

CHAPTER 3

SAFETY MANAGEMENT PROBLEM AREAS

What are the problems that CMV fleet safety managers should focus on in their efforts to achieve greater fleet safety? Driving, whether in a truck or car, involves basic knowledge, physical abilities and skills, and safe behavior practices. Ideally, safe behavior practices encompass defensive driving practices to anticipate and compensate for the mistakes of other drivers on the highway.

In many ways, driving a large truck or bus in commercial operations presents a far greater safety challenge than driving a “four-wheeler.” Mileage exposure and time behind the wheel are an order-of-magnitude higher for commercial drivers compared to non-commercial drivers. Thus, issues like fatigue, schedule delays, and general health are of critical importance for these drivers. And, since a loaded truck may be 20 times or more the size and weight of a car, severe vehicle damage and occupant injuries can result from CMV crashes, with non-CMV occupants the predominant victims.

Given these safety disadvantages compared to car driving, it is notable that commercial drivers generally have good safety records. The crash involvement rate per mile traveled of combination-unit truck (tractor-semitrailer) drivers is less than one-half that of cars and light trucks, and a much smaller percentage of their crash involvements are as the “at fault” vehicle (Craft 2000; Wang, Knipling, and Blincoe 1999). Commercial drivers are less likely than non-commercial drivers to seriously violate speed limits (NHTSA 1991) or engage in aggressive or risky driving behaviors. The majority of car-truck crashes are related more to the errors and misbehaviors of car drivers than to those of truck drivers (FHWA OMC 1999a). However, because of the high mileage exposure of trucks and the oftentimes severe consequences of their crashes, there is a premium on making trucks and truck drivers safer. Annual crash costs are more than four times greater for a combination-unit truck (tractor-trailer) than for a passenger car (Wang, Knipling, and Blincoe 1999).

This chapter addresses the “what” issue. Problem areas considered include deficiencies in driver skill, knowledge, or safety behavior; fatigue and other sources of impairment; physical and medical problems, attitudes, morale, and turnover; vehicle inspection and maintenance, and the problem of high-risk drivers associated with any of these problems. Findings from the scientific literature are cited, and results from the project surveys are presented and briefly discussed. The reader may also wish to refer to Table 1, which provides an overall summary of survey results for the 20 problem areas.

3.1 INSUFFICIENT TRAINING: LACK OF DRIVING SKILL AND KNOWLEDGE

A study published by the Office of Motor Carriers in 1995 (FHWA 1995) assessed the entry-level training of U.S. drivers of CMVs and concluded that neither heavy truck nor motor coach drivers generally receive adequate entry-level training. More recently, in an FMCSA R&T study called “Driver, Vehicle, and Roadside Strategies for 2010” (FMCSA 2002), “inadequate and infrequent training” of CMV drivers, with specific reference to on-the-job training in fleets, was cited as one of five high-priority safety problem areas. The level of driving proficiency and knowledge required to earn a commercial drivers license (CDL) is widely regarded in industry as well below the level required to be a safe and reliable driver in a full-time operational setting. Thus, the adequacy of driver skills and knowledge is an issue of concern for fleet safety managers.

The project survey problem area section included items on driver skills (No. 1a) and knowledge of regulations and rules (No. 1b). Survey results were as follows:

Problem Area 1a. Insufficient training: Lack of basic driving skills.

Respondent Type	Average Importance Rating		“Top Five” Selections	
	Avg. Rating	Rank (of 20)	% of Respondents	Rank (of 20)
Safety Managers	2.74	14	17%	12
Other Experts	3.26	17	16%	9

Problem Area 1b. Insufficient training: Poor knowledge of federal, state, and/or company rules.

Respondent Type	Average Importance Rating		“Top Five” Selections	
	Avg. Rating	Rank (of 20)	% of Respondents	Rank (of 20)
Safety Managers	3.04	12	18%	11
Other Experts	3.30	16	11%	13

Relative to other items in the problem set, driver lack of basic skills and knowledge were not highly rated as safety management problems.

3.2 AT-RISK DRIVING BEHAVIORS AND AGGRESSIVE DRIVING

At-risk driving behaviors include speeding, excessive speed on curves or in relation to weather conditions, improper following distance, lateral encroachment (e.g., during attempted lane changes; perhaps due to improper mirror use), failure to yield at intersections, and general disobedience of the rules-of-the-road. While all drivers exhibit one or more of these behaviors at times, the behaviors represent a major safety concern when they are frequent and constitute a pattern of behavior.

The most common truck driver behaviors cited and associated with fatal large truck crashes include failure to control vehicle (i.e., ran off road or out of lane), driving too fast, failure to yield right-of-way, inattentiveness, erratic/reckless driving, following improperly, and making improper turns (Craft 2000). Of course, these factors are generally more likely to be cited for passenger vehicle drivers than for large truck drivers in crashes.

In a study of local/short-haul commercial driving, Hanowski et al. (2000) identified the driver-related causes of “truck driver at fault” critical incidents (i.e., driver errors resulting in near-crashes or unsafe conditions) to include driver inattention, fatigue, stress due to time pressure, failure to follow proper procedures (e.g., use of mirrors while backing), overconfidence (e.g., excessive speed around corners), visibility, and distraction (e.g., cell phone use). Some of these may be characterized as inadvertent “mistakes,” while others represent intentional at-risk behaviors. Common specific driving errors include lane changes without sufficient gaps, roadway entrances without clearance, left turns without clearance, and late braking for stopped or stopping traffic (Hanowski, Keisler, and Wierwille 2001).

The FMCSA Driver, Vehicle, and Roadside Strategies project (FMCSA 2002) identified commercial driver moving violations, including speeding, erratic or reckless driving, and failure to obey traffic signs among its five high-priority safety issues.

“Aggressive” driving is difficult to define or distinguish meaningfully from “non-aggressive” at-risk driving. However, aggressive driving or “road rage” is generally considered to involve frustration- or anger-related driver emotions and actions characterized by extreme disregard for safety and menacing behavior toward other vehicles and drivers.

Project survey results relating to at-risk and aggressive driving were as follows:

Problem Area 2. At-risk driving behaviors (e.g., speeding, tailgating).

Respondent Type	Average Importance Rating		“Top Five” Selections	
	Avg. Rating	Rank (of 20)	% of Respondents	Rank (of 20)
Safety Managers	3.75	1	55%	1
Other Experts	4.21	3	58%	4

Problem Area 3. Aggressive driving (i.e., “road rage”).

Respondent Type	Average Importance Rating		“Top Five” Selections	
	Avg. Rating	Rank (of 20)	% of Respondents	Rank (of 20)
Safety Managers	3.26	7	26%	8
Other Experts	3.33	11	14%	11

As shown above, at-risk driving behaviors was among the very highest-rated and ranked safety problem for safety manager and was near the top for the other expert respondents as well. More than half of the respondents in both groups considered this to be a “Top 5” safety problem.

One safety manager respondent had a different perspective on at-risk driving behaviors; he suggested that “lack of operational discipline” was a more apt description. Per this view, a major goal of management is to establish driving rules and policies and ensure that drivers follow them.

The results for aggressive driving were somewhat mixed. Fleet safety managers rated the problem of somewhat greater importance than did other experts, but overall it was in the middle of the problem set. These results are difficult to interpret because it is possible that different respondents answered based on different definitions of aggressive driving. In addition, even though respondents were instructed to answer in regard to commercial drivers, some may have answered in regard to the overall traffic environment. The question warrants further study.

3.3 SPACE MANAGEMENT AND DEFENSIVE DRIVING

Studies relating to fatal crashes, all crashes, and critical incidents involving heavy trucks have consistently indicated that two-thirds or more of such events are precipitated by the actions of other motorists rather than those of the truck driver (FHWA 1999a; Hanowski et al. 2002; Hanowski, Keisler, and Wierwille 2001; Wang, Knipling, and Blincoe 1999). A study of the unsafe driving acts of other motorists around heavy trucks (FHWA 1999b) identified the following as being most common: changing lanes abruptly in front of a truck, driving left of center, following too closely, unsafe passing (primarily with insufficient headway), unsafe speed, merging improperly, and driving between large trucks. Given these statistics and the huge role that 4-wheeler driver behavior plays in truck crash causation, it is apparent that the space management and defensive driving skills of truck drivers play a critical role in their risk of crash involvement.

FMCSA maintains a web page (www.nozone.org) providing share-the-road, defensive driving, and space management information and tips for both commercial and non-commercial drivers.

The project survey included an item (No. 4) in the problem area section as follows:

Problem Area 4. Lack of defensive driving skills (e.g., space management around vehicle).

Respondent Type	Average Importance Rating		“Top Five” Selections	
	Avg. Rating	Rank (of 20)	% of Respondents	Rank (of 20)
Safety Managers	3.48	4	40%	4
Other Experts	3.58	8	23%	7

Fleet managers rated this among the top safety problems. For the other expert respondent group, it was rated and ranked somewhat lower, but still in the top one-half.

3.4 DRIVER FATIGUE

In the past decade, commercial driver fatigue has probably received greater press and government and industry attention than any other safety problem, in part because of the obvious but complex relation between fatigue and hours-of-service (HOS) regulations and enforcement. Commercial drivers drive long hours, often at night, and sometimes have irregular and unpredictable work schedules. Fatigue is an ever-present safety concern associated with the operational requirements of truck and bus transport.

Some studies, most notably those by the National Transportation Safety Board (NTSB), have indicated a very high involvement of fatigue in CMV crashes. Best known is NTSB’s 1990 study of 182 fatal-to-the-driver large truck crashes. The most frequently cited probable crash cause was driver fatigue, which was cited in 57 (31%) of the 182 crashes. Based on this study alone, fatigue must be considered a predominant risk factor for commercial drivers.

However, fatal-to-the-driver truck crashes represent a relatively small proportion of fatal truck crashes (about one-seventh) and a very small proportion of all truck crashes (about 1 in 700), and the risk of fatigue in these crashes is many times that of these larger crash populations. Knipling and Shelton (1999) presented range estimates of driver fatigue as a principal factor in heavy truck crashes, as a function of various parameters, including heavy truck type (combination or single-unit), crash severity, and depth of crash investigation (i.e., police accident report data vs. in-depth crash investigation data). These percentage estimates had a huge range—from 0.2% to 40%—a 200-fold range. Overall, based on in-depth crash investigations, fatigue was estimated to be a principal factor in about 1% of all large truck crashes and 3% to 6% of fatal large truck crashes (combining fatal-to-the-driver with fatal-to-other-motorists).

As emphasized by the project team, the most important deficiency in the above statistics is that they only address fatigue as seen and cited as a principal factor in crashes. They do not address the *contributing*, as opposed to primary, role that fatigue may play in crashes. Attentional lapses are reliably associated with sleep deprivation (Balkin et al. 2000; Dinges et al. 1998) and driver inattention is a very common contributing factor to crashes. Instrumented vehicle studies employing continuous driver alertness monitoring (using the PERCLOS eyelid droop metric) and driver error capturing are beginning to document and quantify the pervasive contributing role that fatigue can play in truck driving safety (Hanowski, Keisler, and Wierwille 2001).

Motor coach drivers face many of the same fatigue issues that truck drivers face. Focus group discussions with motor coach drivers have identified the presence of passengers in the vehicle as a major factor unique to motor coach driving that significantly contributes to motor coach operator fatigue. In particular, motor coach drivers cannot stop for a nap “on demand” as can a truck driver (FMCSA 2001a).

Various CMV safety forums have indicated fatigue as a priority safety problem. The 1995 Truck and Bus Safety Summit identified fatigue as the No. 1 safety problem. More recently, at a June 2001 driver and fleet safety conference, sponsored by the 21st Century Driver and Truck Alliance (Grace and Suski 2001), “consideration of driver fatigue as a major issue” was rated as a top priority for fleet safety managers. Also, in an FMCSA R&T study called “Driver, Vehicle, and Roadside Strategies for 2010” (FMCSA 2002), “fatigue, alertness, and distraction” was cited as one of five high-priority safety problem areas.

The project survey included an item (No. 5) in the problem area section as follows:

Problem Area 5. Driver fatigue/drowsiness.

Respondent Type	Average Importance Rating		“Top Five” Selections	
	Avg. Rating	Rank (of 20)	% of Respondents	Rank (of 20)
Safety Managers	3.37	6	29%	6
Other Experts	4.28	2	67%	2

The other expert respondent group rated CMV driver fatigue among the very top safety problems, and two-thirds considered it a “Top 5” safety problem. For the safety manager respondent group, it was rated and ranked somewhat lower—6th out of the 20 safety problems.

Different trucking operations types are associated with dramatically different daily and weekly schedules for drivers, and thus, potentially, different levels of fatigue. Below are the mean importance ratings placed on fatigue/drowsiness by safety managers from different operations types:

1. For hire, long-haul/truckload: 3.35;
2. For hire, long-haul/LTL: 2.56;
3. For hire, local/short-haul: 3.14;
4. Private industry [private carrier], long-haul: 3.58; and
5. Private industry [private carrier], local/short-haul: 3.32.

3.5 LOADING AND UNLOADING DELAYS AND RESULTING SAFETY PROBLEMS

Under the sponsorship of the FMCSA, the Trucking Research Institute (TRI) has conducted a major study on the effects of loading and unloading cargo on truck driver fatigue (O’Neil et al. 1999; Krueger and Van Hemel 2001). Phase I of the study included a literature review and focus group interviews with drivers (Krueger and Van Hemel 2001). Phase II was a simulation-based experimental study in which the alertness effects of performing loading tasks were compared to control drives not involving physical labor. These studies found no consistent evidence of fatigue resulting from the physical activity of loading and unloading. Instead, drivers overwhelmingly complained about the time required and unplanned delays associated with loading and unloading far more than about the physical work per se. Moreover, drivers in most segments of the truckload industry do not load and unload their trucks; that work is performed by shipper and receiver personnel. For these reasons, this discussion focuses on the delay issue rather than the effects of physical work.

“Hurry up and wait” at loading/unloading docks was cited by many drivers in the TRI focus groups as contributing to driver fatigue and unsafe driving practices. At many docks, trucks must queue up behind other trucks waiting to load or unload; drivers must remain awake and on duty during such waits. (Some shippers and receivers assign numbers to truckers as they arrive, thus permitting them to park the vehicle and rest during their waiting time.) The time lost at loading/unloading docks, if unplanned, puts drivers behind schedule, creating a real or perceived need to exceed speed limits and/or available work and driving hours under the HOS.

The project survey included an item (No. 6) in the problem area section as follows:

Problem Area 6. Delays associated with loading and unloading (e.g., resulting in long working hours, tight schedules, and fatigue).

Respondent Type	Average Importance Rating		“Top Five” Selections	
	Avg. Rating	Rank (of 20)	% of Respondents	Rank (of 20)
Safety Managers	3.45	5	40%	4
Other Experts	4.18	4	60%	3

Both respondent groups rated and ranked this as among the top carrier safety management problems. As one other expert respondent stated, “tight schedules lead to drivers getting in a big hurry, which leads to risky behavior.”

Operations-type differences were pronounced for this item also. Truckload safety managers assigned the item a mean rating of 4.04, and 51% of them ranked it as a “Top 5” item. For LTL safety managers, the corresponding statistics were 2.22 and 17%. For private long-haul carriers, the statistics were 2.74 and 32%.

3.6 ALCOHOL AND ILLICIT DRUG ABUSE

The 1990 NTSB fatal-to-the-driver crash investigation study identified alcohol and/or drug use as a close second to fatigue as a contributing factor in these fatal crashes. Fifty-three drivers (29%) tested positive for alcohol and/or drugs. More recently, FMCSA data relating to all fatal truck crashes (as opposed to fatal-to-the-truck-driver only) indicated that 1.3% of involved large truck drivers had blood alcohol content (BAC) levels of 0.10 or more, as compared with 19.7% of passenger vehicle drivers involved in fatal crashes (Craft 2000). Preliminary findings from the FMCSA/NHTSA Large Truck Crash Causation Study (LTCCS) indicate little alcohol and illegal drug use by truck drivers involved in crashes (Craft 2002).

Federal law requires all motor carriers employing drivers holding CDLs to have drug and alcohol testing programs. The random testing rates are 50% for controlled substances (drugs) and 10% for alcohol. In 1999, it was estimated that 1.3% of CDL holders tested positive for controlled substances and 0.2% for alcohol use (FMCSA 2001).

The project survey included an item (No. 7) in the problem area section as follows:

Problem Area 7. Alcohol and/or illicit drug abuse.

Respondent Type	Average Importance Rating		“Top Five” Selections	
	Avg. Rating	Rank (of 20)	% of Respondents	Rank (of 20)
Safety Managers	1.99	20	2%	20
Other Experts	2.54	20	2%	19

This safety problem received the lowest overall importance ratings and rankings from both respondent groups.

3.7 DRIVER HEALTH AND WELLNESS PROBLEMS

Driving is a continuous sensory-motor task that requires alertness and physical responsiveness to stimuli from the environment. Accordingly, certain core physical abilities and

basic medical health are essential for safe driving performance. FMCSRs (49 CFR 391.41) set physical qualifications standards for commercial drivers to prevent individuals with certain medical conditions from operating a CMV in interstate commerce. Disqualifying conditions include vision and hearing impairment, diabetes, and epilepsy. Current research is refining medical standards (e.g., on vision and diabetes) to make them more performance-based and thus more explicit, fair, and effective (FMCSA 2001c).

Lifestyle and General Health

In a report on CMV driver health and wellness, Roberts and York (2000) found that the prevalence of unhealthy lifestyles and associated medical conditions was significantly greater for CMV drivers than for the rest of the U.S. adult population. This includes significantly elevated rates (compared to the general adult population) of smoking, obesity, hypertension (high blood pressure), poor eating habits, physical inactivity, and stress. These behaviors and conditions contribute to absenteeism, increased medical costs, and reduced driver morale and retention. Few empirical studies have directly related these physical conditions to driving performance and crash involvement, but it is likely that they contribute substantially to reduced performance.

Survey results for this item are shown as follows.

Problem Area 8a. Lifestyle/general health-related (e.g., poor diet, smoking).

Respondent Type	Average Importance Rating		“Top Five” Selections	
	Avg. Rating	Rank (of 20)	% of Respondents	Rank (of 20)
Safety Managers	3.65	3	46%	2
Other Experts	3.79	6	44%	6

Notably, this was rated and ranked among the top safety management problems, with an even higher importance placed on the factor by safety managers than by other experts. Section 5.1 of this report addresses the issue in more detail.

Sleep Apnea

Sleep apnea is an emerging concern because of its profound disruption of sleep and its association with increased statistical risk of crash involvement (Stutts 2000). Obesity is a prime risk factor for sleep apnea, and the incidence of obesity among CMV drivers is approximately twice that of the general population (Roberts and York 2000). A major FMCSA-funded study, performed by the University of Pennsylvania under a subcontract with the TRI, estimated the prevalence of sleep apnea among CDL holders and also

quantitatively assessed how sleep apnea impairs driver performance (Pack et al. 2001 and 2002). The study found that mild sleep apnea occurs in 17.6% of those holding CDLs, moderate sleep apnea in 5.8%, and severe sleep apnea in 4.7%. These percentages are similar to those for the overall U.S. male population, but still indicate a significant medical and safety problem. The study also found progressive decrements in vigilance and other awake performance with increasing severity of sleep apnea. Sleep apnea sufferers tended to sleep less than other drivers, and the most marked deficits occurred in individuals with both severe sleep apnea and an average sleep duration of less than 5 hr/day. Partial sleep deprivation (i.e., less than 5 hr/night) was found to be more common (13.5%) than severe sleep apnea (4.7%), but these at-risk conditions overlapped in a disproportionate number of subjects. These estimates, as well as associated research findings on alertness and performance deficits, justify designating sleep apnea as a priority medical concern for commercial drivers.

Sleep apnea was a problem area addressed in the survey; the results are as follows:

Problem Area 8b. Sleep apnea.

Respondent Type	Average Importance Rating		“Top Five” Selections	
	Avg. Rating	Rank (of 20)	% of Respondents	Rank (of 20)
Safety Managers	3.07	11	9%	14
Other Experts	3.79	6	16%	9

Overall, sleep apnea was rated near the middle of the problem set, with somewhat greater importance placed on the issue by other expert respondents than by fleet safety managers.

Cardiovascular Illness

In the 1990 NTSB fatal-to-the-truck-driver study, nearly 10% of the crashes involved some form of cardiac incident. The following factors, all common among truck drivers, contribute to chronic and acute cardiovascular illness: elevated blood cholesterol, elevated blood pressure, excessive weight/obesity, lack of exercise, and smoking (Roberts and York 2000).

Evaluation of the item by survey respondents was as follows:

Problem Area 8c. Cardiovascular illness/heart disease.

Respondent Type	Average Importance Rating		“Top Five” Selections	
	Avg. Rating	Rank (of 20)	% of Respondents	Rank (of 20)
Safety Managers	3.19	8	13%	13
Other Experts	3.32	12	4%	17

Safety managers rated this as more important than other specific medical problems in the problem set. The ratings assigned by other experts were somewhat lower.

Prescription Drug Side Effects (e.g., Drowsiness)

No statistics were found relating to the incidence of prescription drugs among CMV drivers or their involvement as a contributing factor in crashes. However, prescription drug use is a factor being studied in the LTCCS, and preliminary results indicate that some cases are associated as a crash factor (Craft 2002). Survey results were as follows:

Problem Area 8d. Prescription drug side effects (e.g., drowsiness).

Respondent Type	Average Importance Rating		“Top Five” Selections	
	Avg. Rating	Rank (of 20)	% of Respondents	Rank (of 20)
Safety Managers	2.73	16	3%	19
Other Experts	3.32	12	2%	19

This problem was rated in the bottom one-half of the problem set by both safety managers and other experts. Its “Top 5” rankings were among the lowest of the 20 problems.

Mental Illness (e.g., Depression)

According to the National Institute of Mental Health, 22% of adult Americans suffer from a diagnosable mental disorder. Major disorders include depression, other mood disorders, and anxiety disorders such as panic disorders and obsessive-compulsive neurosis. The project survey included an item on mental illness as a health problem for commercial drivers. The results were as follows:

Problem Area 8e. Mental illness (e.g., depression, anxiety, mood disorders).

Respondent Type	Average Importance Rating		“Top Five” Selections	
	Avg. Rating	Rank (of 20)	% of Respondents	Rank (of 20)
Safety Managers	2.59	17	4%	17
Other Experts	3.05	19	4%	17

This problem was also rated and ranked near the bottom of the 20 safety problems.

3.8 DRIVER ATTITUDE AND MORALE

There are many factors that can undermine commercial driver attitude, morale, and overall level of personal happiness. Time away from home is a major factor, causing feel-

ings of loneliness and straining personal relationships. Other factors, such as long work hours, irregular schedules, dissatisfaction with pay or other job conditions, poor diet, and lack of regular exercise can contribute to unhappiness for some drivers. The project survey included an item in the problem area section as follows:

Problem Area 9. Poor attitude and morale, loneliness, alienation, unhappiness.

Respondent Type	Average Importance Rating		“Top Five” Selections	
	Avg. Rating	Rank (of 20)	% of Respondents	Rank (of 20)
Safety Managers	3.16	9	29%	6
Other Experts	3.47	9	14%	11

This problem was generally rated and ranked near the middle of the safety management problem set by both safety managers and other experts, although it was 6th in the “Top 5” rankings assigned by safety managers. One safety manager respondent stated his belief that “unprofessional” personal appearance and interpersonal demeanor were often associated with undisciplined driving, with resulting incidents and crashes. Another noted that some drivers have a general negative attitude toward management that can affect safety performance.

3.9 DRIVER TURNOVER

Driver turnover rates of 50 to 100% annually are common in many CMV operations. A recent FMCSA-sponsored report (Staplin et al. 2002) analyzed the relationship between driver job changes and safety and determined that frequent job changes or “churning” was associated with a significantly higher probability of crash involvement. For drivers who average three or more jobs with different carriers per year, the odds of being involved in an at-fault crash were found to be more than twice as high as for those with lower job change rates. The analysis was not able to discern the reasons underlying this relationship; whether, for example, it was job changes per se versus changes in geography, operations and cargo type, or other factors.

A factor related to both turnover and safety is driver attitudes. Taylor (1997) administered a questionnaire addressing drivers’ attitudes toward their company and managers, including fairness, pay, dispatching, performance evaluation, and other factors relating to their job satisfaction and morale. He found that negative attitudes toward the company and job were associated with both intent to quit and unsafe driving records.

High driver turnover rates within a company mean that many of their drivers are new to their company and operation, and hence at greater risk for crash involvement. The cost of recruiting, selecting, hiring, and training a new driver

is often \$6,000 or more (Staplin et al. 2002). This cost and the management staff time required places a huge burden on fleet management, curtailing its ability to develop, implement, and sustain safety programs for the rest of their drivers.

The project survey included an item in the problem area section as follows:

Problem Area 10. Driver turnover resulting in unstable workforce.

Respondent Type	Average Importance Rating		“Top Five” Selections	
	Avg. Rating	Rank (of 20)	% of Respondents	Rank (of 20)
Safety Managers	2.96	13	23%	10
Other Experts	4.09	5	46%	5

The above survey results indicate that other experts place significantly greater importance on driver turnover as a safety issue than do fleet safety managers. Almost one-half of the other expert respondents considered this to be a “Top 5” problem. In their comments, some safety managers and other experts stated their belief that turnover and poor safety were related, and that both were related in part to driver pay.

The for-hire truckload segment of the industry generally has higher turnover than either LTL or private long-haul operations. Not surprisingly, safety managers from the truckload segment had significantly higher mean ratings for this item (3.43) than either LTL (2.17) or private long-haul (2.37). Thirty-seven percent (37%) of truckload respondents rated this as a “Top 5” item versus 17% of LTL managers and 11% of private long-haul managers.

3.10 DRIVER UNFAMILIARITY WITH ROUTES

The extent to which drivers encounter unfamiliar routes is largely a function of their type of operation (e.g., truckload operations are likely to involve occasional unfamiliar routes, whereas LTL operations generally schedule regular runs on the same roads). The project survey included an item in the problem area section as follows:

Problem Area 11. Drivers unfamiliar with routes.

Respondent Type	Average Importance Rating		“Top Five” Selections	
	Avg. Rating	Rank (of 20)	% of Respondents	Rank (of 20)
Safety Managers	2.74	14	9%	14
Other Experts	3.32	12	11%	13

Both respondent groups rated this item in the bottom one-half of the problem set. One safety manager commented that a good dispatcher can reduce the problem by assigning familiar routes to drivers or providing additional directions when needed.

By its nature, the for-hire truckload segment of the industry involves more unfamiliar routes for drivers, and this is reflected in safety manager assessments of this problem. The average importance rating assigned by truckload safety managers was 2.94 versus 1.94 for LTL and 2.58 for private long-haul.

3.11 VEHICLE MAINTENANCE, INSPECTION, AND LOAD SECUREMENT

Proper vehicle maintenance is widely considered an essential requirement for CMV safety, and federal and state governments have extensive regulations and enforcement programs to ensure that vehicles do not have mechanical defects or improperly functioning equipment. Roadside inspection out-of-service rates for mechanical problems are quite high—20% to 30% in recent years (Blower 2002). A key question is the degree to which these mechanical problems identified during inspections contribute to crash involvements. According to Fatality Analysis Reporting System (FARS) statistics, vehicle-related factors are coded in about 9% of the large trucks involved fatal crashes (Craft 2000), with brakes and tires being the most frequently cited defective components. Preliminary data from the LTCCS indicate a small percentage of truck maintenance factors in crash causation (Craft 2002). However, in-depth investigations performed by Michigan’s Fatal Accident Complaint Team have indicated that 55% of trucks involved in fatal crashes have at least one mechanical defect, and that about one-half of these would be sufficient to place the vehicle out of service in roadside inspections (Blower 2002). The extent to which this association connotes an actual causal or severity-increasing relationship is difficult to determine. Nevertheless, Blower (2002) concludes that brake, tire, and other mechanical defects contribute substantially to truck crashes.

The project survey included two items relating to vehicle maintenance and inspection within fleets.

Problem Area 12. Neglect of vehicle maintenance (e.g., brakes, tires).

Respondent Type	Average Importance Rating		“Top Five” Selections	
	Avg. Rating	Rank (of 20)	% of Respondents	Rank (of 20)
Safety Managers	2.36	19	8%	16
Other Experts	3.38	10	18%	8

Problem Area 13. Failure to inspect vehicle (e.g., pre-/post-trip).

Respondent Type	Average Importance Rating		“Top Five” Selections	
	Avg. Rating	Rank (of 20)	% of Respondents	Rank (of 20)
Safety Managers	3.16	9	24%	9
Other Experts	3.32	12	5%	15

Safety managers rated “failure to inspect vehicle” as a more important safety management problem than vehicle maintenance, whereas the opposite trend was seen in the data for other experts. Overall, these problems were rated in the middle or bottom one-half of the problem set by respondents. Most notably, safety managers considered this to be a relatively unimportant problem, perhaps because they considered their fleet maintenance programs to be effective. One other expert respondent stated the view that vehicle maintenance is most likely to be a safety problem for economically marginal fleets who cut corners to reduce costs and stay in operation.

Improper cargo securement is another vehicle factor that occasionally results in loss of cargo on highways and disastrous consequences to other roadway users. A North American Cargo Securement initiative (information is available at <http://www.ab.org/ccmta/ccmta.htm>) has developed a detailed load securement standard and is disseminating this information to North American fleets. A final vehicle-related problem area on the survey asked respondents to rate this problem from the safety management perspective.

Problem Area 14. Unsecured loads.

Respondent Type	Average Importance Rating		“Top Five” Selections	
	Avg. Rating	Rank (of 20)	% of Respondents	Rank (of 20)
Safety Managers	2.38	18	4%	17
Other Experts	3.23	18	5%	15

This problem was rated near the bottom of the problem set, perhaps reflecting the fact that unsecured loads are not a frequent occurrence, even though the consequences can be very

high when loads are not properly secured. In their written comments, however, a number of safety managers stated that load securement was a remedial and refresher training need for many drivers.

3.12 HIGH-RISK DRIVERS

The safety performance levels of CMV drivers vary widely, with a relatively small percentage of CMV drivers accounting for a disproportionate percentage of crashes or incidents. For example, in an FMCSA-sponsored instrumented vehicle study involving local/short-haul drivers and observation of truck-driver-caused incidents, about 5% of the drivers accounted for 26% of the incidents and about 20% accounted for 60% (Hanowski et al. 2000). One-third of the drivers had no incidents. In a study of long-haul drivers that employed similar monitoring (Dingus et al. 2001), 56 drivers were involved in 24 collisions or near-collisions. Of these, a single driver was responsible for seven of the events, while four drivers (7.1%) had a combined involvement in 13 events (54%). In the FHWA Driver Fatigue and Alertness Study, 14% of the 80 drivers in the study accounted for 54% of the drowsy episodes (Wylie et al. 1996).

The project survey included an item in the problem area section as follows:

Problem Area 15. High-risk drivers [all causes combined] (i.e., the degree to which managers should focus on the worst 10–20% of the drivers).

Respondent Type	Average Importance Rating		“Top Five” Selections	
	Avg. Rating	Rank (of 20)	% of Respondents	Rank (of 20)
Safety Managers	3.69	2	42%	3
Other Experts	4.43	1	68%	1

As shown, the problem of high-risk drivers was rated among the very top problems among both safety managers and other experts. Among other expert respondents, it received the highest average rating and “Top 5” ranking. The high-risk driver will be addressed in greater depth as one of four major safety issues in Chapter 5.