costs of insurance (which is a component of the bottom line) with safety.

Safety Inspections: Inspections address future issues; the authors suggest developing a quantifiable checklist (using scoring based on violations or compliance) as the benchmarking tool.

Perception Surveys: Such surveys may be used on a regularly scheduled basis to determine attitudes among employees toward health and safety.

Pop Quizzes: Employees are asked, on the spot, to demonstrate safe behavior. In the trucking industry, this may be a demonstration of how to tether equipment onto a flatbed trailer or how to conduct a safety inspection.

Discrete Observations of Performance: This entails discrete observation of employee behavior for the purposes of enforcing safety policy. In the trucking and motor coach industry, this is difficult because of the offsite nature of transportation operations, but technology may play a role in observing safety performance.

Finally, Ramirez et al. (2004) discuss the use of a management evaluation system that uses benchmarking to continuously improve management practices. Through analysis of the thirteen companies that participated in an initial application of the benchmarking program, the researchers found that "safety performance was strongly related to companies having superior planning and control, quality management, cost control, and subcontractor management policies."

2.7.2 Best Practices and Benchmarking Among Motor Carriers

There is an interest among carriers to use compiled industry safety data to analyze individual performance among carrier representatives (*Bulk Transporter* 2005). This interest is also found in the research community.

The ATA initiated a motor carrier safety accreditation program known as TruckSafe (see Section 3.2.4). These are considered minimum standards that safe companies should meet and include standards regarding driver health and welfare, ensuring proper vehicle maintenance, driver training, and motor carrier business management practices (Rufford 2005). In 2002, the ATA reported that carriers participating in TruckSafe are involved in 40% fewer accidents than non-participating carriers and that participation is also associated with lower worker compensation and maintenance costs (Knipling et al. 2003).

Within the United States, a benchmarking study and evaluation of carriers by specific segment was done by Keane and Corsi (2002). Through analysis of Motor Carrier Management Information System (MCMIS) and SafeStat data of 11 for-hire and 10 private fleet segments, they found among for-hire fleet types, less-than-truckload and passenger carriers exhibited very good safety behavior, while refrigerated and produce segments displayed poor behavior. Among private fleet types, tank truck and household good carriers displayed very good safety behavior, while general freight and large machinery had poor safety behavior.

In research on non-segment specific practices, the Safe-Returns study by ATAF (ATAF 1999) presented several safety

management practices among motor carriers that led to stable and safe corporate environments. The initial finding from this report is that operations that are safe have the ability to enhance the financial stability of motor carriers, as well as increase productivity and retention rates among customers and drivers.

Safety program success was in turn found to be related to a company's commitment to safety through top leadership, the ability to include employees at all levels in the development of solutions to safety issues, and the ability of a company to be comprehensive in approach and translate safety to all aspects of operations. The report finally cites such important industry benchmarks as those related to hiring criteria, driver training, bonus and award programs, type and frequency of safety meetings, and process during accident review.

ATAF (1999b) outlines recommended management practices for assessing truck driver risk through a discussion of driver selection, in-service performance, and personal driver issues. First is a detailed explanation of a comprehensive driver hiring process. The second item consists of an outline of the checks and balances that should be made regarding driver performance once hired. Finally, methods are discussed on how to approach issues that are personal to the driver, such as driver health, drug and alcohol abuse, stress, and family relationships. No analysis is conducted regarding the effectiveness of the practices outlined in the guide.

The research from Pennsylvania Transportation Institute (2001) and ATAF identified the factors that contribute to safety performance for motor carriers. This research also developed materials and tools that carriers could use to increase safety in their operations, including educational and outreach programs, as well as safety materials and regulation guides. The research found that larger fleets generally experienced fewer violations than smaller fleets, and that membership in state trucking associations was related to safer behavior.

Corsi and Barnard (2003) also conducted research on best safety management practices among motor carriers. They focused only on the safest motor carries and then determined the safety management policies and processes of those carriers within five specific categories of practices.

Within the practice of hiring drivers, Corsi and Barnard found that the most common criteria (among the safest carriers) for hiring drivers and predicting their future safety related behavior was through a review of driving history. One specific practice outlined within this review was the use of automatic disqualification of candidates who possessed a given number of moving violations and/or crashes.

Regarding the training of new and veteran drivers, many managers placed greater emphasis on the safety training of veteran drivers (i.e., continuing education), but a slight majority agreed that training for new and veteran drivers has an equal impact on carrier safety.

For "encouraging and reinforcing" safe behavior, it was found that 44% of managers agreed that rewards for safe driving and punishment for unsafe driving are important. A total of 33% believed that rewards were the more important tool, while 22% indicated that punishment was the strongest encouragement/reinforcement tool.

Finally, Corsi and Barnard looked at fleet maintenance, focusing on computerized equipment use, outsourcing of maintenance activities, and maintenance schedules. They found (a) small carriers are far less likely to use computerized equipment, (b) small carriers were less likely to perform their own maintenance, and (c) small carriers have variety of schedules that are based on equipment and operational characteristics.

CHAPTER 3

Overview of Ongoing and Related Programs

This overview describes the full range of programs and activities that relate to CMV certification and best practices evaluation. For each program, the following elements will be addressed, whenever applicable:

- Objectives. These are the catalysts or driving factors leading to certification, self-evaluation or other programs.
- Focus. Examples are compliance, crash avoidance, best practices, human factors, risk rating, customer acceptance, public relations, or other.
- Development Process. This area includes whether baseline data were used and the degree of stakeholder involvement.
- Program Costs. This includes costs borne both by certifying organizations, and fleets.
- Pre and Post Attitudes. Where available, the question of satisfaction or perceived value is addressed.
- Continuity of Program. This includes use of ongoing or periodic reviews to validate stakeholder status.
- Marketing and Public Relations. This examines how certified organizations use the information in promoting their status.
- Evaluation Processes. This examines any specific evaluation processes to gage effectiveness of certification in meeting initial program objectives, including use of baseline data and ongoing post program measurement of results.

3.1 Topology of Certification Programs

To date, the literature does not yield an organized approach to classification of certification or self-evaluation programs. All programs appear to identify a range of management practices and procedures that are believed to reduce risks of crashes or commercial vehicle injury or equipment damage incidents. The following topology or classification of certification and self-evaluation schemes displays options for carriers and governmental entities to consider. This scheme is drawn from the research team's experience with the current and proposed program schemes.

A. Formal Certification Programs. These programs are characterized by formal processes that are generally accepted within an industry setting or practice area. Standards or processes are developed within a formal set of procedures, involving significant peer review. Audits are generally involved, and businesses that are certified are permitted to hold out their certification status to the general public.
B. Mandated or Recommended Practice Standards. This classification requires fleets or organizations to meet prescribed standards as a condition for an accepted business relationship. The standards could be regulatory or industry promulgated.
C. Alternative Compliance Standards. This classification involves waiver of defined regulatory requirements in return for documented or proven adherence to defined standards or practice requirements.
D. Self-evaluation/Best Practices Standards. This classification includes those programs which set out industry defined best practices to enable fleets or business entities to strive toward a defined level of risk avoidance and hold themselves out as meeting state of the practice safety performance processes.

3.2 Summary of Programs

The following summary is organized by the topology classification outlined in Section 3.1 and addresses each of the elements relating to certification programs set out in the introduction to this section.

3.2.1 Formal Certification Programs

ISO 9000 Certification

The definitive study on ISO 9000 certification effects on commercial vehicle accident reduction is a 2003 report from the Carlson School of Management, University of Minnesota (Naveh et al. 2003).

As described in the study, the nature of ISO 9000 is as follows:

- ISO certification is a common quality innovation by United States and European organizations.
- Certification requires that organizations have verifiable routines and procedures in place for product design, manufacture, delivery, service and support.
- The organization must strictly monitor its processes and must follow process documentation.
- Third party auditor site visits are required twice yearly to verify compliance.
- Customer needs at all steps of the value chain are paramount.
- Managers must set up essential business processes for training, skills, procedures, and policies.
- There are built-in continuous process improvement mechanisms.

Objectives.   The study sought to examine a potential correlation between voluntary ISO 9000 certification by motor carriers and traffic safety. Additionally, the study authors identified these potential benefits:

- New regulatory procedures might be developed based on ISO 9000 processes.
- Safe motor carriers could be identified and regulatory efforts targeted.
- A mechanism to leverage public resources on carriers with poorer safety performance could be identified.
- A focus on "up-stream" issues rather than on downstream non-compliance issues could be used.
- Awareness of ISO 9000 might be a means to reform regulatory processes.

Focus.   The study focus included a detailed look at financial performance, based on a hypothesis that there are correlations between financial performance and safety performance. For the purposes of the study, the key financial performance measure was return on assets (ROA). The safety measures used as dependent variables in the studies were drawn from the FMCSA safety evaluation scheme—SafeStat (see http://ai.volpe.dot.gov)—and included the following safety evaluation areas:

- Driver related safety performance and compliance
- Vehicle related safety performance and compliance
- Safety management values

Development Process.   The study involved one case study of a bulk carrier involved in developing an ISO certification process. Additionally, the study authors consulted with the American Transportation Research Institute (ATRI). The statistical analyses did not require consultation with stakeholders. Through the evaluation process, the study did establish a relationship between pre certification and post certification financial performance and better safety performance among certified carrier organizations.

Program Costs.   Costs of ISO certification are significant. This study did not require any single carrier to bear incremental costs, over and above those already internalized in the business processes. It should be noted that one of the objectives of ISO 9000 is to identify productivity and continuous process improvements that ultimately reduce overall business costs.

Pre and Post Attitudes.   One of the pilot test fleets is still active in the Carrier Safety Management System (CSMS) and is advertising its involvement through press releases. An unpublished feasibility study indicates that two of the test fleets contacted were pleased with CSMS and would still use it, with or without CSA certification (Feasibility Study 2006). This study also reports that both fleets believe that other carriers should use the program because there were large gains, even with substantial investment. However, the two fleets question the applicability of the program to small fleets, given the investment commitment involved.

Continuity of Program.   No study follow up has been identified. The ISO 9000 processes continue to be emphasized in business practice, but there is no continuing evaluation of certification relationships to motor carrier safety performance.

Marketing and Public Relations.   The carrier involved in the study's case study was being encouraged by its insurance carrier to undertake certification to improve its safety performance. This external pressure overrode any public relations objectives.

Evaluation Processes.   Using matched samples and statistical analyses set out in the report, the study compared ISO 9000 registered companies with the 5 best-matched samples. The results indicated fewer fatal, injury, and tow crashes among carriers with higher ROA scores and indicated that adoption of ISO 9000 practices has a positive effect on motor carrier safety.

Canadian Standards Association

In 2000, the CSA published a safety management standard for motor carriers. The Standard—CSA B619-00 Carrier Safety Management System (CSMS)—is specific to the motor carrier industry and can be found at the following website:

http://www.csa.ca/news/releases/Default.asp?articleID=3381&searchType=exactPhrase&searchWordList=trucking&language=English

In July 2001, the CSA also published a set of guidelines for development and implementation of a safety management

system, Carrier Safety Management Essentials—Guidelines to Assist in the Implementation of a Carrier Safety Management System. According to a recent unpublished feasibility study (Feasibility Study 2006), the CSMS was initially developed in response to requests from the Ontario Ministry of Transport as a means to deal with a spate of accidents caused by trucks losing wheels. The Ministry had intended to reference the standard in new legislation, but decided not to provide this mandate.

The CSMS includes a series of requirements:

- Management commitment to safety through set policies and resources
- Implementation of a carrier safety management system, which includes establishing and maintaining documented procedures and records dealing with transportation safety planning, inspection, maintenance and repairs, performance monitoring, and training
- Safety management system support, which includes defining the various policies, procedures, and practices that must be in place to address standards requirements
- A continuous improvement system including regular internal safety system audits, management reviews, and documented preventative actions

As a complement to the published CSMS, the CSA developed a Carrier Safety Management System Qualification program. The voluntary program offers an annual auditing service that reviews the carrier's safety management system efforts and leads to potential use of a qualification mark, consisting of a CSA CSMS label displayed on fleet vehicles.

Focus. CSA indicates that the purpose of standards development was to provide a system "designed to help manage the risk of accidents and safety incidents." An additional objective was to help carriers establish baseline processes that would result in improved performance in safety, service, and productivity, as well as promote uniform safety performance among the entire motor carrier industry. However, the principal evaluation criterion has been much narrower and relates primarily to regulatory violation rates. The standard and guide stress compliance with regulations. They do not focus on measurement of incidents and crashes.

Development Process. The CSA standard was developed through a committee process that included industry representatives and regulatory specialists. The technical committee included motor carriers, industry association representatives, shippers, insurers, consumer organizations, and regulators. As part of the process, four carrier companies participated in pilot projects to provide feedback from industry representatives.

Program Costs. There is no documentation of the costs of compliance with the CSMS, and the research team was unable to contact carriers in the pilot program. However, the Feasibility Study reported that initial costs for one firm included one person for two years to go beyond CSA guidelines and include more comprehensive incident reporting and tracking. One person is responsible for keeping the system active and spends about 2 days per week doing so. CSA annual mandatory audits through its Quality Management Institute cost $6,000. The Feasibility Study also suggests the following with respect to program costs:

- The CSMS implies that fleets should have an independent safety officer, which could be unrealistic in smaller fleet operations.
- CSA annual audit requirements could be costly.
- Required audits of on-site contractors' safety management systems could also be costly.

Continuity of Program. After the pilot effort, no additional fleets appear to have been certified.

Marketing and Public Relations. This aspect is a significant feature of CSMS. CSA encourages fleets to use the CSMS mark to demonstrate to customers, regulators, and the public that they have adopted a safety management system. The mark indicates a qualified carrier in a competitive marketplace. A recent press release touted certification of the last unit of a pilot test fleet, completing certification of the entire fleet. The benefit expressed was to help the firm "demonstrate to customers, enforcement agencies, and the public that it is continuously meeting safety obligations, in a way that provides a consistently high level of service."

Evaluation Processes. The CSA standard includes elements relating to record and reporting requirements. The Feasibility Study indicates that CSMS provides limited coverage of safety objectives, safety indicators, and safety targets, including measurable safety objectives or monitoring and analysis of incidents. A case study report published by CSA in 2003 focuses primarily on "violation rates," and indicates that these rates decreased with involvement in CSMS. These rates take into account driver performance, vehicle condition, and convictions, based on provincial regulatory requirements. The Feasibility Study contacts with two pilot fleets indicated that incident rates (crashes and injuries) were reduced by about 19%, and that insurance rates were reduced by 20%.

3.2.2 Mandated or Recommended Practice Standards

SDDC Requirements

As a condition for contracting with motor coach companies, the SDDC requires safety certification, over and above FMCSA requirements. The Military Bus Agreement provides that

carriers need not have an active FMCSA Safety Fitness Rating, but if the carrier receives less than a satisfactory rating, the carrier cannot be used until the SDDC reviews the carrier's infraction. Additionally, SDDC performs a "capability survey," involving an on-site facilities, terminals, and equipment (FTE) inspection performed by the government or an authorized subcontractor. FTE inspections are also performed periodically to assure safe performance. Additionally, SDDC requires a minimum of 12 months operating experience before services are considered and imposes added requirements for drivers.

For motor carriers who seek to transport military shipments, SDDC requires the following (over and above FMCSA requirements):

- The carrier must agree to permit unannounced safety and security inspections of its facilities, terminals, employees, and operational procedures by the Department of Defense (DOD) civilian, military personnel, or DOD contract employees.
- For carriers who wish to transport materials designated by DOD as protected or sensitive, the firm must be in an approved status of not less than 12 consecutive months and have satisfactory performance. Additionally, a "satisfactory" safety rating must be on file and maintained with the Federal Highway Administration, Department of Transportation, and/or the appropriate state agency or commission in the case of intrastate transportation. Safety ratings that are "unsatisfactory," "conditional," "insufficient information," or "not rated" will not be accepted.

Responsible Care

Beginning in 1988, the ACC (formerly the Chemical Manufacturers Association), initiated the Responsible Care initiative. Participation in Responsible Care is mandatory for companies that are members of the Council. The Council has also developed a companion program for partner companies, including motor carriers that carry chemical products. Each participating company is required to make a CEO-level commitment to uphold several program elements:

- Measuring and reporting performance,
- Implementing the Responsible Care security code,
- Applying the Responsible Care management system (RCMS) to achieve and verify results, and
- Obtaining independent certification that a management system is in place and functions according to professional standards.

Responsible Care has been adopted by chemical and related industries in 52 countries that share a common commitment to advancing the safe and secure management of chemical products and processes.

A key component of the Responsible Care system is transportation safety, which is treated in a generic approach for total operations, as follows.

Objectives. The Responsible Care program shares a range of objectives with the ISO 9000 program. Its fundamentals are listed as follows:

- Sharing best practices to improve performance and trust among business partners
- Obtaining benefits from improved performance
- Expanding marketing opportunities
- Shaping government thinking as to need for increased regulation

Focus. The principal program focus is on management practices that in themselves lead to improved performance, including safety performance. The core element is the RCMS, which is used to drive continuous improvements in environmental, health, safety, and security performance. The RCMS is based on the effective practices of leading private-sector companies, the Global Environmental Management Initiative (GEMI), the ISO, and federal regulatory requirements. The RCMS framework addresses policy and leadership; planning; implementation, operation, and accountability; performance measurement and corrective action; and management systems review.

A key component of Responsible Care is mandatory certification of a company's Responsible Care management system by an independent, accredited auditing firm. These firms audit headquarters and chemical facilities to ensure that every Responsible Care company has in place a rigorous framework to achieve performance and verify results. All Responsible Care companies must obtain initial certification by December 31, 2007. Thereafter, certification must be renewed every 3 years. A new cycle of certification audits begins in 2008.

Companies may choose from two certification options: (1) RCMS certification, which verifies a company has implemented a system that functions according to professional standards or (2) RC14001 certification (a certification process developed and overseen by the Council), which combines RCMS and ISO 14001 into a single, more cost-effective audit process. In addition to earning ISO 14001 certification, the RC14001 certification enables companies to be recognized for meeting RCMS requirements that extend beyond the scope of an environmental management system, such as occupational health and safety, transportation safety, security, product stewardship, and community outreach.

The Responsible Care initiative has established a comprehensive series of standardized performance measurements through which individual companies and the industry track and publicly report their results on an annual basis. This process allows Responsible Care companies to benchmark their per-

formance, set specific goals and targets to improve, and verify their progress. It also enables the public to understand how industry is working to improve performance and to track the results.

Performance measures and specific protocols have been established for various trucking sectors, including less than truckload, bulk trucking, non-bulk trucking, and logistics companies.

A recent addition to the Responsible Care program is security. The Responsible Care security code addresses site, cyber, and transportation security. Facilities are required to conduct comprehensive security vulnerability assessments, implement security enhancements and obtain independent verification of those enhancements. Implementing the security code under a strict timeline is mandatory for members of the ACC.

Development Process.   The ACC provides staff support and advice to member companies and partner companies for achieving certification and for the audit and reporting processes. A number of manuals and specific guidelines are available to member and partner firms.

Program Costs.   There is no documented source on program compliance costs, but they can be assumed to be substantial, as in the ISO 9000 program. However, most companies internalize the costs because the practices are often consistent with individual company policies.

Marketing and Public Relations.   The ACC encourages accredited firms to use the related marks and maintains lists and information on accredited member and partner firms on its website.

Evaluation Processes.   Continuing evaluation of performance measures is an integral part of the Responsible Care program. While the specific detailed metrics are not publicly available, the program indicates that, since 1995, the number of distribution incidents among Responsible Care member companies declined by 27%, while the volume of chemicals shipped increased 11% for the business of chemistry overall. Also, from the most recent reporting year (2002 to 2003), distribution incidents declined 1.3% among Responsible Care member companies.

The metrics used in this evaluation are hazardous material handling incidents reported to the U.S. Department of Transportation.

Insurance Practices as Related to Certification Principles

Insurance practices related to certification principles are included in the Mandated or Recommended Practice Standards section (Section 3.2.2) of the Summary of Programs section (Section 3.2) because of the significant impact that insurance availability has on motor carrier operations. To the degree that insurance companies seek to influence motor carrier firm management practices, this influence can easily override the requirements of motor carrier regulatory schemes. In effect, insurance companies are applying "certification" schemes to the carriers they insure, to minimize risk (safety controls) and control costs. They are promulgating standards as a condition for an accepted business relationship between the carrier and the insurance company. For this reason, the nature of the "standards" can be a guide in considering certification schemes, because their objectives are virtually the same.

The information in the following subsections is drawn from conversations with personnel from firms that offer insurance coverage to motor carriers. They also reflect the practices of the broader motor carrier insurance industry. An overview of insurance underwriting risk evaluation schemes that are often applied in trucking coverage (called Commercial Automobile Liability coverage) is also described. The subsections provide the following information:

1. **Schedules and Guidelines** provide a brief description of the factors insurers consider in evaluating a company and its risk.
2. **Dimensions of Coverage** provide the industry definitions and considerations in Commercial Auto Liability coverage.
3. **Overview of Fleet Exposures** provides insurer expectations about the way the insured companies manage their risk factors.
4. **Workers' Compensation Model** provides a description of how a more data intensive risk evaluation model is applied in workers' compensation insurance coverage.

The third element, overview of fleet exposures, has direct relevance to elements of certification.

Schedules and Guidelines.   Insurance underwriters must undergo an extensive prospective insured evaluation process to arrive at the appropriate price for a given policy. Insurance carriers devote significant resources to developing and refining their risk evaluation processes and, most, if not all, of these processes are proprietary.

Although proprietary, most risk evaluation processes consider four major factors:

- Program design, financial, coverage dimensions, and market conditions. Program design factors define the aggregate and single event limits and deductibles of the policy or coverage being considered.
- Financial factors evaluate the ability of the insured company to pay both the policy premium and the deductible portion of the anticipated losses.

- Coverage factors evaluate the overall nature of the insured's business operations (as related to the policy or coverage) and the loss exposures, which are present in those business operations.
- Market condition factors consider the overall insurance market profitability, competition, and societal/industry trends that may be used to adjust any policy prices.

The following subsections are limited to business operations risk factors, because program design, financial, and market conditions are beyond the scope of this synthesis.

Most risk evaluation models use rating guidelines and schedules when evaluating account dimension factors. The guidelines define "expected average" conditions for a given industry sector, geographical area, or both. Rating schedules define a series of credits and/or debits to compensate for any account specific variance from expected average.

For example, underwriting guidelines would define expected averages for issues such as driver age, experience, and motor vehicle rating (MVR) quality for a trucking industry sector such as regional/dry van/general freight carriers. The rating schedule would define account specific credits/debits for, say poorer than expected MVR quality. For each evaluation, the sum of debits/credits for all of the coverage dimensions is fed into the pricing model and is a determinant of ultimate premium price.

Dimensions of Coverage.   Coverage dimensions focus on the critical elements of the business operation that could lead to losses. These include

- Primary fleet business usage,
- Geography,
- Fleet exposures, and
- Management controls.

Coverage dimensions consider what the prospective insured does and how they do it. This is generally accomplished by describing the flow of the business process. Also considered is a description of the company history, with emphasis on any recent changes in the organization, management, or culture. Finally, consideration is given to any merger or acquisition activity and discontinued products, services, or operations.

Primary fleet business usage considerations link the fleet to the primary business. For for-hire trucking operations, the primary business description is synonymous to the fleet business description. For all other businesses, such as private fleets, the role of the fleet in supporting the primary business is critical in evaluating the specific account risk.

Geography refers to the terrain, traffic, weather, and highway conditions of the primary locale in which the fleet is being operated. For example, risks are different in level vs. moun-

tainous operations, congested (urban) vs. non congested (rural) operations, Interstate highways vs. county operations.

Fleet exposures encompass the review of conditions that have led to losses (e.g., loss analysis review) or the conditions that may lead to a future loss (e.g., loss exposure). Generally, exposures for auto liability are separated into two broad categories: driver and vehicle.

Management controls provide an evaluation of systems that have been put in place to prevent losses. The evaluation process begins with the results of the fleet exposure review. Consideration is then given to whether there are systems in place to mitigate the exposures that are present in the operation.

Overview of Fleet Exposures—Driver and Vehicle.   Driver exposures consider the following:

- Driver record: Number and severity of moving violations. Most evaluation schemes have a matrix that defines the maximum allowable major and minor offenses.
- Driver age. The percentages of younger (e.g., 24 years old and younger) and older (e.g., 65 years old and older) drivers are examined, based on studies that have confirmed a higher crash involvement rate for these groups.
- Driver experience: Both total and in-type experiences are examined. For trucking, in-type experience is critical if the fleet is operating "non standard vehicle" configurations (e.g., tanker or specialized vehicles).
- Driver type: This refers to the primary job of the vehicle driver. For over the road fleets, the primary job is driving. But for private fleets, driving duties may be secondary to the primary job function.
- Driver turnover: Both ongoing and seasonal variations in turnover are considered.

Vehicle exposures consider the following:

- Vehicle type: Consideration is given to whether the vehicle is a tractor-trailer, straight truck, cement mixer, dump truck, or other.
- Vehicle use: The primary "vocational" application is considered. Dump trucks are different in operational risks than are general delivery vehicles.
- Vehicle operation: This factor relates to how, when, where, and why vehicles are being operated.
- Commodity type: Different commodities present different exposures to losses.

Management controls focus on an evaluation of the safety management systems an insurer would expect to see in place for a given set of fleet exposures. Fleets are often classified by their overall standing with respect to safety management in the industry as a whole, for example, sub par, average, and

excelling fleet operations. These are examples of how insurers look at driver management:

- Driver Qualification. This system encompasses the controls that ensure that properly qualified drivers are selected to operate the fleet vehicles.
- Driver Development and Training. Insurers consider how management incorporates a continuum of training activity in driver management, including, classroom, written, and refresher training.
- Driver Supervision. Insurers look carefully at the quality and depth of the system of oversight of driver behavior and activities relating to risks, including tracking of incidents and violations, as well as credentialing.
- Incident Management. The most important elements insurers look for relate to how the fleets handle accident reporting, accident scene handling, investigation, and remedial actions. The best practices are carefully documented and use detailed and structured approaches to ensure behavioral changes and reduction of risk activity. Fleets using these practices keep detailed records and track accidents to ensure appropriate downward trending and improved results.
- Fatigue Management. Exemplary fleets carefully track driver out of service violations in driver logs, employ systematic approaches in monitoring driver logs, and carefully control dispatching and route planning to ensure drivers are not put in a position that extends driving times beyond authorized hours.
- Vehicle Inspection, Repair and Maintenance. Insurers consider that the safest fleets carefully track their vehicle out of service rates, use a process to manage daily vehicle inspection reports, have preventive maintenance systems in place, "spec" vehicles to ensure safe handling loads for normal fleet operations, and keep detailed vehicle performance and maintenance records.

Workers' Compensation Model.   The workers' compensation model for evaluating risk differs from the model used for commercial auto liability. The principal difference is that the workers' compensation model uses impartial external data sources that consistently track (and report) employee exposure (e.g., payroll/hours worked), claim, and injury data. Those sources include Insurance Services Organization and the National Council on Compensation Insurance.

The result is that insurers are able to accurately determine expected losses (e.g., employee injury rates) for most Standard Industry Classification (SIC) codes. These expected losses are then used to set class codes and rate schedules for broad industry groups.

It is difficult to apply the workers' compensation system to trucking because all trucking jobs cannot be put into one exposure class (SIC 4200). Within this trucking class code there is a wide variety of jobs. However, there is currently just one rate schedule for all trucking jobs. To deal with this, underwriters use a concept called "class fit" to adjust a workers' compensation premium rate up or down (e.g., is the operation at the high, medium, or low end of the trucking exposure class?).

Also, the workers' compensation model uses a superior "exposure" base. This base is payroll or hours worked. Payroll (and hours) can be accurately reported and audited. There is general industry agreement that more hours worked leads to more exposure.

Nonetheless, there may be lessons from the workers' compensation model to aid in evaluating risk in trucking operations and provide a foundation for certifying safe operations. One recommendation in the insurance community is that the trucking industry should collect better accident and claim information.

Second, the workers' compensation model suggests that better identification of data needed leads to better decisions. The trucking insurance industry has confidence in its identification exposures, but there is sparse data on safety performance in each exposure area. In the discussion of certification evaluation systems, a key point made is that any system must show a relationship between the certification standard and improved results. Thus, in an insurance context, a key might be to find the data sources that measure "execution." For example, what should be measured, collected, and reported to benchmark execution in the area of effective driver training and development? What should be measured to prove effective execution of accident scene handling? What should be measured to validate effective preventative maintenance systems?

Whether in the context of insurance or in consideration of the effectiveness of certification regimes, the workers' compensation model demonstrates the need to relate decisions on relative risk to real results.

3.2.3 Alternative Compliance Standards

Australian Heavy Vehicle Safety Programs

Australia has pioneered the concepts of accreditation and alternative compliance programs. An excellent summary of the history, purposes, and status of Australia's approach can be found at www.ntc.gov.au. The topic to review is the National Heavy Vehicle Accreditation Scheme (NHVAS).

This section summarizes the Australian effort and current programs. It also describes ongoing considerations of the scheme and how it relates to (1) improved safety performance of involved truck fleets and (2) the voluntary, industry sponsored TruckSafe best practices program.

The NHVAS is included in this section based on the original objectives of the scheme, although some elements do not

provide fleets exemptions from regulatory requirements. The National Transport Commission (NTC) of Australia has undertaken a policy review of accreditation, with the aim of digesting experiences with NHVAS and related programs since 1997, and determining what policy approaches to alternative compliance schemes might be adopted. That review is ongoing.

On the basis of a range of pilot projects in Victoria, New South Wales, and Queensland, the Australian Ministerial Council for Road Transport approved, in 1997, a national heavy vehicle operator accreditation process, now known as the NHVAS. In Western Australia, a non-national scheme was developed to deal with safety of restricted access vehicles near metropolitan areas. This scheme is not discussed further here, because NTC considers that it does not comply with the national policy framework and is not available across the entire country.

Objectives. The NHVAS was introduced as a voluntary alternative to conventional enforcement. As presented by NTC, "it allows heavy vehicle operators to demonstrate, through audit of their transport management systems or driver assessments, that their vehicles and drivers comply with regulatory standards, and in doing this, operators gain access to some variation from compliance and enforcement practices." More specifically, the long-term objectives are listed as follows:

- Improve member operator efficiency by reducing impact of conventional regulatory requirements.
- Raise levels of compliance of non-accredited operators through targeted enforcement.
- Improve road safety.
- Increase productivity of the transport industry through adoption of "good" management practices.
- Allow higher mass (weight) limits to be introduced in a responsible way.

Focus. In the pilot stages, three modules were considered: mass management, maintenance management, and fatigue management. The mass management and maintenance management modules were offered to the industry, with fatigue management to be introduced in 2008.

Operators who seek entry to NHVAS are first audited to ensure that they have the capacity to achieve the relevant standards. Initial accreditation is for 2 years, with an assessment performed before expiration of the accreditation period.

The program is administered under business rules for NHVAS, approved by the transport ministers of the participating jurisdiction. Under the rules, operators are allowed variance in some aspects of enforcement practice, but are not exempted from applicable regulatory requirements. The costs of entry and audits are borne by the operator. NTC publishes requirements for auditing procedures. Once approved, main-

tenance of accreditation is dependent on the operator's continuing compliance, and performance is monitored through compliance audits, investigation of complaints, and random compliance checks.

The focus of each module is as follows:

1. Mass Management
   a. Standards. The focus of accreditation standards is on accurate and documented weights in trips by registered vehicles, as well as documented suspension maintenance.
   b. Concessions. Accredited vehicles are allowed higher weight limits than those not accredited in return for documented mass management compliance.
2. Maintenance Management
   a. Standards. NTC indicates that "Maintenance Management Standards reflect industry 'good' practice and will be used to assess the suitability of elements of an operator's Maintenance Management System." Standard elements are daily checks of roadworthiness, fault recording and reporting, fault repair, maintenance schedules and methods, records and documentation, clearly defined responsibilities and accountability, an internal review system, and training and education.
   b. Concessions. Accredited carriers are not subject to annual inspections in jurisdictions where they are required. This concession is especially beneficial to interstate carriers.
3. Fatigue Management. While NTC does not plan to implement this module until 2008, proposed polices and standards have been published.
   a. Standards. Ten advanced fatigue management standards are involved: (1) scheduling and rostering must include fatigue management measures, (2) operating limits must provide drivers and operators flexibility to manage fatigue, (3) drivers must be in a fit state to perform duties, (4) drivers must participate in a health management system to understand fatigue, (5) management practices must be directed to control fatigue risks, (6) workplace conditions must support fatigue management, (7) demonstrated knowledge and awareness must be part of the program, (8) clear responsibilities and accountabilities are to be established, (9) full documentation and records must be available, and (10) an internal review system must be in place.
   b. Concessions. Accredited operators are allowed extra flexibility over the "standard hours" option. For example, an accredited operator can work 14 hours per day compared with the standard 12 hours. The accredited operator will still need to keep records via logbooks or alternatives (electronic). Other flexible working arrangements are to be defined by NTC.

Development Process and Continuity of the Program. NHVAS was developed through three pilot programs, with

mass management piloted in Victoria, maintenance management piloted in New South Wales, and fatigue management piloted in Queensland. The NTC, including the transportation ministers of each state, embraced the scheme at the national level, and has taken responsibility for coordinating national policy and implementation efforts. Industry associations in each state and nationally have been involved, as well as the individual fleets that were involved in the pilot projects. NTC continues analyzing policy and program options and sponsoring studies related to the program.

Program Costs. Detailed information on costs of accreditation is not available. However, in a policy scoping paper made available to the research team by NTC, this analysis is instructive:

> "There is a perception that only the larger and well-run companies have taken up accreditation because it can be easily accommodated within their corporate management systems. Additionally, the benefits accruing from not requiring an annual inspection through accreditation in Maintenance Management . . . for a large fleet . . . are substantial. For these companies, the marginal cost is small and the benefits represent significant productivity gains as well as providing access to reduced insurance premiums."

Marketing and Public Relations. NHVAS does not have a heavy emphasis on public relations related to accreditation, in contrast to the TruckSafe program of the ATA, presented in Section 3.2.4. Accreditation in the mass management module has become an important qualifier for competitive fleets, because it enables them to haul higher and more efficient loads. The suggestion that there may be reduced insurance premiums resulting from accreditation is another potential marketing point for participation in the scheme.

Evaluation Processes. In 2005, a study published by Austroads provided an important evaluation of safety and other benefits of NVHAC and other safety accreditation schemes (Wright et al. 2005). The study focuses on a full range of safety management programs and serves as an important resource for assessing benefits of these programs.

For NHVAS, the study included a large interstate fleet that had been accredited for both mass management and maintenance management.

For maintenance management, the fleet identified the following benefits:

- Development of a qualified person in each state trained in accident investigation, with benefits in the accident claims process.
- Better understanding of responsibilities through the quality assurance process.
- Reduced costs through waived inspections.

- Better availability of equipment and less down time.
- Introduction of a maintenance software system.

For mass management, the fleet identified the following benefits:

- Lower running costs (i.e., fewer trips).
- Higher payloads.
- Clients gain through fewer loads/trucks for given tonnage.
- Fewer enforcement interceptions.
- Reduction in accidents.

Province of Alberta PIC Program

In 1995, the Province of Alberta founded the PIC program through the Ministry of Alberta Transportation and Utilities (now Alberta Transportation). The program was developed as a joint venture with a number of safety-focused commercial truck carrier and bus operators. The broad objective was to focus regulatory resources on operators other than those with excellent safety records, primarily through weigh station bypass (preclearance) practices. Good carriers bypass the weigh station, allowing enforcement officers to concentrate on carriers who have not demonstrated good safety performance. Routine administration of the program was suspended in summer 2003. The Ministry of Transportation initiated a joint government/industry re-engineering effort to focus on governance, operational, and financial issues in the program. In February 2006, a new business plan was launched.

The Government of Alberta has committed to provide an initial start-up investment in the new organization and to purchase and install an automated vehicle identification (AVI) preclearance system, which allows trucks to bypass weigh stations or other inspection sites. Industry participants will rent transponders and the revenue will go to the new PIC organization.

PIC is a Council of the Alberta Motor Transport Association, which employs the program director and provides management support. An Advisory Council of stakeholders, including the motor transport industry and Alberta Government Representatives, governs the program.

Carriers are entitled to bypass privileges if (a) their safety performance meets prescribed benchmarks and measurements and (b) they meet a defined list of program requirements and submit quarterly reports. Annual audits to ensure compliance with program requirements are conducted. Carriers also are entitled to exemption from a number of audits and receive prorated fees for annual vehicle registration renewal.

Objectives. The program seeks to recognize carriers with high safety performance and encourage other carriers to participate through the bypass and audit exemptions members

receive. Through the stringent requirements, the program is designed to help members improve safety performance and ultimately improve highway safety. Another objective is to permit the Province to focus resources on carriers with poorer safety performance.

Focus. Two focus elements are involved in the program:

1. Excellent safety performance, based on qualifying criteria. The PIC standards set benchmarks and measurement criteria as thresholds for entry into the program based on the following:
   a. A "risk factor" which is a mathematical formula weighing conviction points per vehicle, collision points per vehicle, and CVSA out of service rates per vehicle.
   b. Lost time claim rate.
   c. Preventable collisions per million miles.
   d. CVSA out of service rate.
   e. Drivers' hours of service violations.
2. Safety Program Audits, including prescribed safety management procedures and practices relating to the following:
   a. New driver hiring and training process.
   b. Weights and dimensions management.
   c. Vehicle maintenance programs.
   d. Collision and near-collision analysis and corrective action process.
   e. Program for the on-road monitoring of drivers.
   f. Dangerous goods procedures.

Development Process. The re-engineering effort was the basic process used to define the current PIC program. Stakeholder involvement was key to evaluating the past program and designing the current effort.

Program Costs. As with other good practice programs, carriers bear and must internalize the costs of quality assurance procedures. The safety program audit component of PIC, with the prescribed program requirements, imposes significant administrative actions that carriers must implement. Additionally, the carriers pay the lease rate for transponders used in weigh station bypass.

Pre and Post Attitudes. Anecdotal information indicates that a reason for original program suspension was low carrier participation rates in relation to overall program management costs on the part of the Alberta Government. The commitment of the Alberta Motor Truck Association to support the current PIC program is seen as a positive endorsement by the industry organization of the value of the concept.

Continuity of Program. PIC has developed a business plan for the period February 1, 2006, to March 31, 2008. After the initial Alberta Government subsidy, the program will need to bear its own costs. Carrier participation will be a test of the overall value and acceptance of the program within the commercial vehicle industry.

Marketing and Public Relations. One of the program vision statements is that PIC will be recognized as industry leaders in safety by carriers, customers, contractors, the Alberta Government, other North American jurisdictions and the general public. Members are recognized for safety excellence and can use the program as a selling tool with customers. Additionally, participants receive lower Worker Compensation Board (WCB) rates because a Certificate of Recognition is a requirement, and this entitles the bearer to a 40% reduction and rebate on its WCB rates. Participation also serves as proof to insurance companies that fleets are registered in a compliance program and therefore may be eligible for a lower insurance rate. Fleets also receive an "excellence" rating on the carrier profile, which is expected to add to shipper confidence.

Evaluation Processes. The program-required benchmarks and measures are in effect built-in evaluations of individual member fleet safety performance. The program intends to permit each member to measure safety performance relative to other PIC members, to the industry in general, and potentially to specific industry segments. However, there is no apparent evaluation scheme to determine how PIC will affect or influence overall industry performance.

United States Preclearance Programs— PrePass and NorPass

PrePass and NorPass are two preclearance systems active in the United States that evolved from the Commercial Vehicle Information Systems Network (CVISN) program developed by the FMCSA in the 1990s. Both programs equip qualified carriers with transponders, and fleet vehicles are able to bypass weigh stations so long as the fleet performance is consistent with established criteria. States participate in the program by equipping weigh stations with AVI technology. PrePass sites number more than 260 in 25 states. NorPass is active in 7 states and operates close to 60 sites. HELP, Inc., the owner of PrePass, employs Affiliated Computer Services (ACS) to market and administer the program, and NorPass is administered through each individual state.

Both programs have made arrangements for use of program transponders in the EZ-Pass toll system, an added benefit for program participants.

Objectives. The mutual objectives of both systems are to offer carriers with strong safety performance an incentive to maintain performance through benefits of weigh station bypass, which include reduced time in transit and reduced fuel costs. For state enforcement agencies, the benefit enables concen-

tration on poorer performing carriers and drivers and reduces congestion at enforcement sites.

Focus.   Carrier qualification for both programs is based on performance measured against FMCSA safety evaluation criteria. For PrePass, bypass eligibility is based on a carrier's vehicle and driver out of service rates and SafeStat Safety Evaluation Areas (SEAs). Carriers with 3 SEA values of 75 or greater are not eligible. In addition, carriers with a driver and vehicle SEA of 75 or greater and at least one vehicle or driver out of service rate that is double the national average are not eligible. For NorPass, each state establishes threshold criteria that are somewhat similar to the PrePass qualifications. In both systems, carrier vehicles must have a current state registration through the International Registration Plan and have current International Fuel Tax Agreement status.

Development Process.   PrePass was developed with a broad stakeholder involvement, through HELP, Inc., a non-profit organization of carrier and state representatives. The PrePass bypass criteria were developed through a HELP, Inc., committee process. NorPass has a board of stakeholders that prescribes program details and coordinates state actions.

Program Costs.   PrePass carriers pay a monthly fee for each vehicle enrolled, with unlimited bypass privileges. NorPass carriers purchase transponders and pay no fee for bypass of NorPass sites. NorPass carriers can seek enrollment in PrePass, use a compatible transponder, and then pay necessary PrePass fees.

Pre and Post Attitudes.   The PrePass program has some 385,000 vehicles enrolled and has achieved significant growth over the life of the program. Given the fee for use arrangement involved in PrePass, the enrollment level is a statement of satisfaction in the program.

Continuity of Program.   Both programs are ongoing and in a position to continue offering services.

Evaluation Processes.   Carrier safety performance is "built in" to the programs because carriers must maintain threshold performance to remain eligible for participation in the programs.

There is no available documented information on whether these programs are achieving the objective of enabling enforcement personnel to focus on less safe carriers.

3.2.4 Self-Evaluation and Best Practices Standards

TruckSafe

TruckSafe accreditation is an industry-sponsored best practices program developed in the 1990s by the ATA (see this web location for program details: http://www.atatruck.net.au/trucksafe_about_us.html). The program is audit-based, with certification achieved after a fleet applies and submits to an audit of operations to demonstrate adherence to the Truck-Safe system requirements.

Objectives.   ATA represents TruckSafe as a business and risk management system designed to improve the safety and professionalism of trucking operations. The association suggests that the program will deliver competitive advantages to certified operators and enable operators to verify to customers that they are reducing risks through safe work practices and responding to trends requiring trucking suppliers to have risk management systems in place. Other purposes are to enable fleets to

- Reduce maintenance costs,
- Improve truck insurance benefits,
- Reduce workers' compensation costs, and
- Improve internal operational productivity and employee health and well being.

Focus.   The TruckSafe program offers four modules to operators:

1. Management. This module is aimed at ensuring that the fleet has documented business systems in place to cover each of the standards.
2. Maintenance. This module focuses on keeping vehicles and trailers in a safe and roadworthy condition. Elements of the standard cover daily checks, fault reporting and recording, fault repair, scheduled maintenance, maintenance records and documentation, maintenance responsibilities, internal review, and maintenance training and education. TruckSafe maintenance certification also complies with Australia's Maintenance component of the NHVAS.
3. Training. This module focuses on ensuring that drivers are licensed, authorized, and trained for the full range of driving tasks.
4. Workplace and Driver Health. This module focuses on (1) driver fitness and health and (2) meeting occupational health and safety requirements. It includes requirements relating to workplace health and safety, driver health screening (including medical exams), roles of medical practitioner, rehabilitation, and fatigue management.

Development Process.   ATA developed the TruckSafe module through an industry advisory committee that maintains oversight over the program. The ATA has also actively participated in review and involvement in the NHVAS effort and sought consistency and continuity between the programs.

Program Costs.   In addition to the internal costs for developing processes and systems that are compliant with TruckSafe

standards, fleets pay application, administration, and audit fees for certification. These range from about $1,000 for the smallest fleets to nearly $10,000 for fleets with 250 vehicles or more.

Pre and Post Attitudes.   ATA widely disseminates information about TruckSafe certified operators and offers a number of testimonials from involved operators. Certified fleets are supportive of the program and its benefits, as indicated by their continued involvement in the program.

Continuity of Program.   The success of TruckSafe has led to its growth within ATA, and a number of efforts to bring about consistency between NHVAS and TruckSafe. In recent years, the NHVAS program has accepted TruckSafe audits as meeting the minimum standards for the NHVAS maintenance module. Additionally, the program gained accreditation from the Federal Department of Transport and Regional Services as an audited maintenance program for the purposes of the Australian Fuel Tax Credit System. An ongoing National Transport Commission policy review of accreditation programs has set out a number of options that will bring increased coordination and consistency between TruckSafe and the NHVAS.

Marketing and Public Relations.   ATA provides a number of public relations avenues for accredited fleets and encourages individual fleet advertisement of accreditation as a competitive advantage when dealing with customers and the general public.

Evaluation Processes.   There is no available comprehensive documented analysis of how well the TruckSafe program achieves its objectives. Wright et al. (2005) includes a section on one TruckSafe accredited carrier that documents expected benefits from training, maintenance, and workplace health and safety standards included in the program.

An ongoing policy review raises the question of comparing accident experience between accredited and non-accredited carriers, but this analysis is not yet available.

NPTC Best Practices Program

In early 2004, the NPTC initiated the *Best Practices Safety Guide,* an online benchmarking management tool designed to give users a comprehensive guide to implementation of best management practices in fleet safety. NPTC is a national association representing corporate and business truck fleets. The guide can be accessed at the NPTC website at www.nptc.org.

The online interactive tool is also designed to let fleets compare themselves with national averages and other private fleets. The users answer an electronic questionnaire that provides fleet managers a snapshot of their status in six key areas of safety performance. After the questionnaire is completed, the users receive an immediate score and general feedback based on the answers provided. They are also provided lists of recommended best practices from which they can prioritize for improvement.

The guide was drawn from a web-based tool called Virtual Fleet Risk Manager. The tool was developed for an insurance company.

Objectives.   The core objectives of the program are to enable NPTC member fleets to reduce accidents and incidents, improve compliance, demonstrate responsible care on the part of management, provide focused training at reduce costs, and monitor performance improvement through a long-term, consistent practice. The guide is comprehensive, focusing on an entire management system that will improve safety performance.

Focus.   The Best Practices Safety Guide includes practices and suggestions for action as follows:

- Leadership/Management
  - Management that "walks the talk" and is firm but fair
  - Promotion of individual accountability
  - Participative involvement at all levels
  - Open door policies
  - High-level visible support
  - Managers serve as coaches
- Driver
  - Screening and selection practices
  - Orientation and training including initial and ongoing training in defensive driving and life skills
  - Regulatory compliance
  - Motivation
  - Incentives and rewards
- Equipment
  - Reduction of out of service rates
  - Preventive maintenance schedules
  - Annual inspections
  - Safety technology
  - New equipment safety review
  - Pre/post trip process
  - Mechanic training and development
  - Vehicle specs with safety focus
- Event Management
  - Event reporting and root cause analysis relating to accidents/incidents, hazmat spills and releases, terrorist threats, security breaches, and theft
  - Emergency procedures
  - Security planning
  - Investigation
  - Documentation
  - Action planning/prevention
- Culture
  - Open communications
  - Pride and passion
  - Safety acceptability/ownership
  - Proactive safety approach by employees

  – No short cuts
  – Team approach
  – Strong customer focus
• Evaluation and Measurement
  – Accidents
  – Injuries
  – Key incidents
  – Observation/documentation
  – Audits
  – Roadside out of service rates
  – Security breaches
  – Product excursions

Development Process.   The program was developed by the NPTC Best Practices subcommittee of the Council's Safety Committee. Much of the content was drawn from the Virtual Fleet Risk Manager program and adapted for private fleet operational settings.

Program Costs.   There is no cost to NPTC members for participation in the program. Sponsorships from NPTC associate member (vendors and suppliers) companies provided the start-up costs for program content design and website development.

Pre and Post Attitudes.   NPTC's Safety Committee provides an oversight of the Best Practices program and has generally received positive feedback from those fleet managers who have used it.

Continuity of Program.   NPTC intends to continue the program indefinitely and continue to refine it as needed. Based on feedback received, some additional tools have been added, and emphasis on safety incentive programs is being added as well.

Evaluation Processes.   To date, there has been no comparative analysis of accidents/incidents of fleets that are or are not participating in the program.

A recent analysis of the Virtual Fleet Risk Manager tool could be relevant to the Best Practices program effectiveness. Napier University in the United Kingdom analyzed the core elements of the driver module of the program and found that using the tool is an effective way to identify the highest risk drivers and design risk mitigation approaches to improve their performance.

Other Best Practices Guidelines and Analyses

Quebec Trucking Association.   The Quebec Trucking Association in Canada was developed as a member service to assist fleets in meeting safety-rating requirements under Quebec motor carrier regulations. According to the Feasibility Study, the program is entitled "Logic Software," and offers a number of best practices guidelines, but is not as compre-

hensive as the broader Canadian Safety Management Systems approach. The Feasibility Study points out that Logic Software does not provide guidance on safety policies and safety risk assessment.

I-95 Corridor Coalition Field Operational Test 10: Best Practices in Motor Carrier Safety Management.   In an August 2001 report prepared for the I-95 Corridor Coalition a series of factors contributing to exemplary motor carrier safety performance were identified (Stock 2001).

Included in the study process was a survey of some 600 commercial motor carriers who were believed to be among the safest operators. Safety management practices of safer fleets were presented. Key factors identified as most important to safe fleets included the following:

• In-house training programs
• Communication and safety awareness through regular and frequent safety meetings and constant reminders that safety is the first priority
• Supervision of drivers through monitoring and review of on-road performance, compliance with hours of service regulations, and traffic citations
• Awards programs designed to recognize drivers who are safe
• Thorough documentation and review of all accidents
• Frequent equipment inspection by drivers and mechanics
• Preventative maintenance and timely repairs
• Enforcement focus on poor safety performers

FMCSA Survey of Safety Management Practices Among the Safest Motor Carriers.   In response to a request from the FMCSA, the Supply Chain Management Center of the University of Maryland published a study focusing on the safety management practices of the motor carrier industry's safety performance leaders (Corsi and Barnard 2003). After identification of safety leaders, the study surveyed close to 150 carriers and asked for identification of key safety issues and practices. The results focused on the following:

• Driver hiring practices
• Driver training practices
• Encouraging and reinforcing safe driving behavior
• Managing and monitoring driver activities
• Managing vehicle maintenance

More specific subelements of these issues and practices are spelled out in the study, providing additional insight on detailed practices within each focus area.

American Trucking Association Foundation Reports on Best Practices.   In 1996 and 1997, the American Trucking Association Foundation (now the American Transportation Research Institute) published two research reports on effective safety management practices of motor carriers. The first

report—*Making a Difference. . . . A Compendium of Safety Management Practices of Award Winning Carriers*—codified highly effective safety management practices of carriers with outstanding over the road safety performance. The second report—*SafeReturns. . . . A Compendium of Injury Reduction and Safety Management Practices of Award Winning Carriers*— expanded the focus of the first report to include a detailed overview of motor carrier efforts to reduce incidence and cost of workplace injuries. *SafeReturns* includes the substance of the first report.

SafeReturns was based on a series of case studies, workshops, and surveys. The analysis identified four factors as critical to successful safety management:

- Top management commitment to safety
- Including employees as part of the solution
- Safety focus in all aspects of the operation
- A comprehensive approach

The report spells out components of each of the critical factors and points out that *"the most safety-efficient companies follow the same basic formula—hiring, training, reviewing, compensating and managing—fairly, consistently, and with great attention to detail."*

3.2.5 Self-Evaluation and Certification Programs Related to the Commercial Motorcoach Industry

The literature review did not produce any defined safety certification or self-evaluation programs within the motorcoach industry. There are no publications or articles describing certifications or self-evaluations within the motorcoach industry.

Two different surveys have been performed by the American Bus Association and the United Motorcoach Association to provide benchmarks concerning carrier size, services, passenger volumes, and numerous other operating characteristics. One of these efforts was prepared for the American Bus Association in July 2000 (Motorcoach 2000 Census) and the other was prepared in the fall 2000 for the United Motorcoach Association (2000 United Motorcoach Association Benchmarking and Operating Ratios Study). A similar type of effort is underway in Canada and should be available in the near future. Additionally, *CTBSSP Synthesis 6,* "Operational Differences and Similarities Among the Motorcoach, School Bus, and Trucking Industries," presents detailed information on the motorcoach industry.

While these studies provide some dimension to the size and segments of the industry and the many different operating benchmarks and ratios, they do not provide any specific information regarding safety certification or self-evaluation of safety programs.

Outside of the literature, there are numerous activities within the motorcoach industry in the United States and Canada to provide certifications, self-evaluations, or benchmarking in the area of safety. Some of these activities are directed specifically at particular programs (e.g., training) while others are focused on data targeted to measure accident frequencies and severities for individual companies or groups of companies.

Two homogeneous motorcoach insurance captive programs capture accident data from each member and develop a measurement of accidents per power unit in each fleet. The data are accumulated and analyzed over time. They are also accumulated and analyzed among each member of the group. Benchmarks are identified based on broad group data. Next, individual fleet progress in reducing accidents is monitored in relation to these benchmarks. Both of these groups have improved their accident frequency experience over time. This would suggest that benchmarking an individual company's performance against other similar companies is worthwhile in assessing the effectiveness of a safety program.

The International Motorcoach Group, an organization of more than 50 motorcoach companies, has developed and implemented a driver training program that "certifies" drivers after they complete training and pass a final exam. The intent of this program is to produce a higher quality driver because of the consistent training program used among all members. The consistency of training has proven valuable among the group because it produces a common expectation of the knowledge and ability of a driver that has successfully completed this training. No data have been compiled to reflect whether this training has produced reductions in accident frequencies for this group.

As described in Section 3.2.6, the North American Transportation Management Institute (NATMI) has recently developed and deployed a certification program for a motorcoach fleet safety director. This program was developed with the guidance and participation of the Bus Industry Safety Council, which is part of the American Bus Association. This program certifies directors of safety after they complete specified courses and pass a cumulative final exam. This certification program is administered through academic institutions to give it credibility and objectivity.

Large motorcoach companies (100 or more units) have developed safety management programs that can be considered best practices within the industry. One large fleet with five operating locations and more than 300 power units implemented and measured the effects of a comprehensive safety management program in 2002. This program combines the implementation of safety policies and procedures that incorporate consistent hiring standards, training provisions, operational standards, and monitoring and reporting requirements. The application of this type of management system has produced a reduction in accident frequency of approximately 50%, has

reduced driver turnover, and has improved customer satisfaction. The fleet is also using technology as part of its management program. A data event recorder in each bus monitors activities and driving behavior, enhancing the overall program. Sophisticated programs such as these set the bar for the industry as a whole and become examples that can be reapplied, in whole or in part, by smaller operators.

Many motorcoach operators transport members of the military. To do so, they must go through a rigorous review of their safety management operations. This review was developed and required by the Military SDDC. The review is consistently applied to all relevant aspects of a safety management program. The ratings received by operators provide a measure of the quality of their programs. While these ratings are not public knowledge, operators use these ratings with their customers to ensure them of the quality of their safety programs.

3.2.6 Safety Manager Certification

Two related programs, targeted at individual safety managers in fleet operations, are available to safety and other program managers in the motor carrier and motorcoach industries.

NATMI. NATMI has been delivering professional certification programs for several decades (see www.natmi.org). The Embry-Riddle Aeronautical University's Center for Integrated Transportation Safety and Security (CITSS) oversees the certification process, accredits NATMI's training programs, and administers the certification examinations. NATMI offers training in safety management and professional management certification for safety managers and safety supervisors.

Certified Transportation Manager (CTP). The NPTC offers private fleet and other motor carrier professionals a comprehensive certification in management of motor carrier operations. The safety component of the certification curriculum includes the following elements:

- Establish company environmental, health, and safety policies and standards concerning transportation.
- Monitor and evaluate safety and environmental programs and training to ensure compliance and effectiveness.
- Develop and implement safety and environmental programs in conjunction with personnel training.
- Establish and manage environmental and safety regulations as they apply specifically to the facility.
- Provide assistance and information to resolve all fleet-related insurance claims such as vehicle accidents; over, shortage, and damage (OS); workers' compensation; hazardous materials; unemployment; property; and so forth.

C H A P T E R   4

Carrier Safety Manager Survey

4.1 Survey Methodology

The survey portion of this research represents a convenience sample of 25 trucking company safety departments. It sheds light on current safety management certification program knowledge and practices among trucking companies.

4.1.1 Survey Distribution and Analysis

The survey was distributed to members of industry associations, such as the ATA and State Trucking Association (e.g., members of Georgia Motor Trucking Association) and to safety committees within such organizations. The survey was also open to the public via the ATRI's website, and links were available from the front page of the ATA's website (truckline.com). Both word document and PDF versions of the survey were made available to respondents, and contact information allowed respondents to call the research team and request a faxed version if they were unable to download a copy of the online survey. The survey was also publicized through eTrucker.com,[4] bulktransporter.com[5] and *Business Fleet* magazine.[6]

It should be noted that while the survey itself was available to many non-motor carrier related individuals (i.e., it had a very public presence), it can be verified that all respondents included in this analysis are actual trucking companies. Those who completed the survey were given the option to identify their company by name and to provide contact information on a confidential basis. All respondents chose to do so and therefore their status as a trucking company could be verified.

4.2 Principal Survey Results

Respondents were asked to describe the size of their operations. The number of employees for each company ranged

from 10 to 1.6 million with a median company size of 250. The number of power units owned by each carrier ranged from 12 to 10,618 with an average of 1,668 per company and a median of 262. Finally, the number of drivers, including employee drivers and hired owner-operators, ranged from 16 to 17,000 with an average of 2,230 and a median of 340.

Of the respondent carriers, 20% indicated private carrier operations. Thus, it is assumed that 80% are for-hire. Respondents were able to indicate as many operations types as were applicable. Of all respondents, 60% indicated truckload operations, 20% indicated specialized operations, 16% indicated less-than-truckload operations, 8% indicated hazmat, and 28% indicated other, which included dry van, expedited, and drayage.

Figure 1 shows respondent characteristics for operations based on typical distance, with options of short haul and long haul.

When asked to briefly describe their own safety management responsibilities, 24 out of 25 respondents described a core safety related function, with one offering no response.

Respondents were asked to describe their familiarity and past or present participation in a series of safety evaluation and certification programs (see Figure 2). The most well-known program among those listed were non-specific insurance-related safety management processes or programs, with 60% indicating familiarity and 36% having actually participated in such a program or process. A total of 48% of carriers had a familiarity with third party or self-assessment programs related to health, safety and environment, though only 28% had participated in such a program. Likewise, 48% of carriers were familiar with ISO 9000/9001 certification, though only 16% had actually participated in the ISO 9000/9001 certification process. For NPTC's Online Best Practices Fleet Audit, nearly one-third of respondents had a familiarity (though only 20% indicated being a private fleet), and of that one-third, 16% had actually participated. The ACC's Responsible Care program was familiar to 20% of respondents, though only 1 carrier had

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[4]http://www.etrucker.com/apps/news/article.asp?id=54680

[5]http://bulktransporter.com/news/safety3560/index.html

[6]http://www.fleet-central.com/bf/t_inside.cfm?action=news_pick&storyID=24573
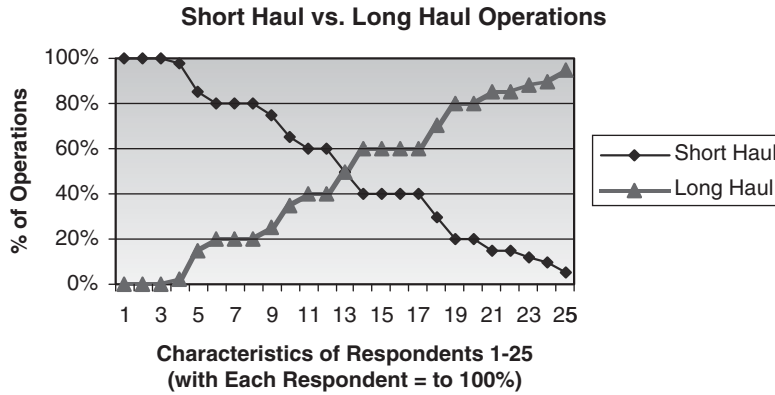
Short Haul vs. Long Haul Operations

Figure 1. Operations type.

previously participated in the program. Only 12% and 8% of respondents, respectively, were familiar with the CSA's Canadian Safety Management Systems and the SDDC, with only 1 carrier (4%) participating in the former and no carriers participating in the later. Only one carrier (4%) was familiar with and had participated in PIC. Other evaluation and certification processes and programs that carriers listed included shipper certification programs, internal safety committee seminars, ATA Safety Council and Safety Director Certification, and a third party employee testing program.

Next, the survey asked those who participated in at least one program to indicate their motivations, with eight options to choose from and to check all that apply. As shown in Figure 3, of the 13 carriers (52%) who had participated or were partic-

ipating in evaluation or certification programs, 77% indicated that safety discipline and/or safety culture were the motivating forces behind participation. This was followed by 38% indicating industry practice as a motivator and 23% indicating a corporate/management requirement. Two respondents indicated insurance rate management as a motivation, while two indicated regulatory requirement offset as a motivation. Finally, one carrier indicated shipper requirements and one indicated marketing value as motivators for their participation in a certification program.

For evaluation of benefits from program participation, respondents were offered four choices and asked to indicate all options that applied. Figure 4 shows that 62% indicated that they evaluated their participation by tracking accident,
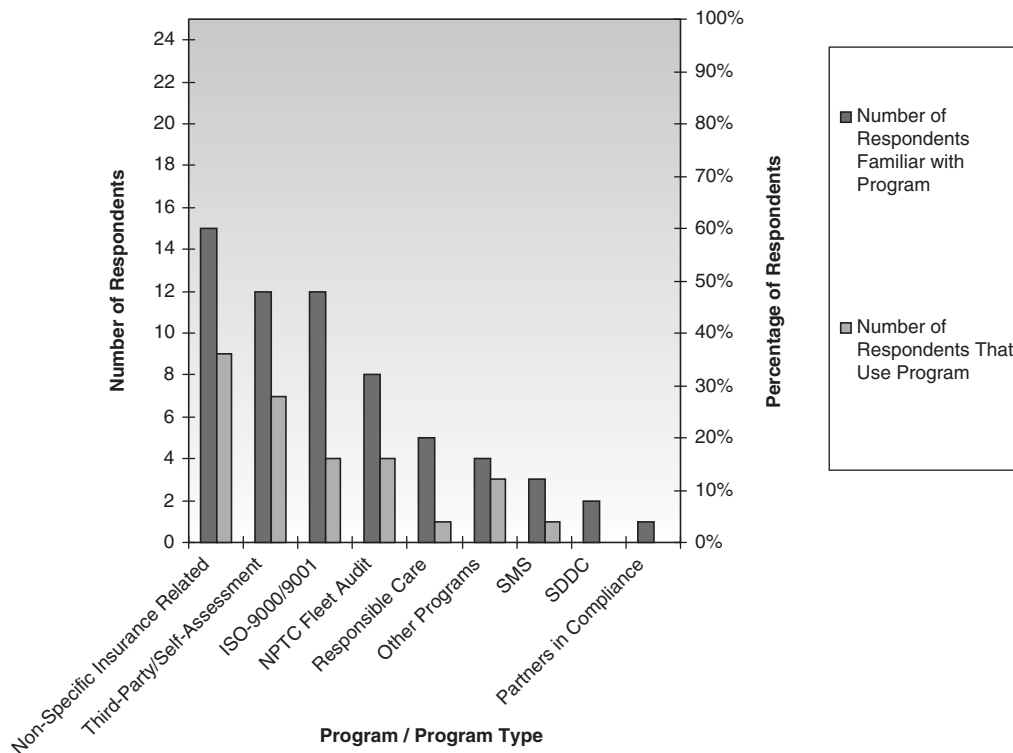

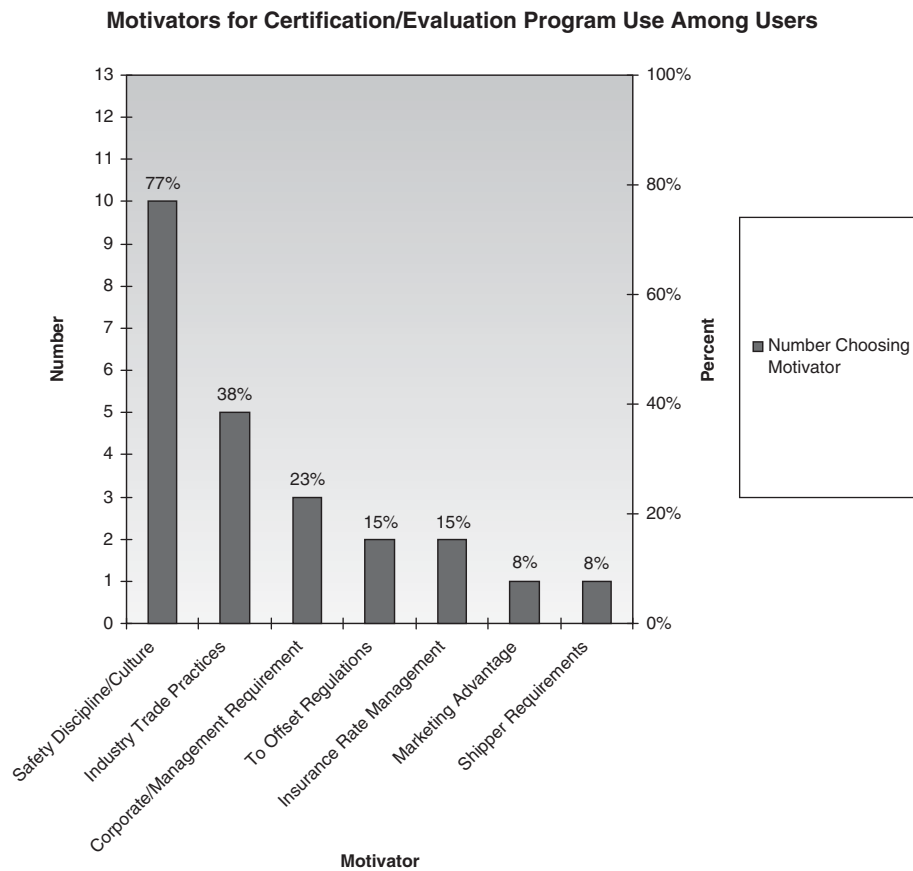*Figure 2. Familiarity and use of evaluation and certification programs.*

Motivators for Certification/Evaluation Program Use Among Users

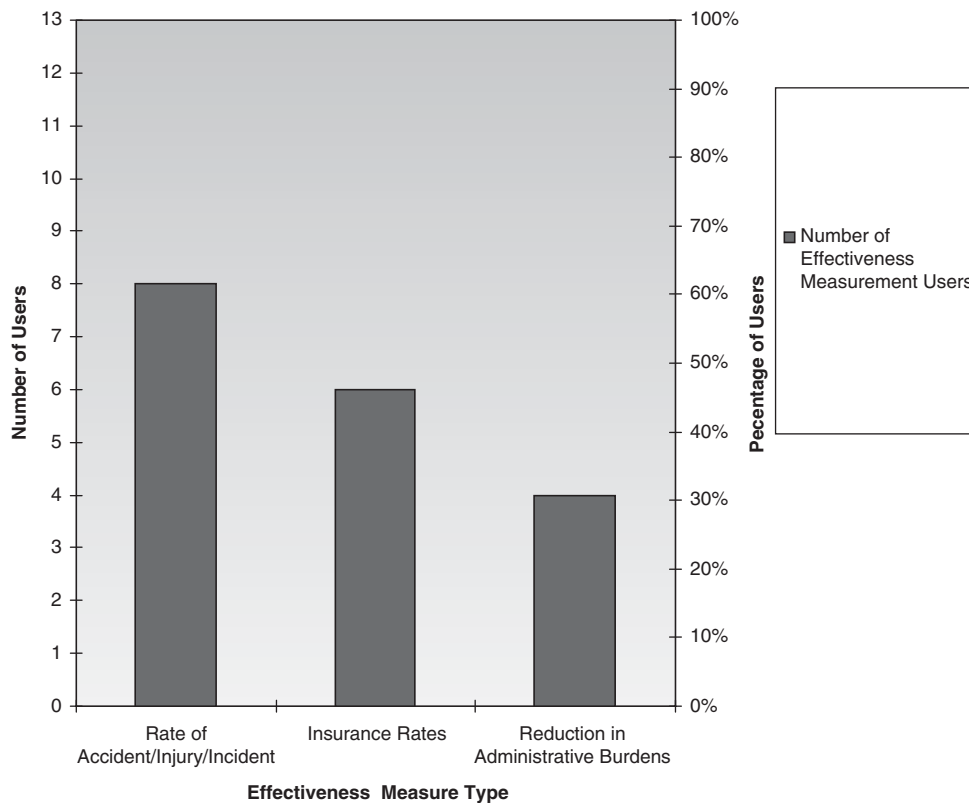*Figure 3. Motivations for program use.*

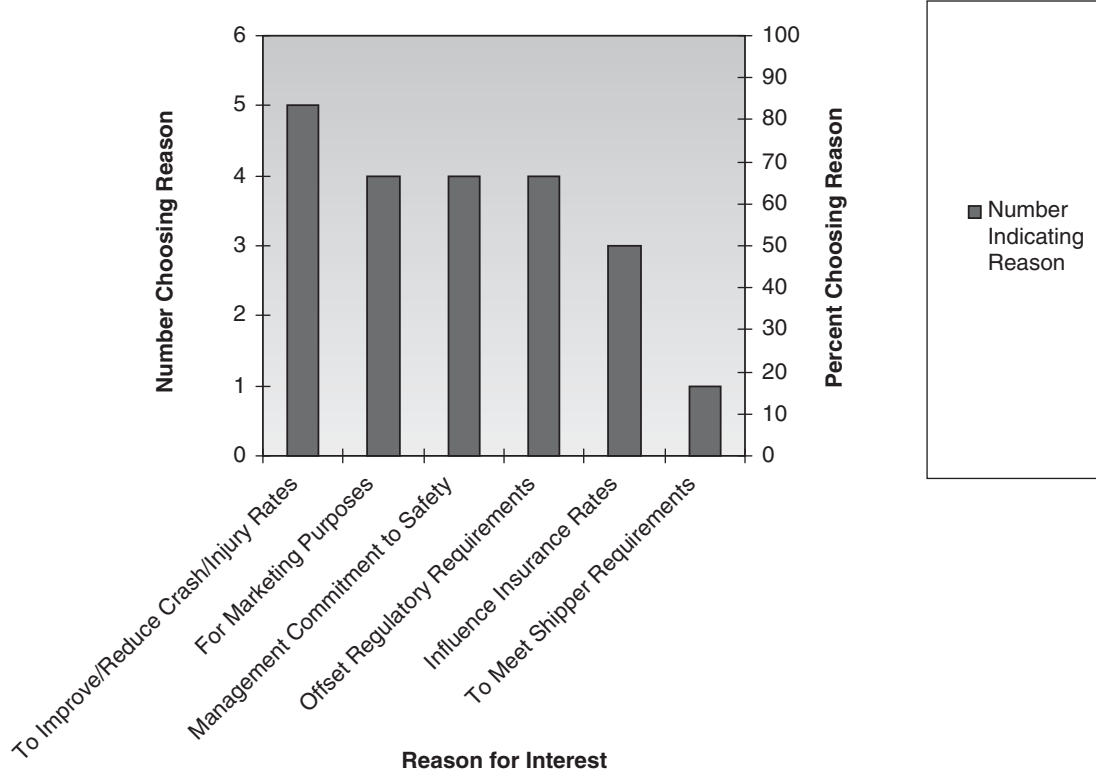*Figure 4. Use of program effectiveness measures among program users.*

Figure 5. Reason for interest in program among non-users.

injury, and incident information, while 46% indicated that they track insurance rates and 31% indicated that they track the reduction in administrative burdens related to regulatory compliance. Finally, one carrier indicated that it tracks driver retention (other) and more than one-third (35%) of those who participated in programs did not indicate that they tracked the effectiveness of their participation is a self-evaluation or certification program.

Of the 12 (48%) carriers who had not participated in a certification or evaluation program, 50% (6) indicated an interest in doing so. Figure 5 shows that among those six carriers, five were interested in doing so to improve or reduce accident and injury rates, four were interested as a marketing tool because of their management's commitment to safety and/or to offset regulatory requirements, and three were interested in doing so to influence insurance rates. Finally, only 1 was interested in program participation to meet shipper or customer requirements.

Respondents were then asked to rank incentives that might expand or promote their company's interest in an evaluation or certification program, with a score of 1 indicating the least ineffective incentive and a score of 7 indicating the most effective incentive. A total of 23 carriers ranked all three incentives that were offered, which included

- Insurance company incentives,
- Regulatory compliance relief, and
- Shipper/Customer requirements (as an incentive).

As demonstrated in Figure 6, the highest score, which was an average score 5.4 (median 6.0) out of 7.0, was given to regulatory compliance relief. This was followed by an average score of 4.8 (median 5.0) for insurance company incentives and an average score of 3.9 (median 4.0) for shipper/customer
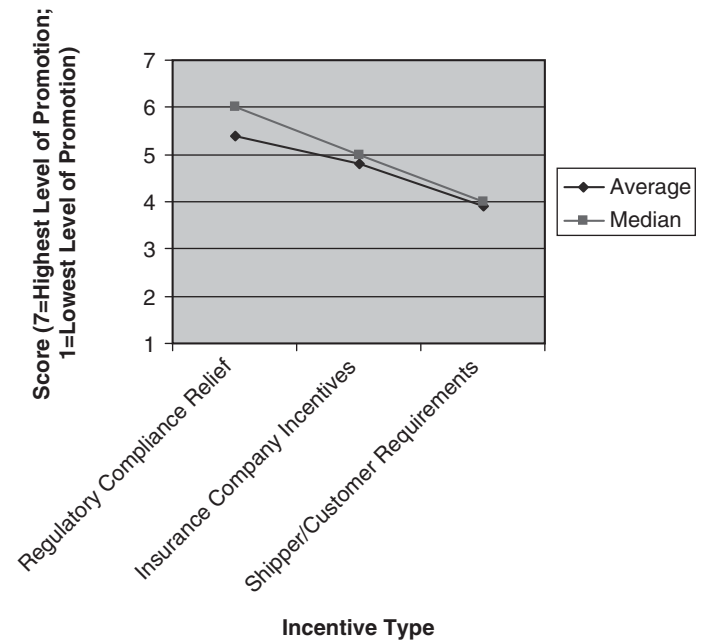

Figure 6. Incentives to promote interest in certification and/or evaluation.
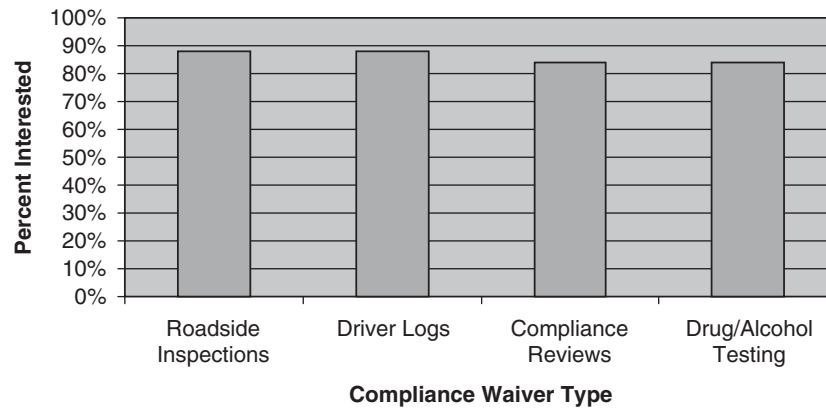
Figure 7. Compliance requirement waivers for certification and/or evaluation program participation.

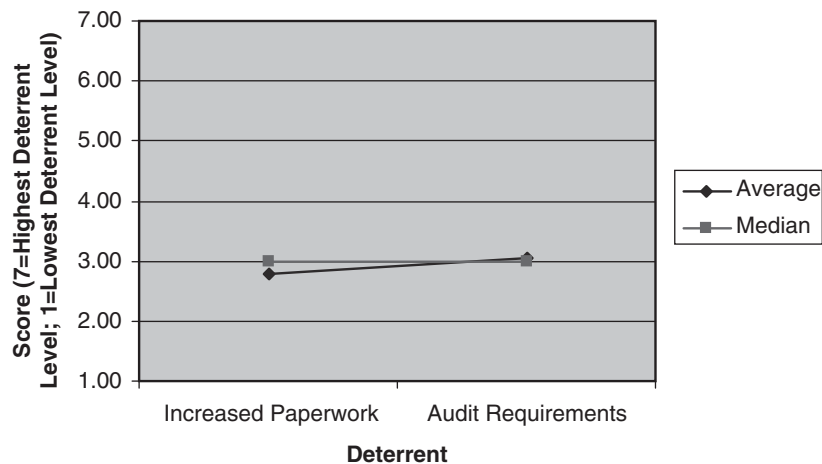**Figure 8. Effect of a potential deterrent on program participation.**

requirements. Only one company indicated an incentive in the blank box labeled "other," offering safety documentation as an incentive and giving it a score of 6.0.

Respondents were then asked about waivers of certain FMCSA compliance requirements based on participation in self-evaluation or certification programs. Of the 25 respondents, 88% indicated that their interest in such programs would be promoted if roadside inspections were waived, and the same number indicated a promotion in interest if driver log requirements were waived (see Figure 7). A similarly high number was given for compliance reviews and for drug and alcohol testing, with 84% indicating a promoted interest in self-evaluation and certification programs based on such compliance waivers.

Finally, respondents were asked to rank two factors that may deter participation in self-evaluation or certification programs, with a score of 1 indicating no deterrence and a score of 7 indicating the highest level of deterrence (see Figure 8). The first of these deterrents was the introduction of increased paper work and documentation. An average score of 2.79 out of 7.00 (median 3.0) was given by the 24 carriers that responded. A similar response was given for the audit requirements associated with certification, which received an average score of 3.04 out of 7.00 and a median of 3.0.

CHAPTER 5

Approaches to Evaluation of Program Effectiveness

Each ongoing program review included a discussion of how the program was evaluated, if at all, and what criteria were used in the evaluation process. **In essence, there is sparse coverage or documentation of measurable program effectiveness of certification and self-evaluation programs in the motor carrier and motor coach industries.** Further, there is little evidence that programs have been designed with an evaluation process as an integral part or purpose. The following highlights the various criteria that are being used to evaluate programs and the available related findings for the respective programs.

Accident and Incident Reduction

- ISO 9000. The study of ISO 9000 firms who implemented the management practices involved is the only study which clearly documents a relationship between implementation of the program and reduced accidents and truck related incidents. The study found, after review of accident performance records of fleets of the firms involved, that adoption of ISO 9000 practices had a positive effect on motor carrier safety.
- CSA Safety Management Systems. An undocumented, anecdotal report indicated that pilot fleets experienced a reduction in incident rates of about 19%.
- Responsible Care. The program indicates that distribution incidents (hazardous material handling incidents reported to DOT) reported by participating companies themselves declined by 27% since 1995.
- PIC, PrePass, and NorPass. These programs used incident rates as thresholds for program qualification, and there is no documentation that indicates program existence has had a direct influence on overall industry incident rates.

Reduction of Insurance Rates

- CSA Safety Management Systems. An undocumented, anecdotal report indicated that two pilot fleets experienced a 20% reduction in insurance rates.
- TruckSafe. Among the suggested benefits of this program is reduction of insurance rates, but there is no documentation of this result.

Improved Compliance

- CSA Safety Management Systems. Among the original objectives of this program was improved compliance, and a report of results from pilot fleets indicates that violation rates decreased through involvement in the program.
- PIC, PrePass and NorPass. Compliance records are used as thresholds for program participation, and there is no documentation that this has had a direct influence on overall industry compliance rates.

Targeting of Scarce Enforcement Resources

While a number of the certification and alternative compliance programs have the potential benefit of improved targeting of scarce enforcement resources, no analysis of this benefit has been found in the literature, and no baseline study of this benefit appears to be available.

Productivity Benefits

In the discussion of each program in Section 3.2, productivity benefits for fleets participating in best practices or formal certification programs are presented. While these have not generally been quantified in the literature, the universality of a stated benefit appears to give them credibility.

CHAPTER 6

Potential for Integration of Certification Programs with Regulatory Regimes

In August 2004, the FMCSA began an initiative to evaluate the effectiveness of its current safety compliance and enforcement programs. Titled Comprehensive Safety Analysis 2010 (CSA 2010), the initiative is seeking to establish an "operational model" that could be used by FMCSA to confirm a carrier has a safe operation and identify carriers that need focused compliance and enforcement activities.

CSA 2010 began with a series of listening sessions to gather public input and suggestions to support the process. The results of the listening sessions have been published and are available on the FMCSA website (http://www.fmcsa.dot.gov/safety-security/csalisteningsessions.htm). A section of the listening sessions report focuses on safety polices and business processes, involving comments on safety culture and environment and pointing out the view that "compliance does not necessarily equal safety" and that "safety management requires a broader approach than simply complying with regulations."

Use of certification as an alternative to compliance programs has been explored significantly in Australia, in connection with development and review of the NHVAS and its relationship to the TruckSafe program. An early report of the National Road Transport Commission was published in January 1998 and reprinted in July 2002. The paper is available with other related resources at http://www.ntc.gov.au/DocView.aspx?page=A02201507300890020. This paper serves as a starting point for considering the concept of an operational model of safety regulation along with industry best practices. The Australian National Transport Commission is now considering how to strengthen its NHVAS programs, and how they can be coordinated with TruckSafe.

To consider how certification programs relate to motor carrier regulatory compliance efforts, the synthesis included discussions with representatives of FMCSA and the CVSA. In a session with FMCSA officials and through an informal survey of CVSA officers, several questions were posed about how this relationship might occur. The following summarizes the input from this process. The comments should be con-sidered as suggestions and ideas, not as official statements of the agencies or officials involved. Nonetheless, they provide a framework for considering the use of a certification model as part of a future framework of FMCSA and state motor carrier enforcement operations. Following are the questions posed and the summary of input from enforcement officials.

1. **What is the potential interest and possible objective for consideration of roles of certification and self-evaluation programs in relation to motor carrier regulatory programs?**
   - These programs could allow focusing enforcement more around problem companies
   - Carriers that spend time and effort maintaining safe vehicles and drivers would take less effort
   - Intrinsically, such programs would benefit highway safety
   - CVSA should be involved in development of such programs
   - Benefit to enforcement community should be specifically documented
   - Such programs could be a "force multiplier" for enforcement officials, especially because only about 1% of all carriers are "seen" through current efforts
   - Potentially, a surrogate for current safety fitness analyses
   - Might be a potential mandate for poorest performing carriers, who need a framework to improve and be tested for fitness
   - FMCSA needs incentives for improved safety performance "outside the compliance and enforcement tool box"
2. **Should there be an "alternative compliance" or regulatory exemptions trade-off as an incentive for participation?**
   - An incentive is essential
   - Should consider as part of CSA 2010
   - Relative to proven safety performance
   - Will need a strong hook to make the effort broad based
   - As a part of the process, regulations need to be evaluated to determine those which have direct impacts on safety.

If a regulation or regulatory process cannot be linked to safety through quantifiable science/data, experience and/or expert opinion, it is not necessary

3. **What elements of regulatory schemes might be waived?**
    - Almost anything, but must be simple and flexible
    - Compliance reviews
    - Weigh station bypass
    - Less vigorous enforcement activity to be defined
    - Administrative process and "paperwork" maintenance, retention, and reporting related issues
    - Minimize "physical" oversight such as inspections, reviews, audits
    - Consider relaxing "tolerance" levels in areas such as hours of service, size and weight—key economic areas for industry

4. **What evaluation criteria could be elements of a program?**
    - Safety rating
    - General safety performance
    - Must demonstrate link between program and safety performance
    - Crash reduction must be the driving element that justifies trust in an alternative compliance relationship—x% reduction per 100 thousand miles traveled

- Strong demonstration of effectiveness will be required as a rationale for moving forward with alternative compliance. Can be considered if there are hard numbers—quantification!

5. **Other factors?**
    - Means to deal with smaller carriers, perhaps through collaborative efforts with state trucking associations
    - Enforceability of any alternative criteria, programs, or standards. Whatever is done, it has to be simple to identify the players, and simple to identify what relief the player gets
    - Process must be open, accessible, transparent, simple, and enforceable
    - Consideration of a pilot program, either as a follow on to ISO 9000 study or otherwise to demonstrate program benefits and effectiveness

Although the summary provides only an informal and limited sample of opinions, the comments received demonstrated a high level of interest. The Australian experience is instructive for the levels of effort needed to achieve consensus on mutual objectives, incentives, performance indicators, qualifications, oversight, auditing, and other program aspects.

CHAPTER 7

Conclusions and Potential Developmental Approach

7.1 Conclusions

This synthesis of certification and best practices and self-evaluation programs yields the following conclusions.

1. There is a rich and relatively settled set of best practice approaches and processes designed to improve motor carrier safety and reduce crashes and incidents.
2. Costs of implementation of best practices by motor carrier firms are generally borne as internal management costs, and the benefits are realized through productivity improvement and reduced safety incidents.
3. Although there is limited validation of crash reduction from best practices applications, there are significant indications of improved motor carrier safety performance through best practices applications.
4. Interest in use of certification and best practices in alternative compliance schemes is strong in North America and Australian enforcement communities.
5. Broad implementation of certification and best practice schemes will require better validation of the effectiveness of schemes and significant incentives from regulatory agencies.

These conclusions suggest further investigation (1) of the effectiveness of certification and best practices schemes to achieve reduced crashes and incidents among motor carriers and (2) of the potential relationship of the schemes to regulatory regimes. The conclusions and a potential approach to this investigation are described in the following subsections.

Best Practice Components—A Common Set of Protocols

A review of the several best practice and self-evaluation programs set out in this synthesis suggests that, although there are minor differences, there is a common set of prescribed practices among all the programs and schemes.

In Section 3.2.2, the discussion of insurance considerations related to certification serves as a basic template for all the schemes. In insurance terminology, "exposures" relate to drivers and vehicles. Each exposure area is then reviewed in relation to management controls. For drivers, the focus is on qualifications and selection; development and training; supervision; incident management; and health and welfare, including fatigue management. For vehicles, the focus is on vehicle specifications and selection, inspection, repair, and ongoing maintenance. For both vehicles and maintenance, the industry leading practices incorporate leadership, accountability, measurements, internal reviews and audits, quality controls, and continuous quality improvement. All these management controls and practices are in common with the core principles of the ISO 9000 process and are found in the TruckSafe, Canadian Safety Management Systems, NPTC Best Practices, and SafeReturns components.

The commonality of the best practice components suggests that it will not be difficult to agree on core protocols of a scheme to test effectiveness and to use them in alternative compliance approaches. However, cost factors—the costs of internalizing management practices—could be a barrier to building consensus on accepted practices.

Need for Evidence of Effectiveness

While there is some evidence that implementation of a formalized best practices scheme will yield improvement in safety performance, it is clear that enforcement agencies will demand stronger evidence that such a scheme will reduce crashes and incidents before embarking on an alternative compliance link to best practices application. Any effort to test effectiveness will require the design of an evaluation process incorporating baseline data and definitive measures of performance success. Enforcement officials indicate that while a pilot effort could help yield such information, a broader approach will require clear demonstration of safety benefits, including crash and incident reductions.

Interest in Certification and Best Practices/Alternative Compliance Schemes Warrants Further Investigation

Alternative compliance programs such as PrePass and Nor-Pass are evidence of motor carrier enforcement community interest in rewarding carriers that have improved safety performance with some exemptions from current regulatory requirements. The CSA 2010 effort by FMCSA is seeking alternatives to current compliance regimes and development of new, more effective operating modes.

Given FMCSA interest in seeking alternative operating and business models, along with proven benefits of best practice use by safe carriers, the confluence of these factors suggests that both the carrier community and FMCSA could benefit from a collaborative effort to investigate the relationship of best practices and the FMCSA approach to improving motor carrier safety.

Validation of Certification/Best Practices Effectiveness and the Relationship to Alternative Compliance Programs

The key research need relating to certification and best practices programs is validation of effectiveness of such programs in improving safety and reduction of crash rates and safety incidents. Alternative compliance schemes could provide significant incentives for carriers to adopt best practices, but enforcement officials are seeking stronger evidence of program effectiveness before adopting alternative compliance approaches.

7.2 Potential Developmental Approach

A pilot program could provide the means to test program effectiveness and engage the enforcement community to consider alternative compliance. A suggested pilot program follows.

1. Establish a Best Practices/Alternative Compliance Pilot Program Steering Committee.
   a. Composition. The Committee would include representatives such as members of the FMCSA 2010 Team, CVSA leadership, industry leadership from the ATA and NPTC, motorcoach associations, state trucking associations, motor carrier insurance industry, and other identified critical stakeholders.
   b. Scope. The Committee would design and oversee a pilot program effort, with a defined timeframe with resources provided by involved agencies and associations.
   c. Support. The Committee would be supported by independent staff to facilitate actions and provide critical information and research.
2. Define Program Elements.
   a. Select Best Practices Components. Using current programs as a guide, the Committee would select and publish the best practices components to be core elements in the test scheme.
   b. Determine Audit Approach. The Committee would determine how the practices of participating truck and bus fleets would be validated.
   c. Determine Planned Measures of Effectiveness. These would include the following elements:
      i. Reduction in crash and incident rates
      ii. Reduction in settlements and equipment losses
      iii. Reduced insurance rates
      iv. More effective targeting of enforcement efforts
      v. Savings in fleet compliance costs, including administrative and other costs for regulatory processes
      vi. Realized program administration costs and practicalities
   d. Establish Baselines for Measurement of Effectiveness.
   e. Determine Compliance Exemptions and Other Incentives for Participating Fleet Operations.
   f. Determine Pilot Scope. This would include the following:
      i. Industry segments and size classes to be involved
      ii. Federal and state participation
      iii. Timeframe
      iv. Outreach activities related to program test
3. Recruit Test Participants and Oversee Pilot.
4. Evaluate and Report Results of Test and Provide Recommendations for Next Steps.

The research team suggests that key stakeholders take further steps to investigate and validate the effectiveness of certification and best practices schemes and how they relate to regulatory regimes affecting the motor carrier community. The research team believes the pilot effort outlined can be an effective first step.

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APPENDIX A

Project Statement of Work

CTBSSP MC-13, Commercial Motor Vehicle Carrier Safety Management Certification

Management quality certification, as promulgated by the International Standardization Organization (ISO) and other standards development organizations, is a method organizations may employ to improve the quality of their products and services. Management quality requirements and guidelines are established, and organizations conduct internal audits to assess their practices, followed by external audits by an independent, accredited certification organization. Once achieved, such certification is a source of pride for these organizations and their employees, and is showcased by companies as objective evidence of their organizational excellence and, by implication, the excellence of their products and services. More than 300,000 organizations worldwide have been quality-certified.

Management quality certification can be applied with an emphasis on safety management. This approach has been applied widely in industrial safety—e.g., in factories and utilities—and is increasingly being applied to motor carrier safety management. Effective fleet safety management involves a number of diverse practices ranging from equipment management (e.g., preventive maintenance) to driver safety training, behavior and performance, and incentive programs. The certification process involves documentation of the explicit safety management standard operating procedures ("SOPs") espoused by a fleet, and demonstration that these practices are indeed followed by managers and drivers. Specific areas for standards-setting and verification include vehicle maintenance, loading dock safety, management operational oversight, driver qualifications and training, evaluation and tracking of driving behaviors, and driver health and wellness.

Preliminary research has shown the promise of safety management certification for improving CMV safety. For example, Australia's TruckSafe claims that its accredited fleets have 40% fewer crashes than non-accredited operators. In addition to structured "certification" programs, other less formal benchmarking and recommended practices programs exist and their relative effectiveness would also be examined.

The objective of this synthesis is to document current information on existing CMV safety certification, self-evaluation, benchmarking, and Best Practices programs, identify major common elements and protocols, and critically assess evidence for the crash-reduction effectiveness of such programs. This synthesis will survey truck and intercity/charter bus carriers and other applicable industries and relevant organizations for their experiences. The effort will also include a literature review and case study information about innovative and successful practices.

The synthesis will also identify research needed to categorically demonstrate the value of safety certification and self-evaluation programs and to develop standardized, public domain guides to support fleets seeking to upgrade their safety management practices. Synthesis findings will also support other organizations, such as insurance companies or major shippers that may wish to develop CMV fleet safety management certification programs or services.

The synthesis will examine the relationship between safety management certification and more conventional indices of fleet safety performance such as roadside violation rate (driver and vehicle), traffic violation rate, and crash rate. This relationship is of particular interest to Federal and State regulators and the enforcement community. The results could provide information to the Federal Motor Carrier Safety Administration on the potential role of government in developing certification incentives. It will also add information that could support the potential that carriers that value ISO or safety certification place higher value and responsibility on safety programs, and could be subject to a less stringent enforcement and compliance regimen.

Audience: CMV fleet safety managers would be the principal audience for this study. In addition, the study would be

useful in guiding future R&T in this area. Thus, it would be useful to FMCSA R&T, CMV industry trade association researchers, and other motor carrier safety researchers.

Potential agencies to be surveyed: Commercial truck and intercity/charter bus carriers with exemplary safety records, FMCSA, the Commercial Vehicle Safety Alliance, American Trucking Associations Foundation, Motor Freight Carriers Association, National Private Truck Council, and insurers of motor carriers. Organizations currently offering safety certification for motor carriers include the ISO, CSA International, and the Australian Trucking Association's TruckSafe program. The hazardous materials-carrying segment of the CMV industry may be an excellent source of information since many safety-related SOPs are employed in this segment and its crash rates are generally low.

Potential information sources: In addition to the above organizations, information sources include journals, texts, trade publications, and web pages relating to management, industrial safety, and commercial motor vehicle transportation safety.

Carrier Safety Manager Survey

NOTE: The survey for *CTBSSP Synthesis 12* was coordinated with the survey process for *CTBSSP Synthesis 14* to minimize the impact of surveys on potential respondents and to increase the response rate. The entire survey is presented here.

CMV Safety Culture and Certification Program Survey

The American Transportation Research Institute (ATRI) is working to gain a better understanding of the concept of safety culture and views on certification programs within CMV companies. The first of these topics will focus on overall company attitudes and practices regarding safety, while the second will inquire about experiences with safety certification programs. Your feedback will be very helpful in this study, and all information will remain confidential. If you would like a copy of the final research report and best practices, please be sure to include your contact information.

Please print/fax completed surveys to Jeff Short at (**770-432-0638**) or send electronic versions of this survey to jshort@trucking.org. Thank you for your time and assistance!

Company
Name:_____

Contact
Name:_____

Your Title and Department:

_____

Phone Number:
_____Email:_____

Your Company Demographics

1. How many power units does your company operate: _____
2. How many employees (excluding drivers) does your company employ:_____
3. How many drivers (employees and owner/operators) does your company employ:_____
4. Which categories best describe your company? *(Check all that apply)*

☐ Trucking Company		☐ Motor Coach	
☐ Private	☐ Truckload	☐ Charter/Tour	☐ Scheduled Passenger
☐ LTL	☐ Specialized	☐ Student Transportation	
☐ HazMat		☐ Other, please specify:	
☐ Other, please specify: _____		_____	

5. Indicate what percentage of your principal operations occur in each area: (*Should equal 100%*)

Trucking Company	Motor Coach
____% Short haul/Local	____ % Local
____% Long haul (500 or more miles)	____ % Regional
--	____ % National
100% Total	--
	100% Total

6. Briefly describe your safety management responsibilities:
    _____

Safety Department / Organization Overview

7. Does your company have a safety management department/safety function (i.e. a department that has safety responsibilities)?   ☐ Yes   ☐ No
    7a. If yes, what level of importance does this department/function hold within the organization's priorities? (*Mark only one)*
        ☐ Safety is the top/central priority.
        ☐ Safety is an equal priority with other operational objectives.
        ☐ Safety is important, but other priorities are more important.

    7b. If safety is not the top/central priority, please elaborate:_____

    _____

8. What is the reporting relationship of the Safety Department/Function to the CEO/President and/or upper management team? (*Mark all that apply*)
    ☐ Safety Department Leader reports directly to the CEO/President.
    ☐ Safety Department has leader(s) who is/are on-par members of the executive team.
    ☐ Safety Department leader reports to another Staff Leader (i.e. Operations or HR).
        Name Other Department: _____
    ☐ Other (Indicate Safety Dept Reporting relationship):
    _____

9. Indicate the areas below where operational decisions are integrated with your organization's safety activities: (*Mark all that apply)*
    ☐ Driver Screening   ☐ Driver Selection   ☐ Driver Discipline
    ☐ Firing   ☐ Compensation   ☐ Company Safety Policies
    ☐ Safety Related Benefits/Incentives

10. Please rank order the following seven motivations for improving company safety 1 through 7, with **1 being the most important** and **7 being the least important**. (*Please use each number only once.*)

_____ Reduce crashes

_____ Avoid enforcement issues (fines/driver violations)

_____ Avoid costly lawsuits

_____ Attract customers

_____ Attract drivers

_____ Decrease insurance costs

_____ Set a high industry safety standard

_____ Other, please specify: _____

CMV DRIVERS: HIRING, TRAINING AND RETENTION

11. What safety-related driver history information do you collect before hiring a driver? (*Mark all that apply*)

☐ Traffic Violations   ☐ Traffic Convictions   ☐ Crash History

☐ Drug & Alcohol Testing History   ☐ General Background Check   ☐ Felony Convictions

☐ Other, please specify:_____

12. In order of importance, list your company's top three safety performance predictors:

1_____
2_____
3_____

13. List the top 3 safety-related driver history indicators that will lead you **not** to hire a driver.

1_____
2_____
3_____

14. Do you hire entry-level drivers?   ☐ Yes   ☐ No

14a. If **yes**, do you have an entry-level driver training program?   ☐ Yes   ☐ No

14a1. If you do, what is the duration:_____ weeks

15. Do you have ongoing safety training for drivers?   ☐ Yes   ☐ No

15a. If **yes**, how frequently: _____

15b. If **yes**, please mark all safety subjects that are included in safety training

☐ Defensive Driving   ☐ Fatigue and Wellness   ☐ Backing
☐ Security   ☐ Coupling/Uncoupling   ☐ Accident Procedures
☐ Extreme Weather Driving ☐ Compliance Training
☐ Other, please specify:

_____

16. Do you have remedial safety training? ☐ Yes   ☐ No
    16a. If **yes**, when is it applied/used?_____

17. For the average driver, how many times per year are the following conducted?
    a. On-site safety training   _____/year
    b. Call-in/dispatch safety training   _____/year
    c. Online training   _____/year
    d. Behind the wheel   _____/year
    e. Other, please specify _____   _____/year

18. What role does safety/safety culture play in your recruiting
efforts?_____
_____

19. How does your company's safety culture relate to driver turnover? (*Mark only one*)
    ☐ Improves Retention   ☐ No Impact   ☐ Harms Retention
    19a. Please
describe:_____

BONUSES AND INCENTIVES

20. Do you have a bonus or incentives program that rewards safe drivers? ☐ Yes
    ☐ No
    20a. If **yes**, please list program details by action and reward:

ACTION/BEHAVIOR	REWARD

EXTERNAL ENVIRONMENT

21. In terms of the general CMV driver population (not just your company's drivers) do
    you agree that drivers operate in a culture of safety? (*Mark only one*)
    ☐ Strongly agree   ☐ Agree   ☐ Disagree   ☐ Strongly disagree   ☐ Uncertain

22. How does the overall culture among drivers within the industry impact your
    organization's safety efforts? (*Mark only one*)
    ☐ Undermines   ☐ No Effect   ☐ Supports

23. How much influence do other drivers outside of your company have on your drivers
    regarding attitudes towards safety? (*Mark only one*)
    ☐ Strong influence   ☐ Some influence   ☐ No influence

24. Indicate how much you agree or disagree with each of the following statements:

	Strongly Agree	Agree	Disagree	Strongly Disagree	Uncertain
Our customers value safety.	☐	☐	☐	☐	☐
Our insurers help make us a safer company.	☐	☐	☐	☐	☐
Enforcement sees our company as one that is safe.	☐	☐	☐	☐	☐
Drivers from other companies see our company as one that is safe.	☐	☐	☐	☐	☐
The general public sees our **company** as one that is safe.	☐	☐	☐	☐	☐
The general public sees our **industry** as one that is safe.	☐	☐	☐	☐	☐

Maintenance/Equipment Specifications

25. Do you have an internal maintenance department?   ☐ Yes   ☐ No
    25a. If **yes**, what is the relationship between the safety department and the maintenance department?
    _____

ACCIDENTS AND DRIVER CONVICTIONS

26. Please briefly describe the process for collecting information regarding violations/convictions that drivers have while employed by your company?
    _____
    _____

27. Please briefly describe the process for collecting accident information related to your vehicles and drivers?
    _____
    _____
    _____

28. Please rank the objectives of your accident investigations from1 through 5, with **1 being the most important** and **5 being the least important**. (*Please use each number only once.*)
    ____ To determine who was at fault.
    ____ To determine appropriate response/actions towards driver.
    ____ To determine methods of accident prevention.
    ____ To protect the company from liability.
    ____ To improve overall fleet safety.

<u>**TECHNOLOGY INVESTMENTS**</u>

29. What type of safety technologies has your company invested in within the past 5-10 years?

1)_____

2)_____

3)_____

4)_____

5)_____

30. What are the objectives/ goals of safety technology investments: (e.g. accident reduction; improved driver performance; accident cost reduction)

Technology Type	Major Objective(s) for Use

<u>**FAMILIARITY/EXPERIENCE WITH EVALUATION/CERTIFICATION PROGRAMS**</u>

31. Please indicate which safety evaluation/certification programs you are familiar with and have participated in:

Familiar with: Participated in:

☐   ISO 9000/9001   ☐

☐   NPTC's Online Best Practices Fleet Audit   ☐

☐   Surface Deployment and Distribution Command   ☐
           (SDDC)

☐   American Chemical Society – Responsible Care   ☐

☐   Partners in Compliance (Alberta)   ☐

☐   The Canadian Standards Association and other   ☐
           Canadian Safety Management Systems (SMS)

☐   Insurance related management process or program   ☐

☐   Health, Safety, & Environment third party or self-   ☐
           assessment program

☐   Other, please specify: ☐
           _____

32. If you have participated in a safety certification program, what was the motivating factor? (*Mark all that apply*)
    ☐ Corporate management requirement   ☐ Safety discipline or culture
    ☐ Shipper requirements   ☐ Industry trade practices
    ☐ Recognition or marketing advantage   ☐ Insurance rate management
    ☐ Offset to regulatory requirements
    ☐ Other, please specify: _____

33. If you have participated in a safety certification program, what measurements, if any, do you use to evaluate the effectiveness of your participation or involvement in the program? (*Mark all that apply*)
    ☐ Accident/Injury/Incident Experience
    ☐ Insurance rates
    ☐ Reduced administrative burdens related to regulatory compliance
    ☐ Other, please specify: _____

INTEREST IN CERTIFICATION PROGRAMS

34. If you have not previously participated in a formal/external safety certification program, do you have a current interest in considering implementation of a safety evaluation or certification program?   ☐ Yes ☐ No Interest
    34a. If **yes,** what was the reason(s)? (*Mark all that apply*)
    ☐ Insurance rates   ☐ Marketing and recognition
    ☐ Management commitment to safety   ☐ Offset to regulatory
    compliance
    ☐ Improve or reduce accident/injury rates   ☐ Shipper/customer
    requirements

35. Indicate how much each of the following incentives would expand or promote your interest in an evaluation or certification program - **1 being would not expand or promote interest at all**, **7 being would expand or promote interest a great deal**):

    Insurance company incentives   1…....2…....3…....4…....5…....6…....7

    Regulatory compliance relief   1…....2…....3…....4…....5…....6…....7

    Shipper/Customer requirements   1…....2…....3…....4…....5…....6…....7

    Other, please specify: _____   1…....2…....3…....4…....5…....6…....7

36. If the FMCSA waived the following compliance requirements in return for your demonstrated and auditable commitment to a self-evaluation or certification program, would this promote your interest in implementing such a program?   (*Choose* ☐ Yes *or* ☐ No)

	Yes	No
Roadside inspections	❏	❏
Driver logs	❏	❏
Compliance reviews	❏	❏
Drug and alcohol testing	❏	❏
Other, *please specify*:	❏	❏

37. Indicate how much each of the following factors would deter your participation in an evaluation or certification program -- **1 being would not deter participation at all, 7 being deter participation a great deal**):

Increased amount of paper work involved in application and documentation of practices	1…....2..…..3…....4…....5…....6…....7
Potential audit requirements associated with initial or on-going certification	1…....2..…..3…....4…....5…....6…....7
Other, please specify: _____	1…....2..…..3…....4…....5…....6…....7

38. Please provide any additional comments or views on the potential for evaluation or certification programs to offset regulatory requirements at the Federal or State level.

_____

_____

_____

Return Completed Surveys Via:

Fax: 770-432-0638 Or **Email: jshort@trucking.org**

Abbreviations and acronyms used without definitions in TRB publications:

AAAE	American Association of Airport Executives
AASHO	American Association of State Highway Officials
AASHTO	American Association of State Highway and Transportation Officials
ACI–NA	Airports Council International–North America
ACRP	Airport Cooperative Research Program
ADA	Americans with Disabilities Act
APTA	American Public Transportation Association
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
ATA	Air Transport Association
ATA	American Trucking Associations
CTAA	Community Transportation Association of America
CTBSSP	Commercial Truck and Bus Safety Synthesis Program
DHS	Department of Homeland Security
DOE	Department of Energy
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
FMCSA	Federal Motor Carrier Safety Administration
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
IEEE	Institute of Electrical and Electronics Engineers
ISTEA	Intermodal Surface Transportation Efficiency Act of 1991
ITE	Institute of Transportation Engineers
NASA	National Aeronautics and Space Administration
NASAO	National Association of State Aviation Officials
NCFRP	National Cooperative Freight Research Program
NCHRP	National Cooperative Highway Research Program
NHTSA	National Highway Traffic Safety Administration
NTSB	National Transportation Safety Board
SAE	Society of Automotive Engineers
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (2005)
TCRP	Transit Cooperative Research Program
TEA-21	Transportation Equity Act for the 21st Century (1998)
TRB	Transportation Research Board
TSA	Transportation Security Administration
U.S.DOT	United States Department of Transportation