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# Impact of Local/Short Haul Operations on Driver Fatigue

## FOCUS GROUPS SUMMARY AND ANALYSIS

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**IMPACT OF LOCAL/SHORT HAUL OPERATIONS ON DRIVER FATIGUE**

**TASK 1: FOCUS GROUP SUMMARY AND ANALYSIS**

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## **EXECUTIVE SUMMARY**

### **OVERVIEW**

Eleven focus groups were held in eight cities across five states. The purpose of these sessions was to gain an understanding, from the local/short haul (L/SH) drivers' perspective, of the general safety concerns related to the short-haul trucking industry and, specifically, the degree to which fatigue plays a role.

Eighty-two L/SH drivers participated in the focus group sessions. Seventy-six of the participants were male, and six were female. Twenty-six percent of the drivers were union members. Participants drove for a wide variety of L/SH industries, including Less than-Truck-Load Common Carrier/General Commodities, Beverage/Beer, Snack Foods, Chemicals/Fertilizers, Gas/Oil, Building Materials, Concrete/Dirt/Gravel, and Construction/Heavy Equipment.

The major portion of each focus group involved a discussion of critical incidents that drivers had either learned about or personally experienced. The purpose of this discussion was to generate a list of causal factors that might highlight safety-critical issues in the L/SH industry. The issues of interest included general safety concerns and those specifically related to fatigue. Once a list of causal factors had been generated, drivers ranked each factor in terms of importance.

### **RESULT HIGHLIGHTS**

Across the eleven sessions, drivers were able to generate fifteen general safety issues. The top five critical issues/causal factors, ranked in terms of importance, were: (1) Problems Caused by Drivers of Light Vehicles (i.e., four-wheelers), (2) Stress Due to Time Pressure, (3) Inattention, (4) Problems Caused by Roadway/Dock Design, and (5) Fatigue. Regarding fatigue, analyses confirmed that drivers who raised Fatigue as a general safety issue had significantly less self-reported sleep per night ( $M=6.1$  hours) as compared to drivers who did not raise Fatigue as an issue ( $M=6.7$  hours).

To further investigate the importance of fatigue, drivers were asked to generate and rank a list of fatigue-related issues. Across all sessions, twenty-two issues were raised. The top five issues, ranked in terms of importance, were: (1) Not Enough Sleep, (2) Hard/Physical Workday, (3) Heat/No Air Conditioning, (4) Waiting to Unload, and (5) Irregular Meal Times. These findings support past research that has suggested that Not Enough Sleep is the single best predictor for fatigue.

### **DRIVERS SPEAK OUT**

During the course of the sessions, drivers were given the opportunity to describe and discuss issues that they felt were important to the L/SH industry. Listed below is a sample of several of these issues, along with a brief paraphrased description or quotation that highlights the issue.

### **Private Driver Education**

- Educating the public is the most important thing that can be done to improve L/SH safety.
- Drivers feel that the public does not know how to interact with trucks.
- An example of private drivers not knowing how to interact with trucks was given in reference to backing accidents. Many four-wheelers (i.e., light vehicle drivers) do not know that four-way flashers mean that a truck is backing up.

### **Respect**

- Drivers feel that they do not get any respect from the driving public.
- Sometimes drivers are required to “make (their) own right of way” as light vehicles do not let them enter or cross the traffic flow.
- Drivers of light vehicles do not allow trucks to change lanes or merge onto a highway. Drivers commented that light vehicle drivers often try to beat them to an off-ramp.

### **Stress Due to Time Pressure**

- “(We are) always working against the clock.”
- One group of drivers felt that the stress due to time pressure was the most important factor affecting their safety, and was the primary reason for accidents and near-misses.
- Participants said that drivers who are “paid per load” have increased time stress. They allege that this has a negative effect on safety and “should be outlawed.”

### **Inattention**

- In trying to be efficient, drivers are thinking about their next stop while driving to it.
- Drivers commented that inattention is caused, in part, by the proliferation of roadside signs. There are too many road signs and, because there are so many, they are ineffective.
- Sometimes inattention is the cause of striking low-clearance bridges.
- Drivers often eat, use a Qualcomm system, or use a computer to print orders while driving.

### **Road Design**

- Closely-positioned on- and off-ramps that handle high volumes of traffic are problematic. Drivers of light vehicles will speed from the on-ramp to the off-ramp and cut trucks off in the process.
- The size of trailers impacts safety. The size of trailers has been increasing, but the size of city roads has not.
- “We need longer merging lanes.”

### **Dock Design**

- Docks are not designed for drivers, but rather for aesthetics.
- The design of some loading docks should be improved. Many docks are hard to get into and have blind spots that hamper backing.
- Docks that have strobe lights make backing easier.

### **Fatigue**

- Problems with fatigue in L/SH are not considered to be as serious as with long-haul because L/SH drivers usually return home and sleep in their own beds each night.
- The monotony of driving can cause fatigue. L/SH drivers are active during the day and, as such, are not apt to experience this monotony. Contrast this with long-haul drivers who drive longer distances and do get tired due to inactivity.
- No air conditioning on hot days leads to fatigue; “heat is a killer.” (Note that focus groups were conducted during the late spring and summer months of 1997).

### **Vehicle Design**

- Barn doors on trailers obscure the driver’s vision when backing. Roll-up doors are preferred.
- High-mounted brake lights for trucks should be mandated.
- Trucks should be equipped with daytime running lamps so they are more visible to others during dawn/dusk hours.
- Directional signals that are placed halfway up the trailer are very effective.
- There are backing alarms on many trucks, but there are no reverse lights on trailers.

### **Road Signs**

- Poor signing on a bridge overpass was described as the cause for one driver ripping the roof off a trailer.
- Some states have no phone number for drivers to call and check for clearances or for information on how to enter a weight class limit road.
- Weight class limit road signs are posted after a driver commits to a road.
- Railroad crossings in the area do not have arms/barriers, only flashing lights. On sunny days, drivers cannot see these lights.

### **Pay Structure**

- There is a wide discrepancy in regard to how L/SH drivers are paid. Compensation methods include being paid hourly, salary, per load, per mile, percentage, and commission. The preferred compensation method for most drivers is hourly.
- Drivers who are paid per load, or percentage, end up doing as many loads as possible; they felt that this method of paying drivers gives them an “incentive to speed.”

### **Driver Training**

- Truck drivers indicated that they want more extensive training to be quality drivers.
- The Smith System is a defensive driving course that is thought of favorably by drivers who have taken it.

### **Rest Breaks**

- Typically, drivers get few or no breaks; “the sooner you get done, the sooner you get off.”
- “Riding from stop to stop is my break.”

## **Backing Accidents**

- Backing accidents are common.
- Back-up alarms are present, but drivers cannot hear horns honking at them over alarms or their loud truck.

## **SUMMARY**

Based on the results of these focus groups, the top five critical issues, ranked in order of importance, were: (1) Problems Caused by Drivers of Light Vehicles, (2) Stress Due to Time Pressure, (3) Inattention, (4) Problems Caused by Roadway/Dock Design, and (5) Fatigue. It is noteworthy that Fatigue was ranked as one of the top five issues, however, it was fifth on the list. In addition, Fatigue was raised as a critical issue in 36% of the focus group sessions. This compares with the other issues, such as Problems Caused by Drivers of Light Vehicles, which was mentioned in 100% of the sessions, and Stress Due to Time Pressure, which was mentioned in 91% of the sessions. Because it was mentioned as one of the top five issues, it can be concluded that Fatigue in L/SH merits further investigation. However, from the drivers' perspective, there seem to be other issues that are of a higher priority.

In discussing the impact of fatigue, drivers gave several reasons why fatigue is not as critical an issue in L/SH as it is in long-haul. For example, unlike long-haul drivers, L/SH drivers typically work during daylight hours, have work breaks that interrupt their driving, end their shift at their home base, and sleep in their own beds at night. Perhaps, when it comes to fatigue, L/SH drivers are more like workers of non-driving professions where fatigue may not result from their work, as in long-haul, but may be impacted by their personal lives (such as not getting enough sleep at night).

## **MAJOR FINDING HIGHLIGHTS**

- Problems Caused by Drivers of Light Vehicles was the highest-ranked critical issue for L/SH drivers. L/SH drivers commented that light vehicle drivers exhibit a poor attitude toward truck drivers and are not educated on how to interact with trucks.
- Stress Due to Time Pressure, the second highest-ranked critical issue, exists because drivers rush to meet delivery times.
- Inattention, the third highest-ranked critical issue, is exemplified by drivers' thinking about future stops/deliveries while on the road. They may also be distracted by in-cab activities such as eating.
- Road design may be improved by lengthening merge lanes. In addition, long trailers make maneuvering difficult on narrow roads.
- Designers should consider the truck driver when designing loading docks. Suggested improvements include improving access to docks, eliminating blind spots, and adding strobe lights to aid in backing.
- The highest-ranked cause for L/SH driver fatigue was Not Enough Sleep.
- Adding air conditioning to cabs would help alleviate fatigue caused by heat.
- Suggestions for vehicle improvement include roll-up doors on trailers, better hazard/warning/markings on tractors and trailers, and better alarms.

- Pay-per-load or percentage pay structures are compensation methods that, reportedly, promote risky and unsafe driving. Hourly pay does not appear to promote such behavior.
- Information on clearances and weight-restricted roads should be made readily available to drivers so that planned routes are legal and safe.

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## INTRODUCTION

### DEFINING LOCAL/SHORT HAUL TRUCKING<sup>1</sup>

The 1992 version of the U.S. Department of Commerce's *Truck Inventory and Use Survey* (TIUS) provides definitions for the trucking industry based on *range of operation*. Range of operation refers to the type of trip (e.g., distance traveled) in which the vehicle typically operates. *Local* is defined as an operation with trips less than 50 miles from the vehicle's home base. *Short range* consists of trips between 50 and 100 miles from the home base. Based on these two definitions, L/SH operations can be defined as those that primarily engage in trips of 100 miles or less from their home base. It is important to include the term *primarily* in this definition since many trucking companies routinely mix trucking operations consisting of local, short, and long-range trips.

In addition to mileage differences between different trucking operations, the tasks performed by drivers of these various *ranges of operation* also differ. For example, long-range hauling (i.e., long-haul) is also referred to as "hook-and-drop," where a trailer is hooked to the truck, driven to the destination, and dropped off. The primary task of the driver in this type of operation is driving. Often, long-haul drivers will make one delivery at their destination and one delivery on the return trip. Contrast this with L/SH drivers who usually make multiple deliveries in a single trip. In addition to driving, L/SH drivers perform a number of tasks. During the course of a day, a L/SH driver may receive the day's driving schedule, load the vehicle, get in and out of the vehicle numerous times, lift and carry packages, and perform many other tasks. For L/SH drivers, driving is only part of their daily tasks.

Another major difference between long-haul and L/SH drivers is that L/SH drivers typically begin and end their day at their home base. This allows L/SH drivers to return to their homes after their shift and sleep in their own beds at night. Contrast this with long-haul drivers who may be on the road for several days or weeks at a time, who drive and sleep at irregular times, and who sleep in the truck's sleeper-berth during off-hours.

### DRIVER FATIGUE

Based on the work/sleep routine outlined for long-haul drivers, it is not surprising that driver fatigue has been an issue in this industry. It might be expected that the monotony of long-haul driving, coupled with a lack of quality sleep, would lead to driver fatigue. In a study to investigate sleep of long-haul drivers, Mitler et al. (1997) found that drivers averaged 5.18 hours of sleep per day. This compares to their self-reported ideal amount of sleep of  $7.1 \pm 0.1$  hours. It was also found that most instances in which drivers were judged to be drowsy occurred during nighttime hours (between 7 p.m. and 6:59 a.m.).

Unlike long-haul driving, L/SH drivers typically work daytime hours. As such, we might hypothesize that fatigue may be less problematic for L/SH drivers. However, limited

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<sup>1</sup> Portions of this section are abstracted from a document prepared by Jim York of the National Private Truck Council. This document, in its entirety, is included in Appendix A.

research is available that has investigated fatigue in L/SH trucking. One recent study (Massie, Blower, and Campbell, 1997) found significant differences in fatigue-related crashes as a function of intended trip distance. In their sample, driver fatigue was a causal factor in 0.4% of trucks making trips of 50 miles or less, and 3.0% of trucks making trips of 50 miles or more.

Stress has been found to be a major issue for L/SH drivers. Orris et al. (1997) administered a cross-sectional questionnaire to 317 package truck drivers (i.e., L/SH drivers). The results indicated that the drivers had a higher level of psychological distress as compared to the norm of the U.S. working population. Drivers perceived significantly more daily stressful events than the norm. These findings suggest that job stress is a psychological health hazard for package drivers.

In other driving and non-driving domains, it is well known that psychological fatigue and physical exertion may lead to inattention and a related reduction in performance. However, in the L/SH industry, the impact that psychological fatigue and physical exertion may have on driving performance is unclear.

The goal of the present research was to determine the impact of L/SH operations on driver fatigue, and to determine the critical L/SH issues (i.e., causal factors of critical incidents) from the drivers' perspective. To this end, a series of focus groups were conducted to investigate fatigue and other general safety issues in L/SH trucking. The methodology, results, and summary of this study are presented in the following sections.

## METHOD

Eleven focus groups were held in eight cities, across five states. The sessions were held between May and August of 1997. The purpose of these sessions was to gain an understanding, from the L/SH drivers' perspective, of the general safety concerns related to the short-haul trucking industry. Since the overall emphasis of this project is on investigating fatigue in L/SH trucking, a significant portion of the focus group questions was directed at answering one basic question: "What is the extent of driver fatigue in the L/SH industry?"

In addition to questions pertaining to general safety issues and driver fatigue, questions were posed to drivers concerning the L/SH industry in general. Our approach in conducting these sessions was to tell drivers that we (as transportation researchers) knew very little about the L/SH trucking industry, and that we believed them (the group we were addressing) to be experts in the field. We told participants that we were there to learn from them and give them a voice in the data generated from this research effort. This approach proved to be very successful in allaying any inhibitions that the drivers may have had prior to the session. Without exception, each of the eleven focus groups resulted in lively discussions and included drivers who provided us with candid and forthright responses.

Drivers were recruited for participation using one of three techniques. One of the most successful techniques was placing advertisements in local newspapers, indicating that a focus group would be held in the area. A 1-800 toll-free phone number was set up for prospective participants to call. Drivers who responded to the ad were administered a screening questionnaire over the phone to assess their eligibility. Once it was determined that a prospective participant was eligible, the participant was informed of the session date, time, and location.

The second method of recruiting drivers was to "cold call" L/SH trucking companies in the area in which the focus groups were to be held. This method proved to be less effective than the others. Managers of companies were contacted and asked if flyers describing the focus group could be mailed to them. If they agreed, they were then asked to post the flyers at a central location in their shop. Several of the managers that were contacted indicated that approval from upper management would be required. In the end, very few drivers were recruited using this technique.

The third technique was to make arrangements directly with company management. Six of the sessions were arranged in this manner. L/SH trucking managers who had contacts with members of the research team were asked if their drivers would participate. Sessions that were arranged by the managers tended to have the majority of participants from the same company, or consisted of drivers who hauled the same types of goods. It must be noted that the recruitment methods attracted drivers who indicated that they had a desire to improve the industry. As such, this may have created a biased sample of participants.

## RESULTS

Analysis of the focus group data was conducted in two phases that consisted of a micro-analysis phase and a macro-analysis phase. On the micro level, each of the eleven focus group sessions was individually analyzed. This analysis included a description of the session and the participants, detailed summaries of the tasks performed, general safety issues, fatigue issues, and miscellaneous findings.

The second phase of analysis was conducted at a macro level whereby all eleven focus group sessions were summarized and treated collectively as if the data had come from one session. As in the individual micro-analyses, the macro-analysis included a general description of the sessions and the participants, and general summaries of the tasks performed, general safety issues, and fatigue issues. In addition, the transcripts of the individual focus group sessions were used in developing a taxonomy of safety issues. From this taxonomy, a tree structure was developed that outlines the relationship between the safety issues. The results from both the micro- and macro-analysis are presented in this section. The macro-analysis is presented first in order to provide a general "feel" for the focus group sessions as a whole.

### MACRO-ANALYSIS

#### Overview of the Focus Group Sessions

For this research effort, eleven focus group sessions were conducted. Table 1 outlines the location and date of the sessions. A total of 82 L/SH drivers participated. Seventy-six drivers, or 92.7% of the participants, were male. Six drivers, or 7.3% of the participants, were female. The focus groups were held in eight cities, across five states. L/SH drivers from a wide range of trucking industries participated and included the industries listed in Table 2.

**Table 1. Location and date of each focus group.**

Location	Date (1997)
Blacksburg, VA	May 3
Roanoke/Salem, VA	May 17
Stafford, VA	June 4
Pittsburgh, PA #1	June 27
Pittsburgh, PA #2	June 28
Seattle, WA #1	July 19
Seattle, WA #2	July 19
Seattle, WA #3	July 21
Secaucus, NJ	August 12
Somerset, NJ	August 13
Charlotte, NC	August 15

**Table 2. Alphabetical listing of the trucking industries represented across the eleven focus group sessions.**

<b>Trucking Industries</b>
Air Freight
Beverage/Beer
Building Materials
Bus
Chemicals/Fertilizers
Concrete/Dirt/Gravel
Construction/Heavy Equipment
Gas/Oil
Less than-Truck-Load (LTL) Common Carrier/ General Commodities
Pizza Products
Produce
Seafood
Snack Foods

### **Driver Description**

Driver self-descriptions were obtained through a questionnaire administered prior to the start of the session and through a section of the focus group that asked drivers to describe themselves. All of the drivers indicated that they were full-time L/SH drivers, or drove L/SH 50% of the time or more. Forty-eight percent of the drivers indicated that, at least on occasion, they drove between states as part of their route. Thirty-three percent of the drivers indicated that, at least on occasion, they drove outside of the 100-air-mile radius (from their work center). Regarding the percent of time in a workday spent driving, 78% stated that at least 50% of their day was driving. The mean number of hours spent working per week was 48.9 hours, and ranged from 20 hours to 65 hours. The mean number of hours spent working per day was 10.4 hours, and ranged from 8 hours to 18 hours (the high end of these ranges was for a driver who drove with a partner). The mean number of miles driven per day was 157 miles, and varied markedly from 3 miles to 425 miles. The mean reported number of years of truck driving experience was 12.8 years, and ranged from 2 months to 40 years. The mean reported number of years of L/SH driving experience was 9.5 years, and also ranged from 2 months to 40 years. The mean age of drivers was 38.9 years and ranged from 24 years to 64 years. Of the 82 focus group participants, 21, or 26%, were union members. In terms of gender, six of the participants, or 7%, were female. (Individual descriptions of the drivers are included in the appendix in random order.)

### **Tasks Performed**

To gain a better understanding of what is involved in L/SH trucking, drivers were asked to list the tasks that they perform in a typical workday and indicate the percentage of time spent on each task. The results of this exercise are presented in Table 3. Table 4 illustrates the data in terms of hours per day. Due to unequal “n” for the different categories, the total percentage equals 128%. The unequal “n” is attributed to the diverse nature of the drivers who participated in these sessions. That is, the tasks performed in a

typical day for drivers who haul construction-related loads are very different from L/SH drivers who haul snack foods. For example, drivers in one focus group worked for a public utility company and hauled dirt, concrete, and other materials. These drivers noted that approximately 70% of their day was driving. On the other hand, drivers in another session, who delivered snack foods, indicated that driving accounted for approximately one-third of their day. Given these large discrepancies, Table 3 should be viewed as a general guide to the tasks performed by L/SH drivers. More detailed information of routine tasks performed by drivers in specific industries is outlined in the micro-analysis.

**Table 3. Percentage of workday spent per task, as reported by drivers. Number of respondents (n) for each category is provided. Percentages sum to greater than 100% due to unequal “n.”**

Driving (n=81)	Loading/Unloading (n=71)	Miscellaneous Work (n=67)	Waiting (n=26)
51.4	33.7	27.7	15.4

**Table 4. Total and mean hours spent per task, as reported by drivers. Number of respondents (n) for each category is provided.**

Task	Total Hours	Mean Hours
Driving (n=81)	420.2	5.19
Loading/Unloading (n=66)	248.6	3.50
Miscellaneous Work (n=101)	179.5	2.68
Waiting (n=22)	40.4	1.55

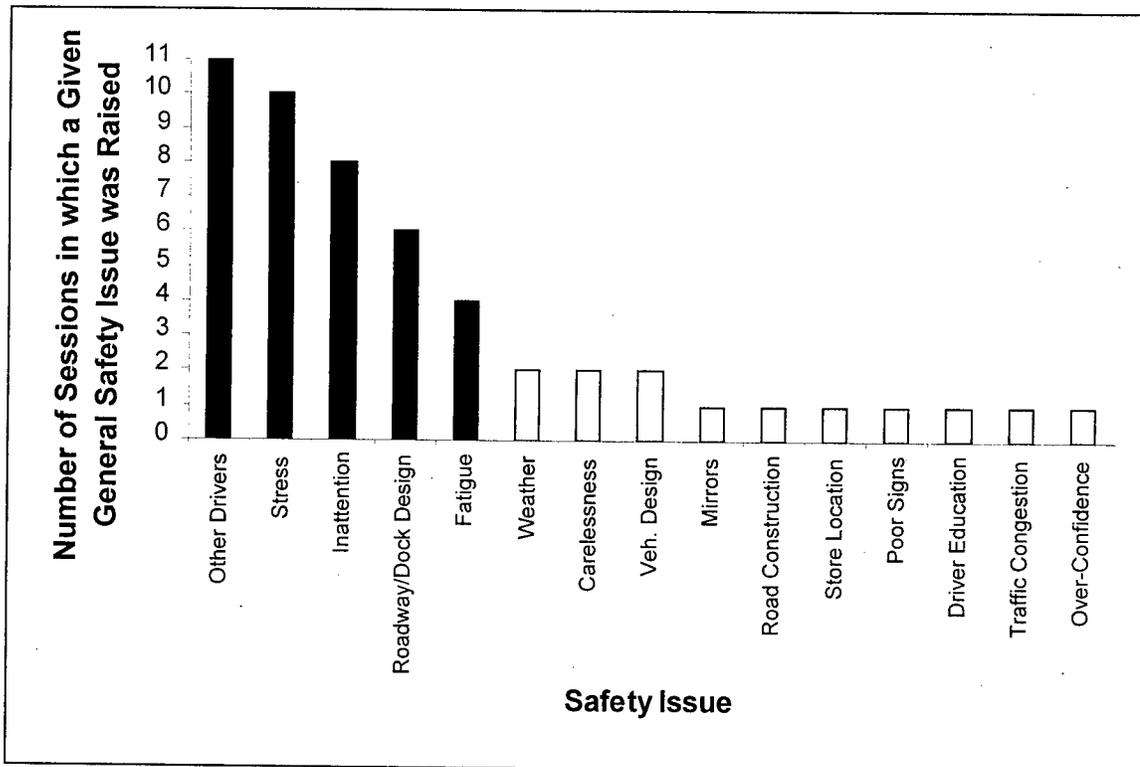
### **General Safety Issues**

Much of the focus group discussion was centered on safety within the L/SH industry. Drivers were asked to discuss driving and non-driving critical incidents that either they had experienced or knew about. Based on this discussion, a list of causal factors was developed and presented to the drivers. Drivers were then asked to rank the importance of each factor. The list of factors is shown in Table 5, along with a brief definition and/or example of each factor. It should be noted that the terms used in this list were generated by the drivers.

**Table 5. List and definition of the general safety causal factors discussed in the focus group sessions.**

<b>General Safety Causal Factor</b>	<b>Definition</b>
Problems Caused by Drivers of Light Vehicles (i.e., “four-wheelers,” “other drivers”)	Problems caused by drivers of light vehicles (e.g., cars).
Stress Due to Time Pressure	L/SH driver stress caused by having too many orders to do in a limited amount of time (e.g., rushing to get work completed, meeting a delivery time).
Inattention	L/SH drivers’ inattention to the road. Often caused by thinking about the next delivery while driving.
Problems Caused by Roadway/Dock Design	Poor roadway design (e.g., narrow road, low bridge) or poor dock design (e.g., poorly lit, low overhang, difficult to back into).
Fatigue	Fatigue on the part of the L/SH driver.
Weather	Poor weather (e.g., snow, rain, wind).
Carelessness	On the part of the L/SH driver, not taking the time to follow proper protocol (e.g., not checking behind trailer before backing).
Vehicle Design	Includes poor arrangement of displays and controls in the truck cab.
Mirrors	Includes bad mirror placement that makes merging difficult.
Road Construction	Includes construction that restricts and/or narrows lanes.
Store Location	Includes stores that are in downtown locations that make delivering difficult.
Poor Signs	Poor roadway signs (e.g., weight restriction signs posted on a road after the driver has committed to it).
Driver Education	Lack of driver education (e.g., defensive driving) on the part of the L/SH driver.
Traffic Congestion	Being stopped by high volume traffic results in L/SH drivers’ rushing/driving too fast to make up time.
Over-Confidence	L/SH drivers’ over-confidence in their own driving ability.

Although each of the factors listed in Table 5 was discussed in one or more of the sessions, the frequency with which each was described varied substantially. Figure 1 outlines this frequency. The abscissa in Figure 1 illustrates the different general safety causal factors that were discussed and ranked by the drivers. The ordinate in the figure indicates the frequency with which each of the factors was listed. As can be seen, Problems Caused by Drivers of Light Vehicles was listed as a causal factor in all eleven focus group sessions. The dark bars indicate the top five factors in terms of frequency.



**Figure 1. Frequency with which each general safety issue was raised across the eleven focus group sessions.**

The next step in the analysis was to combine the rankings from the eleven focus group sessions to determine a consensus of the top-priority safety issues from the drivers' perspective. Two methods were employed to complete this analysis. The first method calculated the mean rankings for each item (as they had been ranked in each of the sessions) and did not apply any weighting value for the frequency with which an item was raised across sessions<sup>2</sup>. The results of this method are shown in Tables 6 and 7. The top five issues, shown in Table 6, were mentioned in at least four of the eleven sessions. It should be noted that "four of eleven sessions" was an arbitrary criterion set after examining the data and observing a natural break in frequencies at "four." Table 7 shows the miscellaneous issues that were mentioned in fewer than four sessions. Based on this method of ranking the issues, Problems Caused by Drivers of Light Vehicles, Inattention, Stress Due to Time Pressure, Fatigue, and Problems Caused by Roadway/Dock Design were the top issues mentioned.

<sup>2</sup> Note that the most important item was ranked "1," the second most important was ranked "2," and so on.

**Table 6. Ranking of general safety issues, not weighted for frequency. All issues were mentioned and ranked by at least four groups. The frequency that each issue was raised is indicated (n).**

SAFETY	
ISSUE	MEAN RANKING OF IMPORTANCE
Problems Caused by Drivers of Light Vehicles (n=11)	2.0
Inattention (n=8)	2.4
Stress Due to Time Pressure (n=10)	2.6
Fatigue (n=4)	3.1
Problems Caused by Roadway/Dock Design (n=6)	3.6

**Table 7. Ranking of general safety issues, not weighted for frequency. All issues were mentioned and ranked by less than four groups.**

SAFETY	
ISSUE	MEAN RANKING OF IMPORTANCE
Traffic Congestion (n=1)	1.0
Carelessness (n=2)	2.8
Vehicle Design (n=2)	4.0
Poor Signs (n=1)	4.0
Over-Confidence (n=1)	4.0
Weather (n=2)	4.5
Mirrors (n=1)	5.0
Driver Education (n=1)	6.0
Road Construction (n=1)	6.5
Store Location (n=1)	6.5

The second method of analyzing the ranked data was to weight each of the factors by the frequency with which it was mentioned. That is, issues that were mentioned less frequently were weighted less than issues that were mentioned more frequently.

As noted, in each session, after a list of safety factors had been generated, the items on the list were ranked in terms of importance. In some of the sessions, factors were either not ranked (drivers did not provide a rank value), or were ranked as a "tie." When the data from all eleven sessions were consolidated, a method was devised to handle factors that were not ranked or "tied." Specifically, items that were not ranked were treated as a "tie." All "tied" items were then re-ranked based on their mean position in the ranking order. An example of this procedure is shown in Tables 8a and 8b. Table 8a shows a hypothetical list of factors. As can be seen, the first two factors are ranked 1-2. The third, fourth, and fifth factors are ranked a "tie." The sixth and seventh factors are not ranked. Table 8b shows the transformation where the third, fourth, and fifth factors are assigned a rank of 4 (i.e., mean of 3-4-5 is 4). The six and seventh factors are each assigned a rank of 6.5 (i.e., mean of 6-7 is 6.5). The benefit of this ranking system is that it accounts for both the rank assigned by the drivers and the number of factors mentioned in a given session.

**Table 8a. Hypothetical list of factors and their rankings. NR refers to “not ranked.”**

SAFETY	
ISSUE	MEAN RANKING OF IMPORTANCE
Issue 1	1
Issue 2	2
Issue 3	3
Issue 4	3
Issue 5	3
Issue 6	NR
Issue 7	NR

**Table 8b. Transformed ranking of importance from Table 8a.**

SAFETY	
ISSUE	MEAN RANKING OF IMPORTANCE
Issue 1	1
Issue 2	2
Issue 3	4
Issue 4	4
Issue 5	4
Issue 6	6.5
Issue 7	6.5

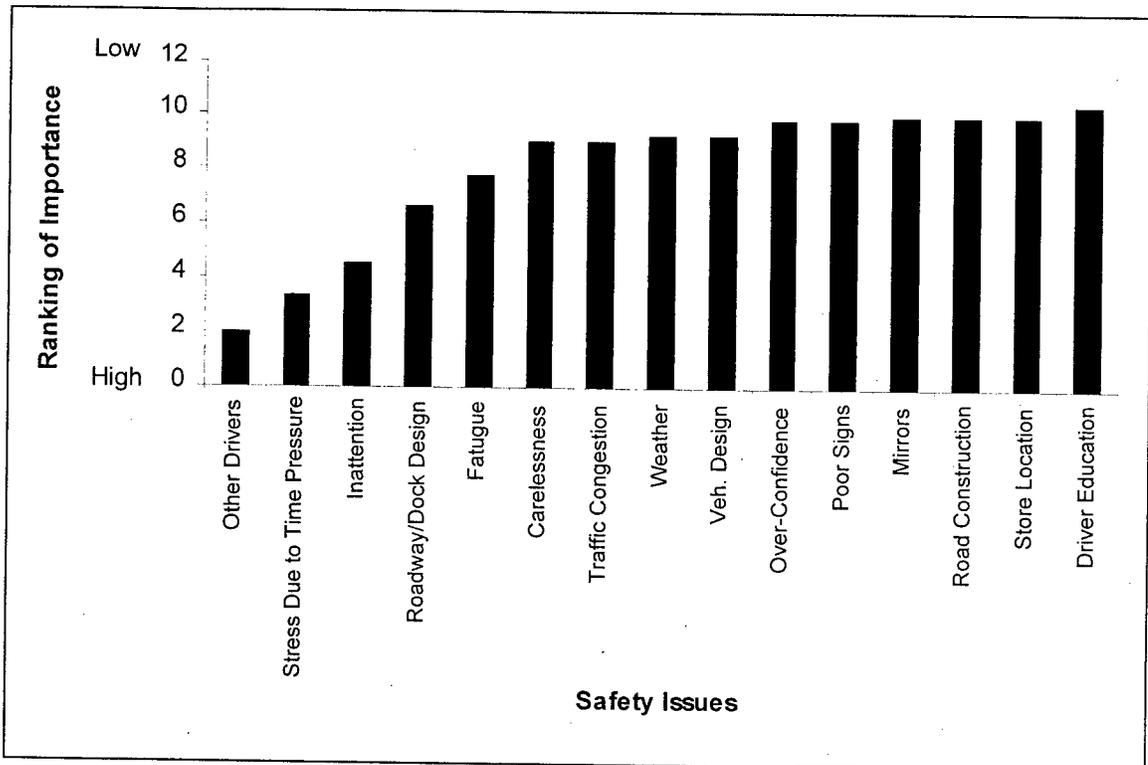
Once all of the listings and rankings for the individual sessions had been transformed based on the aforementioned procedure, the lists of factors were combined across the eleven sessions. Each of the factors raised during the sessions is listed in Table 9 as a function of rank and frequency. Table 10 outlines the general safety factors ranked in terms of importance using this procedure. Figure 2 depicts these results graphically. Because high rankings have low numerical values, the graph, in effect, has a “reverse ordinate.” In comparing the two ranking methods, it can be seen that the top five issues are the same, although they are in a slightly different order.

**Table 9. Frequency with which each general safety issue was raised as a function of the assigned ranking. Maximum frequency is 11, or once for each session.**

SAFETY ISSUE	RANK						Frequency
	1 – 1.5	2 – 2.5	3 – 3.5	4 – 4.5	5 – 5.5	6 – 6.5	
Problems Caused by Drivers of Light Vehicles	7	1	1	2			11
Stress/Time Pressure	3	2	2	3			10
Inattention	3	2	2	1			8
Problems Caused by Roadway/Dock Design		2	2		1	1	6
Fatigue		1	2	1			4
Weather				1	1		2
Carelessness		1	1				2
Vehicle Design				2			2
Mirrors					1		1
Road Construction						1	1
Store Location						1	1
Poor Signs				1			1
Driver Education						1	1
Traffic Congestion	1						1
Over-Confidence				1			1

**Table 10. Ranking of importance for the general safety issues raised during the eleven focus group sessions. Low rank values indicate priority.**

SAFETY	
ISSUE	MEAN RANKING OF IMPORTANCE
Problems Caused by Drivers of Light Vehicles	2.0
Stress Due to Time Pressure	3.3
Inattention	4.5
Problems Caused by Roadway/Dock Design	6.7
Fatigue	7.7
Carelessness	9.0
Traffic Congestion	9.0
Weather	9.2
Vehicle Design	9.2
Over Confidence	9.8
Poor Signs	9.8
Mirrors	9.9
Road Construction	9.9
Store Location	9.9
Driver Education	10.4

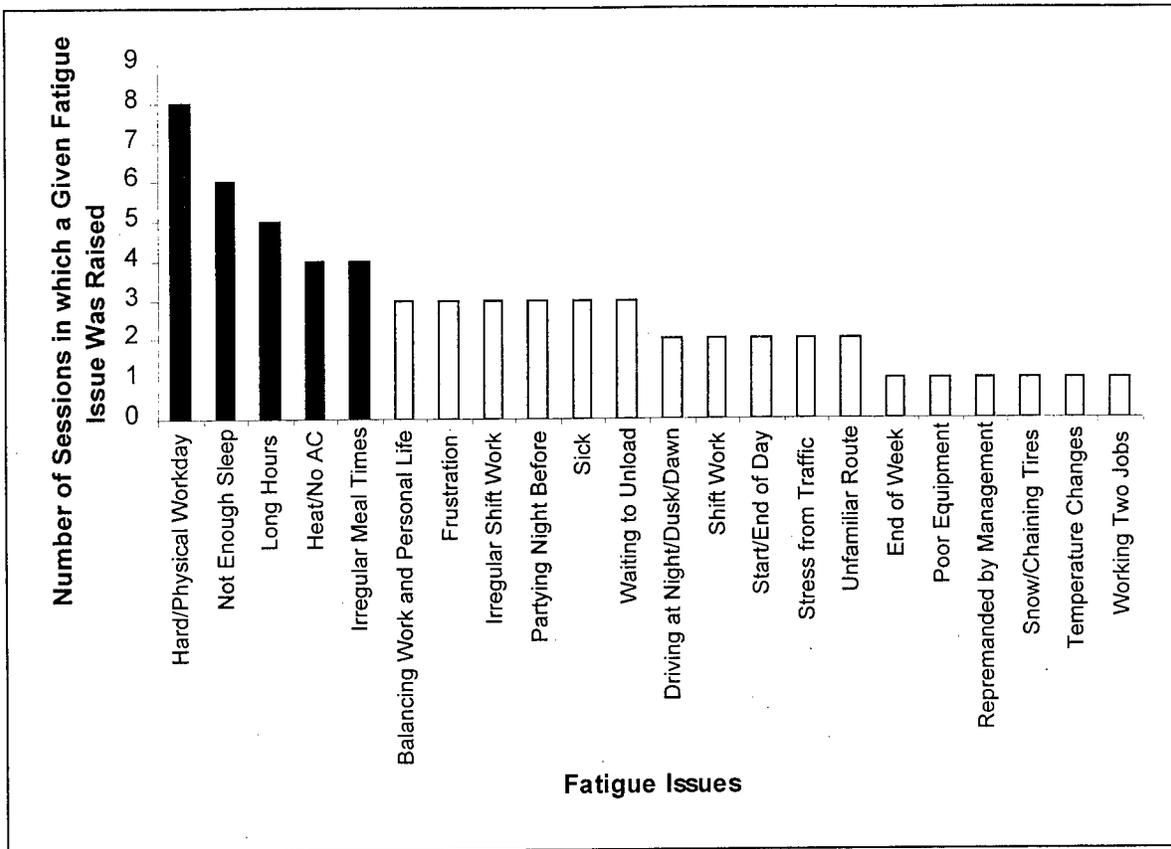


**Figure 2. Ranking of general safety issues. Low scores indicate high priority.**

### **Fatigue Issues**

During the focus group session, discussion revolved not only around general safety issues, but also around issues specific to driver fatigue. Drivers were asked to think about and describe incidents when they were fatigued on the job, and to discuss how they believe fatigue impacts the L/SH industry.

As in the discussion of general safety issues, drivers were asked to list and rank causal factors of on-the-job fatigue. Figure 3 illustrates these issues and the frequency with which each issue was raised. The top five issues, highlighted in black, were mentioned in at least four of the eleven sessions. As can be seen, Hard/Physical Workday was the fatigue issue mentioned most frequently.



**Figure 3. Frequency with which each fatigue issue was raised across the eleven focus group sessions.**

As with the general safety issues, two methods were used to rank the fatigue issues. The first method did not use a weighting factor (for the frequency with which a particular issue was raised). The second method did account for frequency. The results of the non-weighting method, for issues that were raised in at least four sessions, are shown in Table 11. The remaining issues that were raised in fewer than four sessions are shown in Table 12.

**Table 11. Ranking of importance for the top fatigue issues. Each issue was raised in at least four of the eleven focus group sessions. Low rank values indicate priority.**

FATIGUE	
ISSUE	MEAN RANKING OF IMPORTANCE
Heat/No A/C (n=4)	2.9
Not Enough Sleep (n=6)	3.1
Irregular Meal Times (n=4)	3.3
Long Hours (n=5)	3.8
Hard/Physical Workday (n=8)	4.0

**Table 12. Ranking of importance for miscellaneous fatigue issues. Each issue was raised in fewer than four sessions.**

FATIGUE	
ISSUE	MEAN RANKING OF IMPORTANCE
Waiting to Unload (n=3)	2.5
Stress from Traffic (n=2)	2.8
Shift Work (n=2)	3.5
Irregular Workshift (n=3)	3.8
Sick (n=3)	4.0
Frustration (n=3)	4.0
Temperature Changes (n=1)	4.0
Poor Equipment (n=1)	4.0
Partying Night Before (n=3)	4.5
Reprimanded by Management (n=1)	4.5
Snow/Chaining Tires (n=1)	4.5
Balancing Work and Personal Life (n=3)	4.7
Unfamiliar Route (n=2)	4.8
Driving at Night/Dusk/Dawn (n=2)	5.3
Start/End of Day (n=2)	5.5
End of Week (n=1)	6.0
Working Two Jobs (n=1)	6.0

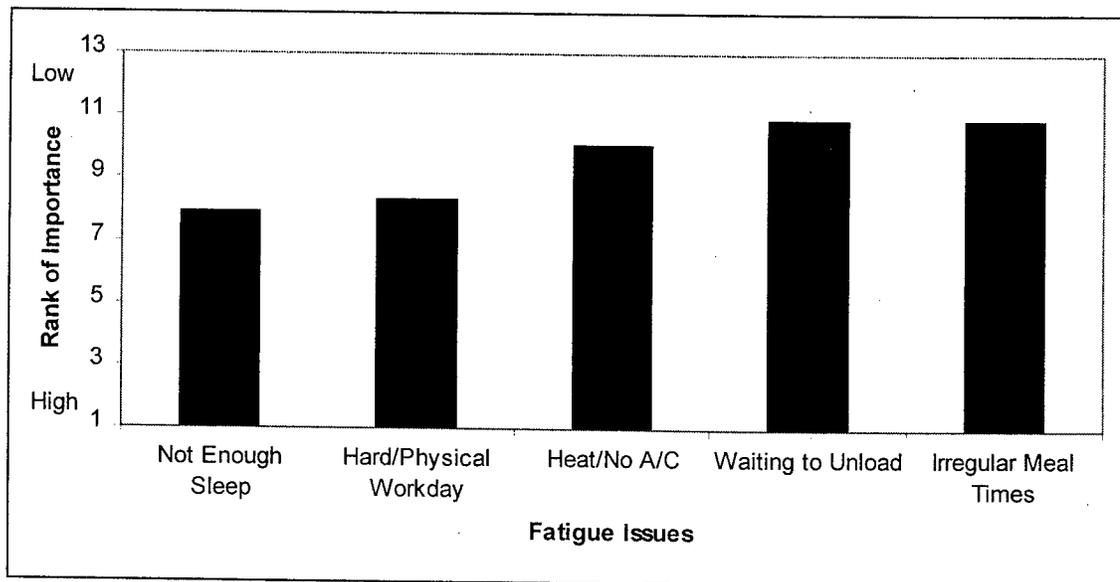
As noted, the second method of ranking the fatigue issues included a weighting factor for frequency. The same procedure was used as was described in the analysis of the general safety issues. The frequency with which each issue was raised, as a function of the transformed ranking, is shown in Table 13. Table 14 shows the fatigue factors ranked in terms of importance. Figure 4 depicts these results graphically for the top five ranking issues.

**Table 13. Frequency with which each fatigue issue was raised as a function of the assigned ranking. Maximum frequency is 11, or once for each session. Not ranked is indicated by “NR.”**

FATIGUE ISSUE	RANK							Frequency
	1 – 1.5	2 – 2.5	3 – 3.5	4 – 4.5	5 – 5.5	6 – 6.5	NR	
Hard/Physical Workday		1	2	2			3	8
Not Enough Sleep	1	2	1	1			1	6
Long Hours	1		1				3	5
Heat/No A/C	2					1	1	4
Irregular Meal Times		2					2	4
Balancing Work and Personal Life			1		1		1	3
Frustration	1				1		1	3
Irregular Workshift		1					2	3
Partying Night Before			1	1			1	3
Sick		1		1			1	3
Waiting to Unload	2						1	3
Driving at Night/Dusk/Dawn							2	2
Shift Work	1						1	2
Start/End of Day					1		1	2
Stress from Traffic		1					1	2
Unfamiliar Route			1				1	2
End of Week							1	1
Poor Equipment				1				1
Reprimanded by Management				1				
Snow/Chaining Tires				1				1
Temperature Changes				1				1
Working Two Jobs							1	1

**Table 14. Ranking of importance for the fatigue issues raised during the eleven focus group sessions. Low rank values indicate priority.**

FATIGUE	
ISSUE	MEAN RANKING OF IMPORTANCE
Not Enough Sleep	7.9
Hard/Physical Workday	8.3
Heat/No A/C	10.1
Waiting to Unload	10.9
Irregular Meal Times	10.9
Long Hours	11.0
Irregular Workshift	11.0
Sick	11.1
Frustration	11.2
Balancing Work and Personal Life	11.2
Partying Night Before	11.3
Unfamiliar Route	12.0
Stress from Traffic	12.1
Temperature Changes	12.2
Poor Equipment	12.2
Reprimanded by Management	12.2
Snow/Chaining Tires	12.2
Start/End of Day	12.3
Driving at Night/Dusk/Dawn	13.0
Shift Work	13.1
End of Week	13.1
Working Two Jobs	13.1



**Figure 4. Ranking of top five fatigue issues.**

The results from the two methods of ranking the fatigue data indicate a general consensus. For the first method, where no weighting factor was assigned, the top five issues were: (1) Heat/No A/C, (2) Not Enough Sleep, (3) Irregular Meal Times, (4) Long Hours, and (5) Hard/Physical Workday. For the ranking method that did include a weighting factor for frequency, the top five issues were: (1) Not Enough Sleep, (2) Hard/Physical Workday, (3) Heat/No A/C, (4) Waiting to Load/Unload, and (5) Irregular Meal Times. The sixth issue using the weighting for frequency was Long Hours. In addition to a general discussion of fatigue, drivers were given a questionnaire during the session that included a number of fatigue-related questions. Table 15 shows the mean results for a set of statements to which drivers elicited a Likert-type scale response. Tables 16 and 17 show the results from a miscellaneous assortment of fatigue-related questions.

**Table 15. Mean response to statements requiring a Likert-type scale response. Anchor points on the scale were at 0 (Strongly Disagree), 50, and 100 (Strongly Agree).**

Fatigue-Related Question	Mean Response	Response Range
In my job, I do the same thing day after day.	72.2	49.4 - 90.7
I feel like my job is exciting.	57.9	31.7 - 81.4
I do too much driving at my job.	29.8	20.6 - 46.7
I feel tired when I'm on the job.	35.3	20.7 - 65.0
My job involves too much physical exertion.	39.5	10.0 - 69.3
My job involves too much mental exertion.	42.0	25.0 - 59.4

**Table 16. Mean response to miscellaneous fatigue-related questions.**

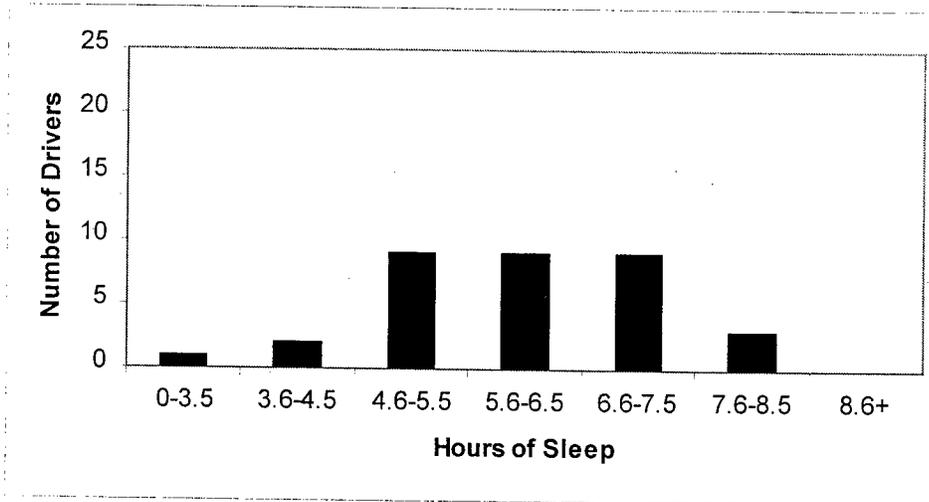
Fatigue-Related Question	Mean Response	Mean Range
How many hours of sleep do you get per night?	6.5	5.4-7.0
Typical part of workday most tired?	49% of drivers responded "end of shift"	N/A
Number of days feels sluggish.	1.8	1.1-2.8
Reason for being tired at work.	In 69% of the sessions, drivers responded "not enough sleep" as first response	N/A

**Table 17. Responses to question, "During what part of a typical workday are you most tired?"**

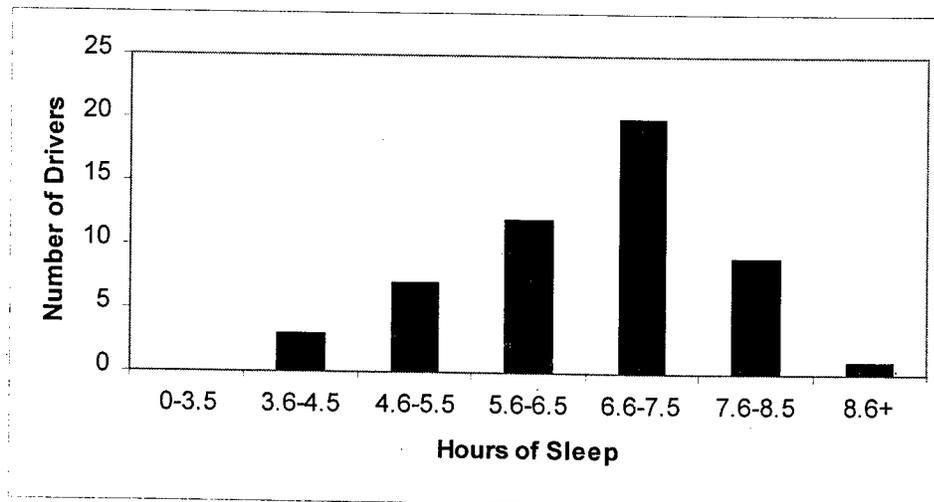
Part of Workday	Percentage of Responses
End of Shift	49%
After Lunch/Midday	36%
Beginning of Day	13%
Dusk/Dawn	1%
At Irregular Times	1%

Recall that drivers in only four of the sessions noted Fatigue as one of the top general safety issues in the L/SH industry (see Table 6). It should also be pointed out that for the fatigue-related question outlined in Table 17, "How many hours of sleep do you get per night?," the mean response was 6.5 hours and the mean range was 5.4 hours to 7.0 hours. Based on these results, the self-reported sleep of individual drivers that were in groups

that did mention Fatigue as a general safety issue was compared to the self-reported sleep of drivers that were in groups that did not mention Fatigue as a general safety issue. The frequency distributions of these two groups are shown in Figure 5 (did mention Fatigue) and Figure 6 (did not mention Fatigue). A two-sample t-test that assumed unequal variances was conducted on the two groups and the results proved to be significant ( $t[58]=2.00, p=0.03$ ). This finding suggests that drivers who have more sleep at night are less likely to see fatigue as an issue during the workday. This result is consistent with other research in the area of fatigue that has indicated that the best countermeasure for fatigue and drowsiness is adequate sleep (Wierwille, 1997). From these results, it appears that the drivers who raised Fatigue as a general safety issue may not have been getting adequate sleep.



**Figure 5. Distribution of hours of sleep for drivers in focus groups where fatigue was raised as a general safety issue. Mean = 6.1 hours (n=30).**



**Figure 6. Distribution of hours of sleep for drivers in focus groups where fatigue was not raised as a general safety issue. Mean = 6.7 hours (n=52).**

## **TAXONOMY OF SAFETY-RELATED ISSUES**

The purpose of developing a taxonomy of safety-related issues was to classify the major factors discussed by the drivers during the focus group sessions. The benefit of such a classification scheme is twofold. First, at the highest level, it provides an overview of the topics discussed. Based on the discussion, safety-related and non-safety-related issues can be grouped and sorted in hierarchical form. The second benefit of a taxonomy is that it provides a quantitative description of the focus group. That is, the dialogue can be analyzed as a function of the frequency with which issues were raised and discussed. Based on the taxonomy, we are able to interpret those issues that are most critical to drivers. However, because the discussions were led by a moderator who was following a script, caution must be used when drawing conclusions from these data. That is, the drivers' dialogue reflects the moderator's script and the probes introduced. Despite this caution, it is believed that the development of a taxonomy provides a useful way to structure and analyze the discussions, within the bounds of the moderator's script and probes.

### **Method of Developing the Taxonomy**

Each focus group session was recorded on audiocassette. The recorded comments were transcribed and reviewed. The review involved extracting key concepts and issues that the L/SH drivers raised during group discussion. These issues were the basis for the development of the taxonomy.

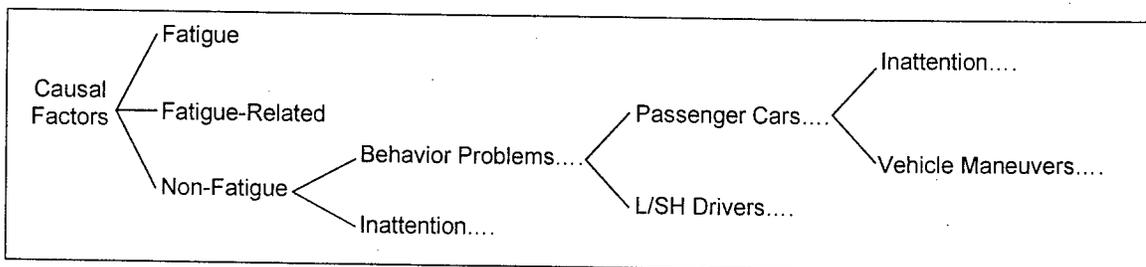
The major issues included in the taxonomy were causal factors of motor-vehicle crashes, non-driving incidents, and near-miss incidents, as described by the drivers. That is, causal factors were extracted from discussions about the incidents. The frequency with which a causal factor was mentioned was used as a measure of its importance.

It must be noted that not all of the subject matter in the focus group discussions involved critical incidents. For instance, drivers would describe their typical workday, or make general complaints (e.g., "union drivers are the worst"). These types of comments were classified as "Non-Safety-Related Issues." In addition, any crashes that involved personal vehicles, or any incident description from which a causal factor could not be determined, were also classified as "Non-Safety-Related Issues." As the "Non-Safety-Related Issues" category was of lesser importance to the goals of this project, the development of this category was limited to a frequency count.

To understand the method of classification, some of the basic assumptions need to be presented. To begin, two major categories were developed: (1) Non-Safety-Related Issues, and (2) Safety-Related Issues. As noted, the development of the Non-Safety-Related Issues category was limited to a frequency count. Under the Safety-Related Issues category, three major sub-categories were developed: (1) Fatigue, (2) Potentially Fatigue-Related, and (3) Non-Fatigue.

The following set of bullets outlines the major assumptions of the taxonomy:

- The term “category” indicates a position or level in the hierarchical structure. Therefore, “higher level” categories are assumed to be at the top, and “lower level” categories are positioned towards the bottom. Figure 7 shows Non-Fatigue as a higher-level category, while Vehicle Maneuvers is at a lower level.
- All safety-related categories are causal factors of crashes/incidents with the exception of the Suggestions for Accident Prevention category.
- A factor may serve as both a category and subcategory depending on the level. In Figure 7, Passenger Cars, L/SH Drivers, Inattention, and Vehicle Maneuvers are subcategories of Behavior Problems. Behavior Problems is a subcategory of Non-Fatigue.
- The Fatigue category includes any factor that the driver explicitly mentioned as causing fatigue. A qualifying statement would be, “Long hours lead to fatigue.” In this example, the driver clearly states that working long hours causes fatigue.
- The Potentially Fatigue-Related category includes any factors that potentially cause fatigue, but where the driver did not explicitly mention fatigue. Consider the statement “Some L/SH drivers work 60-70 hours per week.” In this example, the driver mentions long hours, but does not state that they cause fatigue.
- The Non-Fatigue category includes all remaining causal factors that were not included in the Fatigue or Potentially Fatigue-Related categories. The statement “The wind can cause accidents” is an example of a Non-Fatigue item. It should be noted that this category also includes comments that could have been classified under Fatigue or Potentially Fatigue-Related, but were not classified as such because the driver stated that it was not associated with fatigue. For example, one driver said, “This accident was time pressure-related...it was not due to fatigue.” Time pressure is a subcategory under Fatigue based on other drivers’ comments. But in this case, the driver explicitly stated that it was not due to fatigue. Therefore, it was not classified under Fatigue or Potentially Fatigue-Related.
- Inattention was mentioned as a causal factor for both passenger car drivers and L/SH drivers. However, because the primary focus of this project is on L/SH drivers, Inattention, as it related to L/SH drivers, was placed higher up the hierarchy than passenger car drivers’ Inattention.



**Figure 7. Taxonomy structure.**

- Some of the comments made by drivers were ambiguous in that they could be taken as either a complaint or a suggestion. This is raised as a consideration because one of

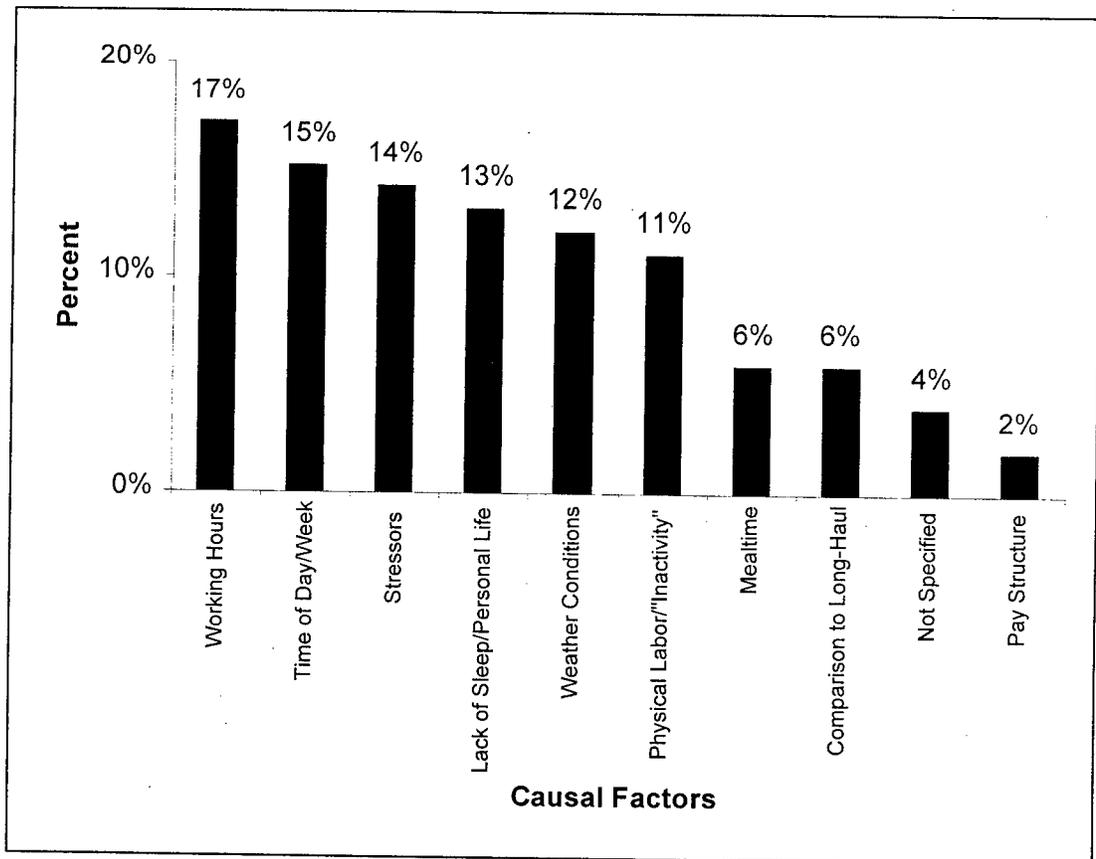
the subcategories in the taxonomy is Suggestions for Accident Prevention. If the statement “There is no education for private drivers on how to interact with trucks” is interpreted as a suggestion to indicate that private drivers need education, then it would belong under Suggestions for Accident Prevention. But if this was interpreted as a complaint, then it would fall under a different subcategory. To avoid this type of confusion, the comment was taken at face value. Using this approach, the above comment was interpreted as a complaint. An example of a suggestion would be if a driver said, “They (light vehicle drivers) need information on a truck’s limitations, and on interacting with trucks.”

- Similar subcategories may appear under different categories. For instance, Weather Problems appears under both Fatigue and Non-Fatigue categories.
- Some statements contain multiple factors. This presented a problem if the same statement could be classified under more than one category. To illustrate, consider the statement “Operating Qualcomm (a computer-satellite-digital link) while driving.” This statement contains two factors, inattention and vehicle equipment, and could be classified under Inattention and Vehicle-Related Factors/Equipment. To solve this dilemma, the presumed underlying factor was used. For this statement, the equipment was not the essential problem. Rather, the problem was the driver’s lack of attention. The driver’s attention was being divided between driving and operating the Qualcomm. Thus, the underlying factor was deemed to be inattention.

### **Taxonomy Results**

The results of this classification strategy are shown in Appendix B. There were a total of 1,075 recorded citations/discussions regarding safety (causal factors) and non safety-related issues. Most of these involved causal factors (76%, 814 of 1,075). As outlined, Non-Fatigue factors were mentioned more frequently than the Fatigue and Potentially Fatigue-Related factors combined, 572 versus 139 and 103, respectively.

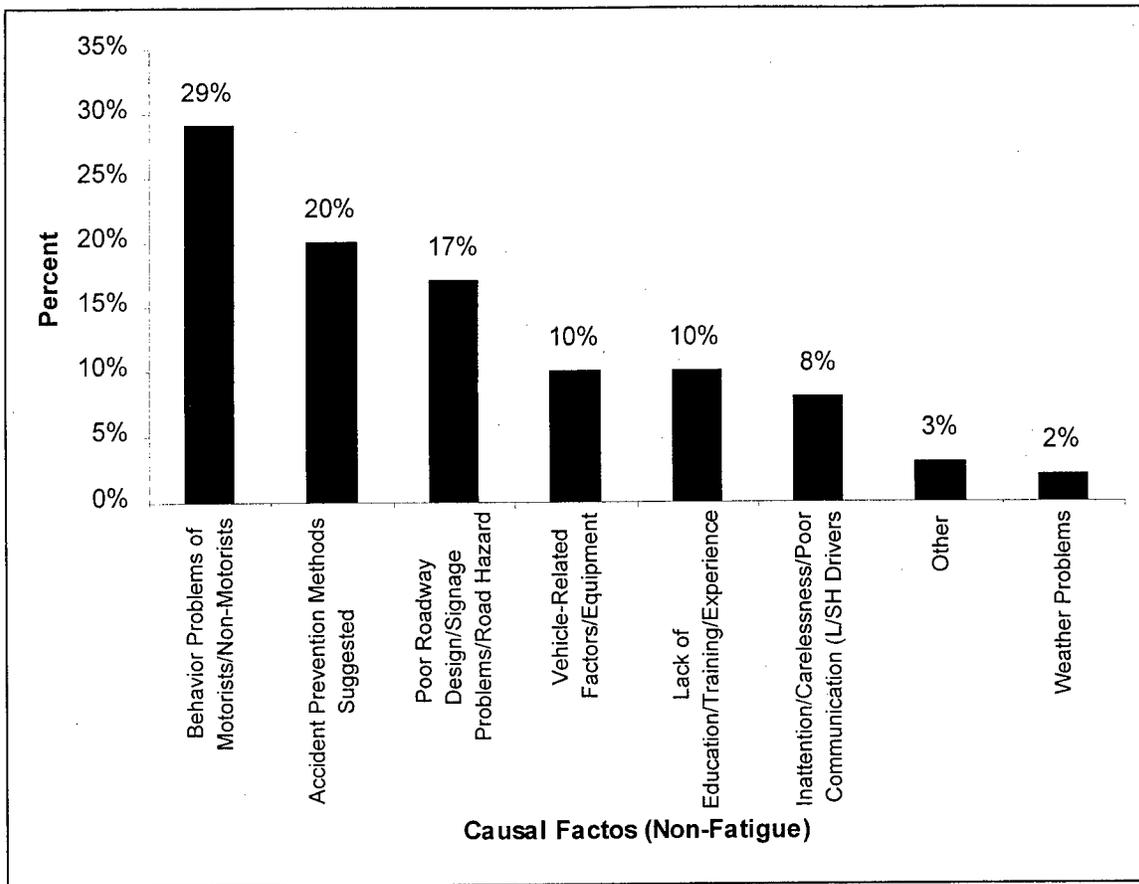
As outlined in Figure 8, for the Fatigue category, six issues comprised the bulk of the discussions. That is, 82% of the discussions related to fatigue involved Working Hours (i.e., long or odd hours), Time of Day/Week, Stressors, Lack of Sleep/Personal Life, Weather Conditions, or Physical Labor/Inactivity.



**Figure 8. Fatigue factors cited by the L/SH drivers.**

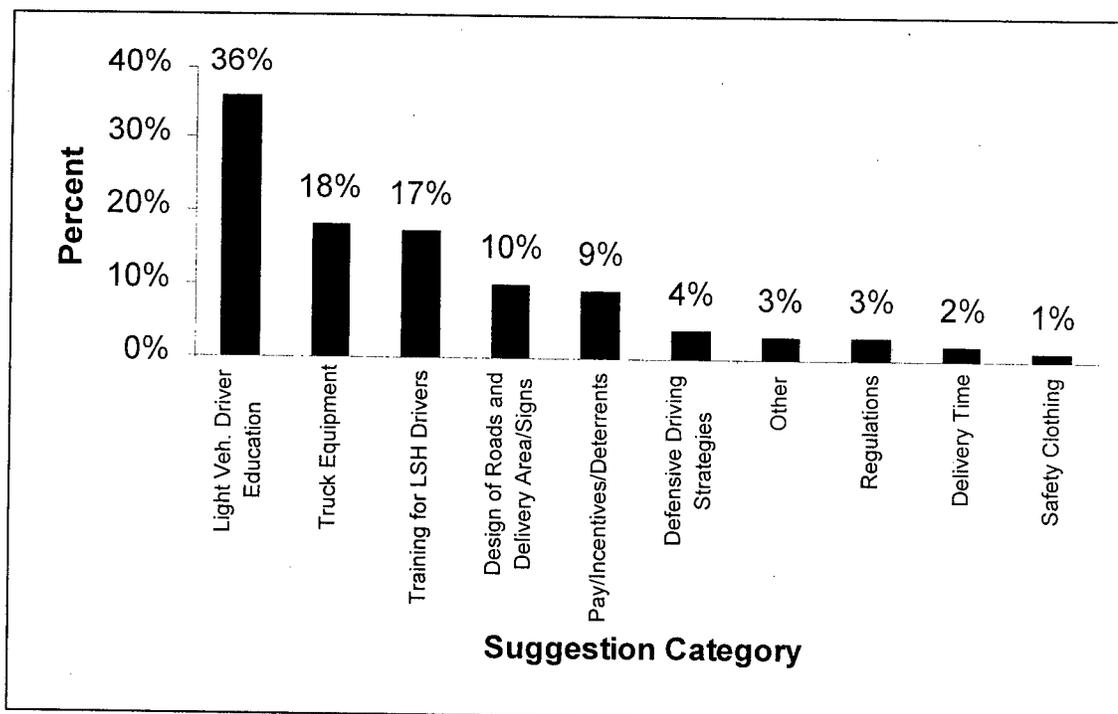
There were two major issues discussed that were potentially related to fatigue. As shown in Appendix B-3, under the Potentially Fatigue-Related category, Stressors and Work Schedule accounted for almost 75% of the issues mentioned.

Of all the Non-Fatigue factors, the three largest groups were Behavior Problems of Other Motorists/Non-Motorists (29%, 165 of 572), Suggestions for Accident Prevention (20%, 114 of 572), and Roadway Design/Structures/Hazards (17%, 98 of 572) (see Figure 9). For Behavior Problems of Other Motorists/Non-Motorists, 82% were attributed to passenger car drivers. The main complaint by L/SH drivers was that they would try to maintain a safety zone (a buffer space in front of their truck) and passenger car drivers would invariably enter that zone (34%, 46 of 136). The other important issues involving the behavior of passenger car drivers were related to their inattention (18%, 24 of 136) and aggressive driving (18%, 24 of 136).



**Figure 9. Non fatigue-related causal factors cited by L/SH drivers.**

In terms of Suggestions for Accident Prevention, Figure 10 shows that the drivers predominantly made suggestions concerning education for other drivers/passenger car drivers (36%, 41 of 114). Many of the L/SH drivers felt that educating light vehicle drivers on trucks' abilities and limitations would make their jobs safer.



**Figure 10. Methods for accident prevention suggested by the L/SH drivers.**

Poor road design was the third largest Non-Fatigue-Related factor. Almost one-third of these comments about poor road design mentioned examples of designs of dock and store delivery areas, and designs of on- and off-ramps. Drivers felt that dock and store delivery areas were not designed with the needs of the truck driver in mind.

### **MICRO-ANALYSIS**

As noted, to meet the goals of the current task, eleven focus groups were conducted. A total of 82 L/SH drivers participated. The focus groups occurred between May and August 1997, and were held in eight cities, in five states. Each session lasted 2½ to 3 hours. L/SH drivers from a wide variety of trucking industries participated.

The following is a summary of each of the eleven focus groups. To help maintain anonymity, the focus group sessions are presented in random order.

#### **Group 1**

##### Session Overview

Present at the session were seven focus group participants, the moderator, and an assistant. The session was arranged by one of the participants who learned of the project through an advertisement in a local newspaper. This participant arranged for a group of co-workers to meet for a focus group session in a conference room on company premises. The session began late in the afternoon, after the participants had completed their shift.

## Driver Description

For all focus group sessions, driver profiles were compiled based on a screening questionnaire and on introductory questions asked at the beginning of the session. A detailed description of all participants is included in Appendix C.

The drivers in this focus group were homogeneous in that they worked for the same public utility company. All of the drivers hauled dirt, concrete, gravel, rocks, earth, and other materials, and all drove either a dump/boom truck or a backhoe hauler. All of the drivers classified themselves as full-time L/SH drivers. None of the drivers drove between states. Forty-three percent of the drivers spent about half their workday driving, while the remaining spent more than half the day driving. On average, they had a 40-plus-hour work week with a range of 40 to 40+ hours. Every participant reported driving 10-200 miles per day. They were all union members. The diversity in this group is reflected in their driving experience and age. The average number of years of truck driving experience was 10 years, with a range of 3.5 to 18 years. Their L/SH truck driving experiences averaged about 9 years, ranging from 3 years to 15 years. All drivers held a CDL, with many having all endorsements. The average age for this group was 41 years old, with a range of 31-55 years. The mean age of these drivers was 41.4 years, and ranged from 31 years to 55 years.

## Driver Response

A copy of the focus group interview guide is provided in Appendix D. As an aside, the interview guide that was developed for the first session (from a chronological standpoint) was modified for all subsequent sessions. The modifications were relatively minor (e.g., changing the wording of a question) and resulted, in part, from feedback from the drivers.

The first part of the focus group consisted of a series of introductory questions. Driver responses to the introductory questions, along with data obtained from a telephone screening questionnaire, are outlined above in the *Driver Description*. The data from the remaining sections of the focus group are classified into four categories: (1) tasks performed, (2) general safety issues, (3) fatigue issues, and (4) miscellaneous findings. Each of these categories is delineated below.

### *Tasks Performed*

After listing and discussing the tasks typically performed by L/SH drivers, the participants were asked to create a pie chart outlining the tasks they perform during a typical workday and the percentage of time spent on each task. The mean responses (in percent) are shown in Table 18. Driving was the primary task of these drivers. Other tasks included Waiting, Assisting Crew Members or Other Drivers, Vehicle Inspection and Maintenance, Paperwork, and Other. The "Other" category included Loading/Unloading, Pipe Work, Dispatch, Checking In and Out, and Breaks.

Some categories require further clarification. The category "Vehicle Inspection & Maintenance" includes the task of cleaning the vehicle, as reported by one driver. The

“Check In & Out” category includes the task “check with crew chief,” as reported by one driver. All drivers who said waiting was part of their workday were waiting to be loaded.

**Table 18. Percentage of time per task, as reported by drivers in Group 1. Not all participants responded in each category. Number of respondents (n) per category is indicated.**

Driving (n=7)	Waiting (n=3)	Assist Others (n=3)	Vehicle Inspection & Maintenance (n=4)	Paperwork (n=6)	Other (n=7)
69.0	15.0	11.7	7.5	5.3	11.7

### *General Safety Issues*

A large portion of the focus group discussion was related to general safety issues in daily L/SH operations. Based on driver responses, a list of general safety issues was developed. This list was then presented to drivers and they were asked to rank the importance of each issue. Table 19 outlines the general safety issues discussed by the drivers and their ranking of importance. The ranking of importance was conducted by consensus after group discussion. When no consensus could be reached, each issue was ranked as a “tie.”

As a side note, it should be pointed out that in preparation for the focus group sessions, it was hoped that a measure of frequency might be collected for each issue described. However, as it turned out, drivers had a very difficult time trying to estimate frequencies for each issue. As such, the only metric that could be identified for the critical issues was the ranking of importance.

**Table 19. Ranking of safety issues as described in Group 1.**

SAFETY	
ISSUE	RANKING OF IMPORTANCE
Problems Caused by Drivers of Light Vehicles	1
Roadway Design	3
Inattention	3
Stress from Time Pressure	3

The primary general safety issue raised by participants in the current session was Problems Caused By Drivers of Light Vehicles. Participants noted that private drivers’ lack of knowledge about trucks, including misinterpretation of truck driver signals, leads to safety problems. Inattention on the part of the truck driver was another issue that was discussed. Drivers commented that when they are inattentive, they do not check their mirrors as often as they should.

Following is a list of paraphrased comments, made by the participants, on general safety issues:

- Loading is hazardous on a dump truck because drivers have to climb up and down small steps.

- The short distance between heavily traveled on- and off-ramps causes drivers to cut across many lanes of traffic.
- Bad mirror placement makes merging difficult.
- Metered signals on on-ramps are seen as a hindrance to truck drivers. It is hard for trucks to get back up to speed after they stop at these on-ramp signals.
- Drivers of light vehicles do not allow enough stopping distance and don't give trucks much room to maneuver when merging. Drivers attributed this to the high volume of traffic.
- It is difficult to drive down narrow residential streets with cars parked on the side of the road.
- Although trucks have white reverse lights, the trailers do not.
- Working with backhoes is hazardous. This work can result in finger injuries due to tailgates and valves being dropped on them, as well as back injuries.
- In this type of work, finger, back, and heel injuries are common.
- Drivers of light vehicles need to be educated on trucks. They need to learn about a truck's blindspots (which vary from truck to truck), safe following distance, and wide turns.
- Drivers commented, "We need longer merging lanes."
- As part of obtaining or renewing a driver's license, private drivers should be required to drive a truck so they can see what it's like.
- Truck drivers also have a blindspot in front of their vehicles. Because of the long nose of the truck, drivers may not see a small vehicle or a pedestrian that moves in front of them.
- (Construction) crew members will pressure the drivers into performing unsafe actions because they don't understand what the trucks can and cannot do.

*Fatigue Issues*

The latter part of the session focused on issues related to driver fatigue. As with the assessment of general safety issues, fatigue-related issues were gleaned from drivers' descriptions and discussions of accidents and near-misses. Table 20 shows the fatigue issues that were raised and the ranking of importance associated with each issue.

**Table 20. Ranking of fatigue issues as described in Group 1.**

FATIGUE	
ISSUE	RANKING OF IMPORTANCE
Stress from Work (Frustration)	1
Traffic Congestion	2
Long Hours	3

For clarification, the stress that drivers reported was related to working with the construction crew and management. Traffic congestion was attributed to construction and poor roadway design.

Measures of fatigue were obtained through questionnaires. The drivers were presented with a 100-point Likert-type scale for six statements. Anchor points on the scale ranged

from 0, meaning that they “Strongly Disagree” with the statement, to 50, to 100, meaning they “Strongly Agree” with the statement. They were also asked four fatigue-related questions. The results of the Likert-type scale ratings are shown in Table 21. Table 22 shows the results of other fatigue-related questions as a mean or percentage, as appropriate.

**Table 21. Mean responses to Likert-type fatigue-related statements.**

Fatigue-Related Question	Mean Response
In my job, I do the same thing day after day.	66.4
I feel like my job is exciting.	57.1
I do too much driving at my job.	23.6
I feel tired when I’m on the job.	20.7
My job involves too much physical exertion.	10.0
My job involves too much mental exertion.	25.0

**Table 22. Mean, percentage, or range for responses to fatigue-related questions.**

Fatigue-Related Question	Mean Response	Range
How many hours of sleep do you get per night?	7.5	6-8.5
Typical part of workday most tired?	57% responded “end of shift”	NA
Number of days feels sluggish.	2.07	0-7
Reason for being tired at work.	57% listed “not enough sleep” as first response.	NA

Following are paraphrased comments made by the drivers related to fatigue:

- Drivers work long hours. They sometimes sleep in their trucks if they are waiting at a job site.
- One driver fell asleep while going home *after* the job. The rumble strips on the road woke him up.

*Miscellaneous Findings*

The following are additional comments (paraphrased) made during the focus group session that are related to the L/SH industry in general:

- Drivers may make up to 16 trips per day depending on the equipment being hauled or the truck being driven.
- Drivers recommended installing pedestrian crossing lights at crosswalks. Currently, pedestrians will walk on the driver’s green light, making the driver wait through a number of lights before he or she can turn left.
- Drivers commented that there is always roadway construction, which results in constantly changing traffic patterns. When an accident occurs, traffic will come to a stop.
- Drivers commented that carpool lanes were a hindrance.
- CB radios encourage short communications, whereas cell phones encourage longer conversations.
- Pagers are not useful for the driver because the displays are “impossible” to read while driving.

- All drivers should be required to attend defensive driver training on an annual basis, not just when the driver is involved in an accident.
- Mentoring was viewed positively only if the mentor was properly compensated (i.e., paid).

### Summary

The following bullets highlight the key findings from the present session:

- Driving, waiting, and assisting crew members or other co-workers were the primary tasks performed by these L/SH drivers.
- The most important safety issue for these drivers related to Problems Caused By Drivers Of Light Vehicles.
- Fatigue is experienced “after the job” or “after lunch” rather than on-the-job; 100% reported feeling fatigue at the end of the shift (57%) or after lunch (43%).
- Stress from work, traffic congestion, and long hours were the greatest factors of fatigue for this group.
- For this group, cooperation is missing between the drivers and crew members (who are, for the most part, non-drivers). This lack of cooperation causes fatigue.
- There is a need for public education on how to interact with trucks.

## **Group 2**

### Session Overview

All participants in this focus group worked for the same company. Company management, at the request of the project principal investigator, arranged the session. Present at this session were nine focus group participants, the moderator, and an assistant. The focus group was held in a conference room on company premises. The session began in the early evening, after the participants had completed their shift.

### Driver Description

All drivers worked for the same company and hauled various types of freight. All of the participants classified themselves as full-time L/SH drivers. Eighty-nine percent of the drivers reported that they drove from one state to another. Seventy-eight percent stated that at least 50% of their workday was driving. The mean number of hours worked in a typical week was 51.4 hours and ranged from a mean of 45 hours to 55 hours. Driver consensus of the average number of miles driven per day was 100-150 miles. The mean number of years of truck-driving experience was 11.2 years, and ranged from 1 year to 28 years. The mean number of years of L/SH driving experience was 8.1 years, and ranged from 1 year to 20 years. All of the drivers held a CDL, and most reported that they also held a variety of endorsements. The trucks driven included tractor-trailer singles and straight trucks. Although some of the drivers had endorsements for double trailers and triple trailers, their company did not use them for L/SH. The mean age of the drivers was 38.9 years, and ranged from 32 years to 50 years.

### Driver Response

The following sections outline driver responses to the questions posed during the focus group.

*Tasks Performed*

Table 23 outlines the tasks performed by the L/SH drivers in this session. Driving, Loading, and Unloading were the primary tasks reported. The primary tasks that comprised the Other category were Phone, Paperwork, and Waiting.

**Table 23. Percentage of time per task, as reported by drivers in Group 2.**

Driving (n=9)	Loading (n=9)	Unloading (n=9)	Other (n=8)
49.4	19.1	21.3	11.5

*General Safety Issues*

Table 24 outlines the general safety issues discussed by the L/SH drivers and their ranking of importance. The drivers in the current session unanimously agreed that Stress was the most important safety issue for L/SH drivers. Drivers provided examples of the impact that stress had on their job. For example, they noted that there is pressure to do their orders (i.e., make deliveries) even if the truck is not in top shape.

**Table 24. Ranking of safety issues as described in Group 2.**

SAFETY	
ISSUE	RANKING OF IMPORTANCE
Stress	1
Problems Caused by Drivers of Light Vehicles	2
Poor Roadway	3
Poor Signs	4

The following are some of the comments related to general safety issues that were voiced during this session:

- The size of trailers impacts safety. The size of trailers has been increasing, but the size of city roads has not.
- Poor signing on a bridge overpass was described as the cause for one driver ripping the roof off a trailer.
- Some states have no phone number for drivers to call and check for clearances or for information on how to enter a weight class limit road.
- Weight class limit road signs are posted after a driver commits to a road.
- Railroad crossings in the area do not have arms/barriers, only flashing lights. On sunny days, drivers cannot see these lights.
- Drivers feel that the public does not know how to interact with trucks.
- Drivers feel that they do not get any respect from the driving public.
- Educating the public is the most important thing that can be done to improve L/SH safety.
- It would be beneficial to have signs on the back of trailers that communicate messages to the public on how to interact with trucks. Currently, there is advertising on the back of trailers. The drivers suggested that there could be different educational messages on the back of different trailers. Also, drivers suggested that cartoon

messages would be effective. An example of the types of messages that need to be communicated is “Yield to four-way flashers” (L/SH drivers turn on their four-way flashers when backing).

- To improve safety, Jake (engine) brakes “should be standard equipment on all vehicles.”
- Weather is a big factor in close calls because drivers do not know what their trucks can do (as they drive different tractors from day to day).
- Backing accidents account for an estimated 50% of accidents in L/SH.
- Barn doors on trailers obscure the driver’s vision when backing. Roll-up doors are preferred.
- Docks are not designed for drivers, but rather for aesthetics.
- Companies need to communicate the L/SH rules and laws to the drivers.

*Fatigue Issues*

Table 25 shows the fatigue-related issues raised by the drivers in this session, along with a ranking of importance. This particular group of drivers stated that fatigue is not a big issue in L/SH. As such, they had a difficult time ranking these issues. The drivers acknowledged that fatigue was an issue for long-haul drivers. However, because L/SH drivers sleep in their own beds every night and are kept busy throughout the day, there are not the same lulls during the workday as there are in long-haul driving. Consequently, several drivers stated that for them, fatigue was not an issue. When pressed, drivers were able to rank the two most important fatigue issues. All other issues generated by the drivers were not ranked.

**Table 25. Ranking of fatigue issues as described in Group 2.**

FATIGUE	
ISSUE	RANKING OF IMPORTANCE
Waiting to Load/Unload	1
Sick	2
Reprimanded by Management Before Start of Shift	4.5
Not Enough Sleep	4.5
Partying	4.5
Snow at Docks and Chaining Tires	4.5

Fatigue-related questions were also asked as part of a paper-and-pencil questionnaire. Table 26 outlines the results of a Likert-type questionnaire that were related to fatigue. Table 27 shows the mean driver responses to a set of fatigue-related questions.

**Table 26. Mean responses to Likert-type fatigue-related statements. Anchor points on the scale were at 0 (Strongly Disagree), 50, and 100 (Strongly Agree).**

Fatigue-Related Question	Mean Response
In my job, I do the same thing day after day.	62.8
I feel like my job is exciting.	66.1
I do too much driving at my job.	27.2
I feel tired when I'm on the job.	26.1
My job involves too much physical exertion.	51.7
My job involves too much mental exertion.	59.4

**Table 27. Mean, percentage, or range for responses to fatigue-related questions.**

Fatigue-Related Question	Mean Response	Range
How many hours of sleep do you get per night?	6.9	5.5-8.5
Typical part of workday most tired?	44% responded "after lunch"	N/A
Number of days feels sluggish.	1.17	0-2
Reason for being tired at work.	Tie for most frequent responses: "lack of sleep," "hard workday," "driving long distances"	N/A

To gain a more complete understanding of how drivers felt about fatigue-related issues, it is worthwhile to note some of the comments made by drivers. These paraphrased comments include the following:

- Drivers reported that fatigue is not much of an issue in L/SH because drivers sleep in their own beds each night.
- Drivers also noted that fatigue is not a big issue in L/SH because drivers are too busy during the day. Contrast this with long-haul drivers who drive longer distances and get tired due to inactivity.
- It is more fatiguing if a driver gets a trailer with barn doors as compared to roll-up doors.

#### *Miscellaneous Findings*

The following are miscellaneous findings (paraphrased) noted during the focus group session that are related to the L/SH industry in general:

- In describing rest breaks, a driver stated that you "get them when you make them."
- There needs to be a manual specific for L/SH drivers on the "do's and don'ts," and on "weight class rules."
- The job requires much lifting.
- Some of the drivers get to use the same tractor each day, although most have to use whatever tractor is available.
- The accident rate for L/SH drivers may be three times that of the long-haul driver. L/SH drivers have to deal with circumstances that long-haul drivers do not have to deal with, such as narrow alleys, fire escapes, street hole covers, and no Jake brakes.
- L/SH drivers may have as many as 30 stops per day and have to back into a dock at each stop.
- It is difficult to check the load in the morning because there is lots of freight on the trailer.

- Drivers do not drive the same route each day, although they would like to so that they could build a rapport with management at their stops.
- Drivers often have to wait to unload.
- The company encourages the use of steel-toed shoes. Other safety attire, such as lifting belts, is optional. Most drivers feel belts are cumbersome and therefore do not wear them.
- Policy dictates that drivers cannot sleep on their lunch breaks.
- The company teaches driver education and defensive driving to the drivers.
- Communication regarding road conditions, rules, etc. is important between drivers.
- Drivers report that cell-phones for car drivers are the worst for diverting attention for those drivers.
- There are no sounders on trailers.
- There are no reverse lights on trailers.

### Summary

There were several key findings in this session. Based on the drivers' responses, these key findings include the following:

- Driving and loading/unloading are the primary tasks performed by L/SH drivers.
- The safety issues ranked most important were Stress, Problems Caused by Drivers of Light Vehicles, Poor Roadway, and Poor Signs.
- The most critical safety issue reported was Stress.
- Several drivers believed that fatigue is not a major issue in L/SH.
- The size of trailers impacts safety. Although the size of trailers has increased, the size of roads has not.
- Communication for bridge clearances and weight class limit roads is poor in some states.
- The public does not interact well with trucks.
- Educating the public on interacting with trucks was noted as the most important way to improve L/SH safety.
- Public education should include instruction when drivers get their driver's license, as well as public service/education messages on the back of truck trailers.
- A driver manual should be developed that is specific to the L/SH industry.

### **Group 3**

#### Session Overview

Participants in this session learned of the focus group from an advertisement placed in a local newspaper. The session was held on a Saturday, which was a day-off for all participants. The focus group met in a conference room at a hotel in a large metropolitan area. Five drivers attended, along with the moderator and assistant.

#### Driver Description

The drivers in this session hauled a variety of goods including grocery products, hardware, metal building products, concrete, and general commodities. Sixty percent of the drivers only drove combination trucks, 20% drove a straight truck, and 20% drove

both straight and combination trucks. All drivers classified themselves as full-time L/SH drivers. Aside from one driver whose driving area range is unknown, half of the drivers reported that they drove within the state. Sixty percent of the drivers reported spending about half their workday driving, while the remaining 40% reported spending more than half the day driving. The average reported workweek was 45 hours and ranged from 20 hours to 60 hours. Mean miles driven per day was 208 miles and ranged from 20 miles to 450 miles. All of the participants worked for private delivery companies (none of the participants worked for the same company). Eighty percent of the drivers were union members. The average number of years of truck-driving experience was approximately 23 years and ranged from 13 years to 30 years. Their L/SH truck driving experience averaged 8 years and ranged from 3 years to 10 years. One driver was not included in the calculations for driving experience because he failed to provide this information (missed answering this question on the questionnaire). All drivers held a CDL with most or all endorsements, with the exception of one driver whose license status was unknown (again, a missed question on the questionnaire). Although most drivers appeared to be between 30-45 years of age, only one of the drivers provided his age: he was 64 years old.

### Driver Response

#### *Tasks Performed*

The proportion of time spent on various tasks during a typical workday is outlined in Table 28. Driving is the primary task of these drivers, followed by Waiting and Loading/Unloading. The “Other” category includes Paperwork, Changing Trailers, and Breaks.

**Table 28. Percentage of time per task, as reported by drivers in Group 3.**

Driving (n=5)	Loading/ Unloading (n=5)	Waiting (n=4)	Vehicle Inspection & Maintenance (n=3)	Other (n=3)
45.0	22.0	32.5	5.0	6.67

As compared to the other focus groups, Waiting was a much more prominent activity for the drivers in this group. Accordingly, the reasons for waiting were distinguished in the pie charts drawn by the drivers. For instance, one driver differentiated between waiting for his truck to be loaded and waiting for the dispatcher.

#### *General Safety Issues*

General safety issues were ranked in order of importance. These issues are shown in Table 29. It is worth noting that even though many of the drivers reported working long hours and logging many miles, fatigue was not mentioned as an issue.

**Table 29. Ranking of safety issues as described in Group 3.**

SAFETY	
ISSUE	RANKING OF IMPORTANCE
Traffic Congestion	1
Stress/Time and Management Pressure	2
Vehicle Design	4
Problems Caused by Drivers of Light Vehicles	4
Over-Confidence in Skills	4

Following is a list of paraphrased comments by the participants on general safety issues:

- The CB radio is an important communication device used by drivers. For example, during poor weather conditions, CBs are used to make other drivers aware of treacherous conditions.
- Falsifying log books allows drivers to drive more miles. One driver attributed several accidents to this illegal practice.
- “Pay per load” drivers tend to speed and run yellow lights (i.e., driving dangerously).
- “Pay per load” pay structure leads to excessive wear-and-tear on the trucks.
- Newly graduated or inexperienced truck drivers are the ones who drive irresponsibly. One driver commented, “they’re the ones that go through the light...cut you off...tailgate you.”
- Illiteracy is a factor that can affect safety. Drivers who cannot read English and who cannot read instructions at the piers or loading docks cause accidents.
- Drivers of light vehicles need to understand a truck’s limitations and interact with them accordingly.
- Drivers try to maintain a safe following distance, but other cars will cut in, thus reducing their “safety net.”
- The rule that trucks must stay in the right two lanes makes it difficult when the right lane is an exit-only lane. It is difficult for trucks to get into the left lane because of traffic. It is also difficult to exit left-hand off-ramps.
- Separate speed limits for cars and trucks cause crashes. It encourages cars to enter the truck’s safety zone, which causes rear-end crashes.
- Drivers reported problems caused by closely positioned on- and off-ramps.
- Drivers of light vehicles need to be educated on the trucker’s point of view.
- Because drivers cannot legally maintain their own vehicles, brakes and tires are not always maintained. This is a contributing factor in crashes.
- Mirrors could be better placed to combat the truck driver’s blindspots. Windshield wipers are typically of poor quality.
- Inexperienced drivers have a false sense of confidence about their driving abilities. An analogy was made to teen drivers.
- Regulations should be left alone. Just as the airline industry experienced safety problems as a result of deregulation, so did the trucking industry.
- High traffic volume causes many drivers to be in a hurry.
- High-mounted brake lights for trucks should be mandated. The cost for this would be minimal. These brake lights seem to be effective because they are visible to cars.

- Drivers of light vehicles need to get behind the wheel of a truck as part of their education. In addition, “interacting with trucks” should be included as a section on the driver’s license test.

*Fatigue Issues*

The latter part of the session focused on issues related to driver fatigue. Drivers were asked to generate a list of fatigue-related causal factors. A list of issues that were discussed during the focus group is shown in Table 30. Drivers in this session were unable to rank these issues in terms of importance. As such, all issues were given the same ranking. The results from the questionnaire related to fatigue are shown in Table 31 (Likert-type statements) and Table 32 (questions).

**Table 30. Ranking of fatigue issues as described in Group 3.**

FATIGUE	
ISSUE	RANKING
Irregular Mealtimes	3.5
Irregular Hours	3.5
Hard Physical Labor	3.5
Stress from Driving in Traffic	3.5
Accumulation of Long Work Hours	3.5
Heat-No A/C in Truck	3.5

**Table 31. Mean responses to Likert-type fatigue-related statements. Anchor points on the scale were at 0 (Strongly Disagree), 50, and 100 (Strongly Agree).**

Fatigue-Related Question	Mean Response
In my job, I do the same thing day after day.	51.0
I feel like my job is exciting.	64.0
I do too much driving at my job.	28.0
I feel tired when I’m on the job.	32.0
My job involves too much physical exertion.	30.0
My job involves too much mental exertion.	52.0

**Table 32. Mean, percentage, or range for responses to fatigue-related questions.**

Fatigue-Related Question	Mean Response	Range
How many hours of sleep do you get per night?	6.7	5.5-7.5
Typical part of workday most tired?	60% responded “end of shift”	NA
Number of days feels sluggish.	1.8	0-7
Reason for being tired at work.	40% listed “working too many hours” as first response.	NA

To gain a more complete understanding of how drivers felt about fatigue-related issues, it is worthwhile to note some of the comments made by drivers. A sample of these paraphrased comments follows:

- Low pay forces many drivers to work two or more jobs. Whereas long-haulers can relax on a long straight drive, L/SH drivers do not have the same luxury.

- Driving on long stretches can relax a driver too much and cause drowsiness. Soft medians that help slow the truck down, and roads designed wide apart can prevent accidents when the truck drifts out of the lane.
- The “pay per load” pay structure negatively affects safety. It causes diminished mental alertness and increased fatigue.
- Irregular meal times and working odd, inconsistent hours cause fatigue.
- One driver mentioned that he felt sleepy when working night shifts.
- Physical exertion from lifting heavy items onto hand trucks was expected of drivers.
- Driving in heavy traffic was mentioned as being stressful and fatiguing.
- The accumulation of working long hours was mentioned as a large fatigue factor because it is hard to make up for this lack of sleep.
- Heat and no air conditioning (A/C) also cause fatigue.

### *Miscellaneous Findings*

The following are additional comments (paraphrased) made during the focus group session that are related to the L/SH industry in general:

- When having to deliver to residential areas, parking is problematic.
- Drivers had negative sentiment towards dispatchers. One driver stated, “(the) definition of a dispatcher is a liar.”
- For some drivers, customer relations are a “major part of the job.” Drivers must satisfy the customers.
- The public has a colored perception of truck drivers. Truckers are seen as bad drivers. In the public’s eye, truck drivers are always to blame when there is a crash involving a truck and a car.

### Summary

Based on the drivers’ responses, there were several key findings in this session. They include the following:

- Driving, waiting, and loading/unloading are the primary tasks performed by this group of L/SH drivers.
- The drivers tended to agree with the statement, “My job involves too much mental exertion” more than they did with other statements regarding fatigue, driving too much, and physical exertion.
- For the question, “During what part of a typical workday are you most tired?,” drivers gave one of two responses: 60% answered “end of shift,” and 40 % answered “beginning of shift.”
- Long work hours and not enough sleep were mentioned by 60 % of the drivers in response to the question, “Reason for being tired at work.”
- “Pay per load” compensation has a negative impact on fatigue and safety.
- There is a need for public education on how to interact with trucks. Among the suggestions were: airing TV ads during prime time; having a section pertaining to truck interaction on the driver’s license test; driving in a truck as part of driver training; and using tax incentives to encourage companies to advertise public education messages on trucks.

## Group 4

### Session Overview

Six participants, along with the moderator and assistant, attended this session. Drivers learned of the focus group through an advertisement placed in a local newspaper. The session was held on a Saturday, which was a day-off for all participants. The focus group met in the conference room of a local office building.

### Driver Description

The participants in this session were a diverse group of L/SH drivers in terms of their experience and products hauled. Each of the participants worked for a different trucking company. All participants classified themselves as full-time L/SH drivers and stated that at least 50% of their workday was driving. Sixty-seven percent stated that they drove between states. One of the drivers was recovering from heart surgery and was only driving part-time. Aside from this individual, the mean number of hours worked in a typical week was 52 hours and ranged from 45-60 hours. The mean number of miles driven on a typical workday was 299 miles and ranged from 100-425 miles. The types of cargo hauled included miscellaneous commodities, paper, beer, chemicals, fertilizer, lime, coal, and pre-hung doors. The participants represented both for-hire and private L/SH trucking companies. The mean number of years of truck driving experience was 12.2 years, and ranged from 2 years to 20 years. The mean number of years of L/SH driving experience was 9.1 years, and ranged from 1.5 years to 20 years. All of the drivers held a Commercial Drivers License (CDL) with most having all endorsements. The trucks driven by the participants included tractor-trailer singles and doubles, and straight trucks.

### Driver Response

#### *Tasks Performed*

As shown in Table 33, driving and loading/unloading were the primary tasks reported in this session.

**Table 33. Percentage of time per task, as reported by drivers in Group 4.**

Driving (n=6)	Loading/Unloading (n=5)	Customer Relations (n=4)	Miscellaneous Work (n=4)	Waiting (n=2)
53.33	28.33	8.33	5.83	2.53

#### *General Safety Issues*

Table 34 outlines the general safety issues discussed by the drivers, and a ranking of importance. The drivers in this session unanimously agreed that Stress Due to Time Pressure was the most important safety issue for L/SH drivers. One of the drivers commented, “(we are) always working against the clock.” Drivers indicated that their jobs needed to get done and the customer had to be happy. It did not matter how long it took to complete the job: the bottom line was that they had to get it done. The drivers felt

that the stress due to this time pressure was the most important factor affecting their safety and was the primary reason mistakes, resulting in accidents and near-misses, were made.

**Table 34. Ranking of safety issues as described in Group 4.**

SAFETY	
ISSUE	RANKING OF IMPORTANCE
Stress Due to Time Pressure	1
Fatigue	2.5
Inattention	2.5
Problems Caused by Drivers of Light Vehicles	4
Mirrors	5

It is worth noting some of the comments made by drivers related to general safety issues. These comments are paraphrased and include the following:

- Related to time stress, a scheduling plan (i.e., a plan of the delivery order) is important for drivers making multiple deliveries.
- Backing accidents are common.
- Most companies award a safety bonus, typically on a quarterly basis of \$100/month for no “preventable” accidents.
- Cell-phones have been installed in some trucks, but are not common. The cell-phones used include both hands-on and hands-free technology.
- Qualcomm is a communication system that connects drivers to dispatch via a satellite link. Drivers are not supposed to operate the Qualcomm while driving, but they often do.
- Drugs to stay awake are more of a problem for long-haul drivers.

*Fatigue Issues*

The fatigue issues raised by drivers and their ranking values are shown in Table 35. The drivers in this session were not able to discriminate between the importance of these issues, so all issues were assigned the same rank.

**Table 35. Ranking of fatigue issues as described in Group 4.**

FATIGUE	
ISSUE	RANKING OF IMPORTANCE
Long Hours	4.5
Sick	4.5
Partying Night Before	4.5
Not Enough Sleep	4.5
Hard Workday	4.5
Driving at Night/Dusk/Dawn	4.5
Unable to Keep Regular Meal Times	4.5
Waiting to Unload	4.5

The results from the Likert-type statements are shown in Table 36. Mean responses to the other fatigue-related questions are shown in Table 37. Drivers commented that fatigue was more of an issue for drivers who worked more than 8 hours per day.

**Table 36. Mean responses to Likert-type fatigue-related statements. Anchor points on the scale were at 0 (Strongly Disagree), 50, and 100 (Strongly Agree).**

Fatigue-Related Question	Mean Response
In my job, I do the same thing day after day.	75
I feel like my job is exciting.	64.2
I do too much driving at my job.	46.7
I do not feel tired when I'm on the job.	65
My job involves too much physical exertion.	30
My job involves too much mental exertion.	50

**Table 37. Mean, percentage, or range for responses to fatigue-related questions.**

Fatigue-Related Question	Mean Response	Range
How many hours of sleep do you get per night?	6.42	4.5-8.5
Typical part of workday most tired?	50% responded "end of shift"	N/A
Number of days feels sluggish.	1.33	0-2.5
Reason for being tired at work.	50% had first response of "working too many hours"	N/A

To gain a more complete understanding of how drivers felt about fatigue-related issues, it is worthwhile to note some of the drivers' comments:

- When asked his thoughts on fatigue, one driver stated, "(fatigue is) one of the biggest, most dangerous things out there in the trucking industry."
- Fatigue is more of a problem with long-haul. However, because L/SH drivers have to interact with long-haul drivers, it becomes a L/SH problem also.
- Many drivers work more than 10 hrs/day to earn extra money.
- Paying drivers more on an hourly basis would reduce fatigue.
- Fatigue is more of a problem with some younger L/SH drivers as they are more inclined to party the night before working.
- Salaried drivers are at a disadvantage because they typically work longer hours than drivers paid hourly.
- Fatigue occurs when drivers are delayed due to waiting to unload freight. One driver recommended that researchers look into improving the efficiency of shipping and receiving.

#### *Miscellaneous Findings*

The following are miscellaneous findings (paraphrased) noted during the focus group session that are related to the L/SH industry in general:

- Drivers noted that education is the key to reducing accidents. For private drivers, education includes how to interact with trucks. For L/SH drivers, education includes defensive driving.
- The Smith System is a defensive driving course sponsored by companies and thought of favorably by the drivers who have taken it. This system includes instruction on

“Identify-Predict-Decide” (i.e., *Identify* the problem, *Predict* what will happen, *Decide* on an action).

- Truckers feel that they are not respected as much as they should be by (1) private drivers, (2) many receiving crews, and (3) management.
- The design of some loading docks should be improved. Many docks are hard to get into and have blind spots that hamper backing.
- There is a wide discrepancy for how L/SH drivers are paid. Compensation methods include being paid hourly, salary, per load, per mile, percentage, and commission. The preferred compensation method for the present group was hourly.
- CB radios are installed in many L/SH trucks, although they are not seen as being very useful.
- Drivers do not want added regulation.

### Summary

The key findings in this session include the following:

- Driving and loading/unloading are the primary tasks performed by L/SH drivers.
- The safety issues ranked most important were Stress Due to Time Pressure, Fatigue, Inattention, and Problems Caused by Drivers of Light Vehicles.
- The most critical safety issue was Stress Due to Time Pressure and was a concern common to all drivers.
- Fatigue is problematic, particularly for drivers working long shifts in excess of 8 hours per day.
- Working longer hours was in response to low pay.
- Drivers speculated that higher hourly pay and fewer hours (e.g., 9 hours max.) may lead to fewer fatigue-related accidents.
- Drivers stated that education is key to reducing accidents. Education must be directed at (1) private drivers in terms of how to interact with trucks, and (2) truckers in terms of defensive driving.

### **Group 5**

#### Session Overview

All participants in this focus group worked for the same company. Company management, at the request of a project consultant, arranged the session. Present at this session were seven drivers, the moderator, an assistant, the project consultant, and the drivers' manager. The focus group was held in an office on company premises. The session was held in the afternoon on a day in which drivers did not have to service their routes.

This particular focus group session was the only one in which individuals other than the drivers, the moderator, and the assistant were involved. The involvement of the consultant and manager may have biased the data. Therefore, the results of this session must be considered in light of their presence and input. Stewart and Shamdasani (1990) provide a clear description of the focus group interview process. They note that outside observance of the session must be done unobtrusively. Both the project consultant and

the drivers' manager were present in the room and involved in the questioning and response process. From a protocol standpoint, an important lesson was learned from this session: *All focus groups should involve only the moderator, assistant, and drivers.* This lesson was applied to all subsequent sessions where only the moderator, assistant, and drivers were in attendance.

### Driver Description

Seventy-one percent of the participants worked for a beer-hauling company. The other 29% of participants hauled pizza products for a large pizza chain. All of the participants classified themselves as L/SH drivers at least 50% of the time. Twenty-nine percent of the drivers reported that they drove from one state to another. Seventy-one percent stated that at least 50% of their workday was driving. The mean number of hours worked in a typical week was 58.3 hours and ranged from a mean of 45 hours to 65 hours. For the beer haulers, the number of miles driven on a typical workday ranged from 10-60 miles. For the pizza product drivers, the number of miles driven on a typical day ranged from 400 miles to 850 miles. However, for this latter group of drivers, a partner was on-board to share half of the driving duties. In addition, the partner would help in all other duties, including unloading. All of the participants in this session were employed by private L/SH trucking companies. The mean number of years of truck-driving experience was 9.0 years, and ranged from 2 years to 20 years. The mean number of years of L/SH driving experience was 8.3 years, and ranged from 2 years to 15 years. All of the drivers held a CDL, and 29% of them reported having endorsements. All participants drove tractor-trailer singles. The mean age of the drivers was 31.6 years, and ranged from 24 years to 41 years.

### Driver Response

#### *Tasks Performed*

The tasks involved in the drivers' typical daily work routine are outlined in Table 38. The mean percentage of time involved in each task is provided. As can be seen, Driving and Unloading were the primary tasks reported. It was reported that Merchandising was seen as the primary task of beer haulers. The beer haulers noted that driving is a task they do to get to their principal job of selling and merchandising. Since several of the drivers grouped Merchandising with Unloading in the present session, which was similar to other sessions with beer/beverage haulers, they are grouped together and included in the Unloading category.

**Table 38. Percentage of time per task, as reported by drivers in Group 5. Number of respondents per category (n) is indicated.**

Driving (n=7)	Unloading (n=7)	Miscellaneous Work (n=6)
35.8	45.3	22.6

### General Safety Issues

The list of the general safety issues, along with a consensus ranking of importance, is shown in Table 39. Problems Caused by Drivers of Light Vehicles was ranked as the most important safety issue.

**Table 39. Ranking of safety issues as described in Group 5.**

SAFETY	
ISSUE	RANKING OF IMPORTANCE
Problems Caused by Drivers of Light Vehicles	1
Roadway Design	2
Weather	4
Stress Due to Time Pressure	4
Inattention	4
Road Construction	6.5
Store Location	6.5

The following is a list of the highlights and paraphrased comments related to general safety issues:

- Drivers haul kegs weighing over 160 lbs. and do not always use hand trucks. The drivers' manager commented that the drivers *are* the lifting tools.
- There is instruction provided by the company on how to lift, but no set amount of weight that can be lifted in a day.
- Drivers often eat while driving.
- Drivers have access to lifting belts, but most do not use them.
- Pizza haulers' safety equipment includes wearing lifting belts and bump caps (hard hats). However, most do not wear them.
- There is a general sentiment that "injuries are part of the job."
- Drivers go out in all types of weather. The manager stated, "these guys don't have a choice," and they must go out.
- The public does not give truckers any respect. The public is seen as the biggest cause of accidents.
- Backing accidents are common. Back-up alarms are present, but drivers can't hear horns honking at them over alarms or their loud truck.
- Wet weather is a factor in driving safety, particularly within the first five minutes of rain.
- Roadway design is a problem, particularly for drivers starting a new route.
- Store delivery areas are not designed with delivery in mind. That is, they are often small and hard to get into.
- Road construction areas that reduce lanes are problematic because cars drive past trucks and do not want to get stuck behind them.
- Drivers use computers that print order tickets while driving.
- In trying to be efficient, drivers are thinking about their next stop while driving to it.
- The driver is ultimately responsible for his truck operation, and regulations will not help this.

### *Fatigue Issues*

During the session, the drivers generated a list of fatigue-related issues and then ranked these issues in terms of importance. This list, along with the rankings, is presented in Table 40.

**Table 40. Ranking of fatigue issues as described in Group 5.**

FATIGUE	
ISSUE	RANKING OF IMPORTANCE
Long Hours	1
Lack of Sleep	2
Physical Work	3
End of a Run	5
Balancing Work and Family	5
Remaining Positive (Frustration)	5

An outline of the drivers' mean responses to the Likert-type statements that assessed fatigue-related issues is presented in Table 41. Driver responses to other fatigue-related questions are shown in Table 42.

**Table 41. Mean responses to Likert-type fatigue-related statements. Anchor points on the scale were at 0 (Strongly Disagree), 50, and 100 (Strongly Agree).**

Fatigue-Related Question	Mean Response
In my job, I do the same thing day after day.	90.7
I feel like my job is exciting.	81.4
I do too much driving at my job.	21.4
I feel tired when I'm on the job.	32.1
My job involves too much physical exertion.	69.3
My job involves too much mental exertion.	57.9

**Table 42. Mean, percentage, or range for responses to fatigue-related questions.**

Fatigue-Related Question	Mean Response	Range
How many hours of sleep do you get per night?	5.6	4-7.5
Typical part of workday most tired?	71% responded "end of shift/day"	N/A
Number of days feels sluggish.	2.67	1-5
Reason for being tired at work.	71% had first response of "not enough sleep"	N/A

The following is a list of issues and paraphrased comments generated by drivers during the focus group session that are related to fatigue:

- When unloading, fatigue is caused by going from cold (trailer, cooler) to hot (outside).
- The time of day that drivers are most tired includes the early morning, end of day, after meals, and on Monday after the weekend. Regarding fatigue on Monday, the rationale given by drivers was that they spend the weekend doing chores and spending time with the family, not resting.
- Fatigue at the end of the day is the cause of near-misses on the commute home.

### *Miscellaneous Findings*

The following are miscellaneous findings (paraphrased) noted during the focus group session that are related to the L/SH industry in general:

- Rest breaks are not typically taken. The general sentiment is that “driving is my break.”
- Breaks would be taken if drivers were paid “hourly” vs. “commission.”
- As drivers/salespeople, a portion of beer haulers’ wage is “at risk pay” as incentive to sell.
- Although beer haulers have incentives in place to sell more beer and expand their routes, the company will reduce the size of a driver’s route if it gets too big.
- Weather affects the size of loads. Poor weather increases pizza sales, but decreases beer sales.
- Pizza haulers drive mostly at night.
- The beer-hauling company may install cell-phones so drivers can communicate with each other.
- The beer-hauling company is investigating the possibility of getting bigger trailers with more bays.
- Education is needed for light vehicle drivers regarding interacting with trucks.

### Summary

As noted, the results of this focus group session need to be qualified and considered with caution due to the presence of the non-drivers who participated. With the presence and input of a trucking consultant and the drivers’ management, this session was more of a general meeting to discuss safety issues as opposed to a “focus group.”

The following is a list of highlights from this session:

- Merchandising is seen as the primary task of beer haulers, whereas driving is an incidental task to get them to their primary task.
- The general safety issues ranked most important were Problems Caused by Drivers of Light Vehicles, and Roadway Design.
- Long Hours was the consensus response for the most critical cause of fatigue on the job. Lack of Sleep, and Physical Work were ranked 2 and 3, respectively.
- Drivers feel fatigue an average of 2.7 days per week.
- Hours-of-service regulations are in effect for pizza product drivers, but not for beer haulers. Pizza haulers work an average of 60 hours per week but drive with a partner, whereas beer haulers drive an average of 57.6 hours per week and typically work alone.
- Beer haulers reported eating and using the computer while driving.
- Drivers note that public education is needed on how to interact with trucks.

### **Group 6**

#### Session Overview

All participants in this focus group worked for the same company. The session was arranged by company management at the request of one of the project researchers.

Present at this session were ten focus group participants, the moderator, and an assistant. The focus group was held in a conference room on company premises. The session began in the afternoon, after the participants had completed their shift.

Driver Description

The drivers in this focus group all worked for a snack food company. None of the participants were union members. Drivers hauled potato chips, pretzels, cookies, crackers, and dip. Seventy percent of the drivers drove tractor-trailers, and the rest drove panel vans. All drivers classified themselves as full-time L/SH drivers. Half of the drivers reported that they drove from one state to another on occasion, or on a regular basis. Sixty percent of the drivers spent about half their workday or more driving, while 40% spent less than half of their day driving. On average, drivers had a 50-hour workweek, with a range of 45-60 hours. This average excludes one driver who failed to respond to this question on the questionnaire. Mean miles driven per day was 98 miles, and ranged from 43-180 miles. This mean does not include one driver whose daily mileage is unknown as a result of an incomplete questionnaire. The average number of years of truck driving experience was 15 years, with a range of 2 years to 40 years. The number of years of L/SH truck driving experience averaged 12 years, and ranged from 2 years to 30 years. Only six of the drivers held a CDL, while the rest held a regular driver's license. The average age of the group was 40.1 years, and ranged from 24 to 60 years.

Driver Response

*Tasks Performed*

The proportion of time spent on various tasks during a typical workday is outlined in Table 43. Driving and Loading/Unloading were the primary tasks reported. The "Other" category included Checking In, Paperwork, Pickup, and Checking In and Out.

**Table 43. Percentage of time per task, as reported by drivers in Group 6.**

Driving (n=10)	Loading/ Unloading (n=9)	Waiting (n=5)	Sales (n=3)	Other (n=6)
33.6	33.8	16.6	55.0	18.7

*General Safety Issues*

General safety issues were listed and then ranked in order of importance. The top issues are shown in Table 44. Problems Caused by Drivers of Light Vehicles, and their inattention to driving and lack of respect for truck drivers, was ranked as the most important L/SH safety issue. Stress from Time Pressure/Deadlines was ranked second by drivers of route vans, while the tractor-trailer drivers felt that Deadlines should be ranked third. Fatigue was more of an issue at the end of the day rather than during the day.

**Table 44. Ranking of safety issues as described in Group 6.**

SAFETY	
ISSUE	RANKING OF IMPORTANCE
Problems Caused by Drivers of Light Vehicles	1
Roadway Design	2.5
Stress from Time Pressure (Deadlines)	2.5
Fatigue	4

The following is a list of paraphrased comments by the participants on general safety issues:

- Because part of their job is sales, some of the drivers carry cash. One of the drivers reported being robbed while delivering in a “bad” part of town.
- Working with different trailers can cause personal injury. A driver who relied on using the grab rail on a particular trailer reached for the grab rail on a trailer that did not have one. He commented that it was dark and he couldn’t see that there was no grab-rail present. He ended up falling off the trailer.
- Drivers of light vehicles do not know how to merge. L/SH drivers described examples of having to brake hard because of light vehicles cutting them off.
- Some drivers feel that it would be safer if the middle lane of a three-lane highway was the primary truck lane. In addition, drivers commented that the center lane should be wider.
- Lack of road signs is problematic for drivers not familiar with a road.
- Drivers described on- and off-ramps that need to be spaced further apart to avoid congestion.
- One driver said 70% of drivers, both truck and private, do not use their directional signals. They just start drifting into the lane they want to use.
- Private drivers often do not have their headlights on at dawn.
- “No-slip strips” on the floors of the trucks help prevent falls.
- Trucks should be equipped with daytime running lamps so they are more visible to others during dawn/dusk hours.
- Drivers mentioned examples of crashes resulting in property damage that were due to driving too fast. Drivers attributed their excessive speed to time pressure deadlines.

*Fatigue Issues*

The latter part of the session focused on issues related to driver fatigue. Drivers were asked to generate a list of fatigue-related causal factors, and then rank them in terms of importance. The rankings are shown in Table 45. Loading and unloading were the predominant tasks for these drivers, but because they must start very early in the morning, they frequently have to wait for someone to show up at the store so they can deliver the products. As such, Waiting to Load/Unload was ranked as the most important factor.

**Table 45. Ranking of fatigue issues as described in Group 6.**

FATIGUE	
ISSUE	RANKING OF IMPORTANCE
Waiting to Load/Unload	1
Irregular Hours	2

Drivers' mean responses to the Likert-type statements that probed fatigue-related issues are presented in Table 46. Driver responses to other fatigue-related questions are shown in Table 47.

**Table 46. Mean responses to Likert-type fatigue-related statements. Anchor points on the scale were at 0 (Strongly Disagree), 50, and 100 (Strongly Agree).**

Fatigue-Related Question	Mean Response
In my job, I do the same thing day after day.	89.0
I feel like my job is exciting.	47.0
I do too much driving at my job.	25.5
I feel tired when I'm on the job.	23.0
My job involves too much physical exertion.	28.5
My job involves too much mental exertion.	33.5

**Table 47. Mean, percentage, or range for responses to fatigue-related questions.**

Fatigue-Related Question	Mean Response	Range
How many hours of sleep do you get per night?	6.10	5-7
Typical part of workday most tired?	80% responded "end of shift"	NA
Number of days feels sluggish.	1.2	0-3
Reason for being tired at work.	30% listed "not enough sleep" or "sick" as first response.	NA

The following are a few paraphrased comments on fatigue that were mentioned during the group discussion:

- The drivers of this focus group indicated that they do not experience fatigue while working.
- Fatigue was more of an issue at the end of the day.
- One driver felt most fatigued on Mondays because he has a six-day workweek.

#### *Miscellaneous Findings*

The following are additional comments (paraphrased) made during the focus group session that are related to the L/SH industry in general:

- During the pre-trip inspection, drivers may choose to drive another truck if they feel the one they have is not safe to drive.
- Drivers may make ten trips in and out of their truck to load hand carts, then make a couple of trips to the store with the filled hand carts.
- Route-van drivers are responsible for completing their route, regardless of the time it takes. Tractor-trailer drivers are on the clock and must punch in and out.

- Drivers' routes are planned for them. They are responsible for checking their load and validating their paperwork.
- Some of the trucks are equipped with roll doors that have broken rollers and hinges.
- Unloading and pickup procedures are different for different stores.
- Delivery procedures vary by store. Some stores require you to count every box or every item so they know they are getting what they paid for. Building rapport with the store managers reduces the need to count everything (they trust that everything is there).
- Using turn signals encourages other drivers to go faster and prevents L/SH drivers from changing lanes (i.e., other drivers will not let them in).
- Car drivers will frequently try to pass trucks by using the shoulder; this usually occurs during rush hour.
- Public service announcements should be aired "...at a decent hour," not at 2 AM as is presently the case.
- The driver's license test should include questions for light vehicle drivers on how to share the road with trucks. Four-wheelers need to be educated and told that trucks "cannot stop on a dime."

### Summary

Based on the drivers' responses, there were several key findings in this session. They include the following:

- An equal amount of time was spent driving and loading/unloading.
- The safety issues ranked most important were Problems Caused by Drivers of Light Vehicles, Roadway Design, Deadlines, and Fatigue.
- Fatigue was reported to be an issue after-the-job by 80% of the drivers. Fatigue on the job was specifically mentioned as not being an issue.
- Waiting to Load/Unload and Irregular Hours were the greatest factors of fatigue for this group.
- Traffic congestion is an important issue for drivers.
- The need for public education on how to interact with trucks was frequently mentioned, particularly regarding lane merging, truck limitations on stopping distances, and the tendency for car drivers to cut in front of trucks.
- TV ads should be aired for public awareness on how to interact with trucks.
- Participants advocated on-going driver education/training for company truck drivers.

### **Group 7**

#### Session Overview

This focus group was arranged by company management who had been contacted by one of the researchers. Attendees included the moderator, an assistant, and six focus group participants. The session was held on a Saturday, which was a day-off for the drivers. The group met in a large meeting room on the company premises.

### Driver Description

The drivers in this focus group all worked for a snack food company and were all union members. They all hauled potato chips, pretzels, cookies, crackers, and dip. Half of the drivers drove tractor-trailers, and the other half drove step vans. Sixty-seven percent of the drivers classified themselves as full-time L/SH drivers, while the rest said they were L/SH drivers at least half of the time. All drivers reported driving within the state limits. Eighty-three percent of the drivers spent at least half their workday driving. On average, drivers worked a 48-hour week, with a range of 30-60 hours. Mean mileage driven per day was 103 miles, and ranged from 50-160 miles. The average number of years of truck-driving experience was 7 years, and the number of years of L/SH truck-driving experience averaged about 6 years. Both general truck-driving experience and L/SH experience ranged from 1.5 years to 15 years. Sixty-seven percent of the drivers held a CDL. The average age of the group was 33.5 years, with a range of 25-47 years.

### Driver Response

#### *Tasks Performed*

The proportion of time spent on various tasks during a typical workday is outlined in Table 48. Driving and Loading/Unloading are the primary tasks of these drivers. The "Other" category included the following tasks: Checking In and Out, Paperwork, and Customer Relations.

**Table 48. Percentage of time per task, as reported by drivers in Group 7.**

Driving (n=6)	Loading/ Unloading (n=5)	Waiting (n=4)	Other (n=6)
49.2	18.0	8.8	12.9

#### *General Safety Issues*

A list of general safety issues was generated by the drivers, and then ranked in order of importance. The top-ranked issues are shown in Table 49. Problems Caused by Drivers of Light Vehicles and Inattention were the highest-ranked issues. Related to Problems Caused by Drivers of Light Vehicles, the L/SH drivers mentioned that cars frequently cut in front of them and stop suddenly. Participants commented that private drivers are not aware of stopping distances required for trucks.

**Table 49. Ranking of safety issues as described in Group 7.**

SAFETY	
ISSUE	RANKING OF IMPORTANCE
Problems Caused by Drivers of Light Vehicles	1.5
Inattention	1.5
Fatigue	3
Vehicle Design	4
Weather	5

Following is a list of paraphrased comments by the participants on general safety issues:

- Inattention is a problem with many light vehicle drivers. They try to drive and do other things behind the wheel (e.g., reading the newspaper, putting on makeup).
- Drivers constantly cut trucks off, and will even try to use the shoulder to accomplish this (usually during rush hour).
- All company tractor-trailers have a 65 mph governor, and the panel vans have a 55 mph governor.
- Despite having to haul heavy loads, the brakes on panel vans do not seem well-equipped to handle heavy loads.
- There should be more public education for private drivers on how to interact with trucks. Private drivers should get behind the wheel of a truck to see what it is like.
- Elderly private drivers are seen as problem drivers. L/SH drivers felt that the elderly driver problem could be alleviated by providing more public transportation and more frequent driver testing.
- Drivers commented that the “pay per load/mile” issue needs to be addressed because this compensation practice negatively impacts safety.
- Truck drivers must drive defensively. They have to look and plan ahead.
- Checking that the load is secure prevents certain types of accidents.
- Backing accidents are common. They are caused by inexperienced truck drivers or are due to blindspots. The trucks are not equipped with sounders.

#### *Fatigue Issues*

The fatigue issues that were generated by the drivers, along with their associated rankings of importance, are shown in Table 50. Not Enough Sleep was ranked as the most important issue leading to fatigue on the job.

**Table 50. Ranking of fatigue issues as described in Group 7.**

FATIGUE	
ISSUE	RANKING OF IMPORTANCE
Not Enough Sleep	1
Irregular Mealtimes	2
Personal/Family Life	3
Sickness	4.5
Hard Workday	4.5
Weather	6

Driver responses to the fatigue-related Likert-type statements are shown in Table 51. Table 52 outlines the mean driver responses to a set of fatigue-related questions.

**Table 51. Mean responses to Likert-type fatigue-related statements. Anchor points on the scale were at 0 (Strongly Disagree), 50, and 100 (Strongly Agree).**

Fatigue-Related Question	Mean Response
In my job, I do the same thing day after day.	90.0
I feel like my job is exciting.	31.7
I do too much driving at my job.	33.3
I feel tired when I'm on the job.	38.3
My job involves too much physical exertion.	33.3
My job involves too much mental exertion.	28.3

**Table 52. Mean, percentage, or range for responses to fatigue-related questions.**

Fatigue-Related Question	Mean Response	Range
How many hours of sleep do you get per night?	5.42	3-7
Typical part of workday most tired?	67% responded "end of shift"	NA
Number of days feels sluggish.	2.42	0-5
Reason for being tired at work.	67% listed "not enough sleep" as first response.	NA

The following are a few paraphrased comments regarding fatigue-related issues that were made during the group discussion:

- While describing a crash where the driver fell asleep, another driver responded that he must have been "working too many hours."
- Fatigue is sometimes caused by heat. Some of the vehicles are equipped with A/C, while others are not. Unlike in the past, drivers are now allowed to wear shorts during hot weather. One driver commented, "it was a God-send."
- Drivers begin very early in the morning because of supermarkets' delivery policies. Drivers would like to see receiving hours revised to 9 AM-5 PM so they can work "normal" hours.
- Drivers believe fatigue is more of an issue for long-haul drivers than for L/SH drivers.

#### *Miscellaneous Findings*

The following are additional comments (paraphrased) made during the focus group session that are related to the L/SH industry in general:

- Drivers have two general pay schedules: panel van drivers are paid a base salary plus commission, and the tractor-trailer drivers are paid hourly.
- Because their trailers are pre-packed, drivers must check that the load order matches the route schedule. If it is incorrect, they must unload and repack their trailers.
- Part of the job involves keeping track of the number of products delivered and the number of empty boxes returned.
- Panel van drivers make about 16 stops per day.
- Drivers must check their voice mail three times per day.
- Some of the drivers carry pagers.
- Quality training is not widespread within the company. Some drivers do not receive formal training, while tractor-trailer drivers are trained for seven weeks.

- Some companies offer a bonus for safe driving. However, this particular company does not. Drivers are paid a bonus if they keep their speed under 55 mph.

### Summary

Based on the drivers' responses, there were several key findings in this focus group.

They include:

- Driving and loading/unloading were the primary tasks reported by most of the L/SH drivers.
- The safety issues ranked most important were Problems Caused by Drivers of Light Vehicles, Inattention, Fatigue, Vehicle Design, and Weather.
- For all drivers, fatigue was reported to be an issue after-the-job (67%) and after lunch (33%).
- Fatigue factors for this group include Not Enough Sleep (average number of sleep hours for this group was 5.42 hours), Irregular Mealtimes, Personal/Family Life, Sickness, Hard Workday, and Weather.
- Private drivers need to be educated on how to interact with trucks. Their training should involve getting behind the wheel of a truck.
- Drivers advocate more training for new L/SH drivers.

### **Group 8**

#### Session Overview

Present at this session were eight focus group participants, the moderator, and an assistant. Participants learned of the focus group from advertisements placed in local newspapers. In addition, several companies in the area were contacted and told of the session. Flyers were sent to several L/SH companies to distribute to their drivers. The focus group was held on a Saturday, on the drivers' day-off. Attendees met in a conference room at an area hotel.

#### Driver Description

Sixty-three percent of the drivers worked for a beer-hauling company. The other 37% of participants hauled a variety of goods including produce, chemicals, and general commodities. All but one of the participants was self-classified as a full-time L/SH driver. This other participant also worked long-haul on occasion. Twenty-five percent of the drivers reported that they drove from one state to another. Thirty-eight percent stated that at least 50% of their workday was driving. The mean number of hours worked in a typical week was 47 hours and ranged from 42.5-53 hours. The mean number of miles driven on a typical workday was 78 miles and ranged from 63-530 miles. All of the participants in this session were employed by private L/SH trucking companies. The mean number of years of truck-driving experience was 4.37 years, and ranged from 7 months to 10 years. The mean number of years of L/SH driving experience was 2.03 years, and ranged from 7 months years to 5 years. All of the drivers held a CDL, with most having all endorsements. The trucks driven by the participants included tractor-trailer singles and straight trucks. One of the participants also drove a tanker truck on occasion.

## Driver Response

### *Tasks Performed*

The tasks performed by drivers in this session are shown in Table 53. As can be seen, Driving and Loading/Unloading were the primary tasks reported. It must be noted that Merchandising was seen as the primary task of the beer haulers. Merchandising entails tasks such as stocking the shelves and putting up displays. Several of the drivers grouped Merchandising with Unloading.

**Table 53. Percentage of time per task, as reported by drivers in Group 8.**

Driving (n=7)	Loading/Unloading (n=7)	Miscellaneous Work (n=7)	Breaks (n=3)
36.43	45.0	15.36	10.0

### *General Safety Issues*

Table 54 outlines the general safety issues discussed by the L/SH drivers, along with a ranking of importance. As in the other focus group sessions, drivers were asked about "Frequency of Occurrence" for each of the issues. They noted that there was always time pressure, although it was not always work-related. For example, it may be related to the driver's personal life. They also noted that fatigue was "an everyday thing," but those who drove at night noted that fatigue was worse at that time.

**Table 54. Ranking of safety issues as described in Group 8.**

SAFETY	
ISSUE	RANKING OF IMPORTANCE
Inattention	1
Stress Due to Time Pressure	3
Fatigue	3
Problems Caused by Drivers of Light Vehicles	3
Problems Caused by Roadway/Dock Design	5

The drivers in the current session unanimously agreed that Inattention was the most important safety issue for L/SH drivers. One of the drivers commented that inattention was a result of drivers driving the same route over and over. Based on group discussion, Stress Due to Time Pressure also appeared to be a critical issue. Along with Stress Due to Time Pressure, Fatigue, and Problems Caused by Drivers of Light Vehicles were ranked second to Inattention.

It is worth noting some of the comments made by drivers related to general safety issues. These comments are paraphrased and include the following:

- Drivers who are paid per load, or percentage, end up doing as many loads as possible; this method of paying drivers gives them an "incentive to speed."
- Those who are "drivers/salespeople" may work 60-70 hours per week.

- There is time stress when working “percentage” because the driver tries to do as much work as possible, and drive as fast as possible, to keep his or her hourly rate up.
- Drivers are aware of lifting standards, but responded, “standards don’t apply to us.”
- One driver estimated that 25% of intersections are poorly signed.
- There are backing alarms on many trucks, but there are no reverse lights on trailers.
- Slow-moving drivers are more hazardous than those who go too fast; this sentiment applies to both private drivers and truckers.
- Speed governors are seen as the cause of many accidents because the trucker cannot keep his/her speed up or drive with the traffic flow.
- Some truckers always drive with headlights on, but this is not mandatory.
- Drivers felt that the public does not know how to interact with trucks. In addition, drivers feel that they do not get any respect from the driving public.
- Sometimes drivers are required to “make (their) own right of way” as light vehicles do not let them enter or cross the traffic flow.
- Drivers stated that companies need to pay drivers enough or they will run illegal log books (related more to long-haul).
- There was a consensus that public education is needed on interacting with trucks.

*Fatigue Issues*

The latter part of the session focused on issues related to driver fatigue. As with the assessment of general safety issues, fatigue-related issues were gleaned from drivers’ descriptions and discussions of accidents and near-misses. As with the general safety issues, drivers were asked to list causes of fatigue and rank them in terms of importance. Although a list was generated, drivers found it difficult to rank issues in terms of importance since, as one driver put it, “it’s one thing or another” and “not everyday you’re tired, but two or three times during the week you’re going to be tired.” Drivers noted that the reason for fatigue changed from day to day and, as such, ranking them didn’t make sense. The list of fatigue issues generated by the drivers is presented in Table 55. For the purpose of comparing the issues generated by this group to other groups, a “tie” ranking value was assigned for all issues.

**Table 55. Ranking of fatigue issues as described in Group 8.**

FATIGUE	
ISSUE	RANKING OF IMPORTANCE
Shift Work	6
Night/Dawn Hours	6
End of Work Week	6
Beginning/End of Day	6
Start of New Job	6
Non-Regular Work Shift	6
Personal Life	6
Financial Situation Requiring Two Jobs	6
Long Hours	6
Physical Work	6
Frustration	6

Drivers' responses to the Likert-type statements are shown in Table 56. Drivers were also asked four other fatigue-related questions as part of a paper-and-pencil questionnaire. These questions, along with drivers' mean responses, are shown in Table 57.

**Table 56. Mean responses to Likert-type fatigue-related statements. Anchor points on the scale were at 0 (Strongly Disagree), 50, and 100 (Strongly Agree).**

Fatigue-Related Question	Mean Response
In my job, I do the same thing day after day.	75.6
I feel like my job is exciting.	40.6
I do too much driving at my job.	43.8
I feel tired when I'm on the job.	58.8
My job involves too much physical exertion.	67.5
My job involves too much mental exertion.	37.5

**Table 57. Mean, percentage, or range for responses to fatigue-related questions.**

Fatigue-Related Question	Mean Response	Range
How many hours of sleep do you get per night?	6.5	5-8
Typical part of workday most tired?	50% responded "start of shift"	N/A
Number of days feels sluggish.	2.81	1-5
Reason for being tired at work.	75% had first response of "not enough sleep"	N/A

To gain a more complete understanding of how drivers felt about fatigue-related issues, it is worthwhile to note some of the comments made by drivers. These paraphrased comments include the following:

- Speed governors cause fatigue for drivers because it takes longer to get where you are going.
- With fatigue, drivers noted that "driving at night is the toughest thing."
- Drivers commented that the worst times for fatigue include dawn; start of the day; odd shifts where work starts early one day and late the next; personal life and financial situation that results in working two jobs; staying up with sick kids; physical labor; starting a new job and getting used to the work; and the end of the week.
- One driver noted that frustration while on the job leads to fatigue.
- For night-shift drivers, it is hard to adjust to being awake during the day on the weekend (for the family) and then back to working nights again on Monday.
- There is an incentive not to hire extra drivers. If the company pays "percentage," they can work a few guys harder and save money.
- There is less fatigue involved in hourly pay vs. salary or percentage. Drivers noted that a competing beverage hauler went to a four-day workweek and drivers are now averaging 16 hours per day for four days of work.
- One driver told of a local oil hauler who regularly works his drivers 16-17 hours per day.
- Drivers who have both long- and short-haul experience noted that they are better rested in short-haul as compared to long-haul.

### *Miscellaneous Findings*

The following are miscellaneous findings (paraphrased) noted during the focus group session that are related to the L/SH industry in general:

- Regarding rest breaks, one driver stated “riding from stop to stop is my break.”
- Typically, drivers get few or no breaks. One driver commented “the sooner you get done, the sooner you get off.”
- Drivers feel that education is needed for the public, specifically, instruction on how to interact with trucks.
- One of the drivers who hauls gas participates yearly in the Smith System truck driver defensive driver training. The beer haulers felt that they weren’t the cause of accidents, so they did not need defensive driving education.
- Lots of lifting is required in the beer industry.
- Beer haulers feel that “putting beer on shelves is our primary responsibility” and that “driving really is a subsidiary.”
- Union jobs, though coveted, are a thing of the past. Because manpower costs are so high, union drivers pull the least freight.
- Compensation packages included hourly, percentage, mileage, salary, and hourly/mileage combination.
- Drivers know of lifting standards (there are posters at their work site), but don’t follow them.
- Older private drivers are seen as problematic because they drive too slowly and don’t pay attention.
- Many loading docks/areas are poorly designed. Drivers feel that docks and unloading areas are not given much consideration by designers.
- One driver reported that the L/SH industry wants to change hours-of-service, making it similar to long-haul. L/SH companies want to be able to re-set the driver’s clock after 24 hours so they can go out again. This idea would not be good for drivers.

### Summary

There were several key findings in this session. Based on the drivers’ responses, these key findings include the following:

- Driving and loading/unloading are the primary tasks performed by L/SH drivers.
- The safety issues ranked most important were Inattention, Stress Due to Time Pressure, Fatigue, and Problems Caused by Drivers of Light Vehicles.
- Fatigue is problematic. The L/SH drivers in this session reported an average of nearly three days per week that they felt fatigued.
- Drivers who are paid “per load” or “percentage” end up doing as many loads as possible, which gives them “incentive to speed.”
- There is less fatigue involved in hourly pay vs. salary or percentage.
- L/SH drivers who are considered “drivers/salespeople” may work 60-70 hours per week.
- Driver consensus is that public education is needed on how to interact with trucks.
- Backing alarms are seen as beneficial.
- The absence of reverse lights on trailers should be addressed.

## Group 9

### Session Overview

All participants in this focus group worked for the same company. The session was arranged by company management at the request of the project principal investigator. Present at this session were nine focus group participants, the moderator, and an assistant. The focus group was held in a conference room on company premises. The session occurred on a Saturday, on the drivers' day-off.

### Driver Description

All drivers worked for the same company and hauled a variety of freight types. All of the participants classified themselves as full-time L/SH drivers. Eighty-nine percent of the drivers reported that they drove from one state to another. Eighty-nine percent stated that at least 50% of their workday was driving. The mean number of hours worked in a typical week was 51.3 hours and ranged from 49-59 hours. Driver consensus of the average number of miles driven per day ranged from 50-300 miles. The mean number of years of truck-driving experience was 16.2 years, and ranged from 5 years to 40 years. The mean number of years of L/SH driving experience was 14.4 years, and ranged from 5 years to 40 years. All of the drivers held a CDL, and most reported that they also held a variety of endorsements. The trucks driven by the participants included tractor-trailer singles and straight trucks. The mean age of the drivers was 42.9 years, and ranged from 32 years to 57 years.

### Driver Response

#### *Tasks Performed*

Table 57 shows the tasks performed by the drivers in this session. Driving, Loading, and Unloading were the primary tasks reported. The primary tasks that comprised the "Other" category were Pre-Trip Inspection, Post-Trip Inspection, Phone, and Paperwork.

**Table 57. Percentage of time per task, as reported by drivers in Group 9.**

Driving (n=9)	Loading (n=9)	Unloading (n=9)	Other (n=8)
49.4	18.1	19.2	15.0

#### *General Safety Issues*

Table 58 outlines the general safety issues discussed by the L/SH drivers, and a ranking of importance. The drivers in the current session unanimously agreed that Stress from Time Pressure, and Problems Caused by Drivers of Light Vehicles were the most important safety issues for L/SH drivers.

**Table 58. Ranking of safety issues as described in Group 9.**

SAFETY	
ISSUE	RANKING OF IMPORTANCE
Stress from Time Pressure	1.5
Problems Caused by Drivers of Light Vehicles	1.5
Inattention	3

It is worth noting some of the highlights of the discussion pertaining to general safety issues. These comments are paraphrased and include the following:

- Pre-trip inspections should take 30-45 minutes, but actually only take about 5 minutes because drivers are in a rush to start making their deliveries.
- As reported by the drivers, according to management, 75% of all accidents are the fault of truckers. All backing accidents are the fault of truckers.
- Drivers described several crashes and near-misses. Several of these were attributed to poor signing at loading docks and poor dock design.
- Backing accidents are estimated to be 70% of all L/SH accidents.
- Get Out And Look (GOAL) stickers are posted on the driver's side mirror to help prevent backing accidents.
- Accidents caused by four-wheelers are attributed to the private driver not knowing what four-way flashers mean on trucks (i.e., truck is backing up).
- Summer driving is the most dangerous season to drive because speeds are higher.
- Cell-phones are dangerous for four-wheelers because they distract drivers' attention from the road.
- When first hired, drivers participate in a company-sponsored defensive driving course

*Fatigue Issues*

Table 59 shows the list of fatigue issues raised by the drivers, along with a ranking of importance. Heat/Hard Workday and Lack of Sleep were the two issues ranked the highest. Table 60 shows the mean driver responses to the Likert-type statements. Table 61 outlines the set of fatigue-related questions and the mean driver responses.

**Table 59. Ranking of fatigue issues as described in Group 9.**

FATIGUE	
ISSUE	RANKING OF IMPORTANCE
Heat/Hard Workday	1
Lack of Sleep	2
Unfamiliar Route	3.5
Physical Work	3.5

**Table 60. Mean responses to Likert-type fatigue-related statements.**

Fatigue-Related Question	Mean Response
In my job, I do the same thing day after day.	70.0
I feel like my job is exciting.	70.0
I do too much driving at my job.	20.6
I feel tired when I'm on the job.	21.7
My job involves too much physical exertion.	36.1
My job involves too much mental exertion.	46.1

**Table 61. Mean, percentage, or range for responses to fatigue-related questions.**

Fatigue-Related Question	Mean Response	Range
How many hours of sleep do you get per night?	6.44	4.5-7.5
Typical part of workday most tired?	60% responded "after lunch" or "midday"	N/A
Number of days feels sluggish.	1.39	0-2
Reason for being tired at work.	50% responded "lack of sleep"	N/A

The following are paraphrased comments regarding fatigue, as described by the drivers in this session:

- Straight trucks do not have A/C. No A/C on hot days leads to fatigue. One driver commented, "heat is a killer."
- Not enough sleep and late-night partying were also mentioned as factors that lead to fatigue on the job.

#### *Miscellaneous Findings*

The following are miscellaneous findings (paraphrased) noted during the focus group session that are related to the L/SH industry in general:

- No one wears lifting belts because they are uncomfortable given the frequency with which drivers are in and out of the truck cab.
- Roll doors are preferred to swing doors (barn doors). Drivers have to get out of the truck more often with swing doors.
- Drivers are suspended from work without pay if they are involved in a chargeable accident.
- Since they have become L/SH drivers, they have also become better four-wheelers.
- Docks that have strobe lights make backing easier.
- Drivers recommended public service messages on TV to educate the public on how to interact with trucks.
- There should be truck-related questions on the private driver's license exam.
- Cell-phones in the cab would make drivers' jobs easier because regular phones are not always very accessible.
- Drivers who are "paid per load" have increased time stress. This has a negative effect on safety and "should be outlawed."

#### Summary

There were several key findings in this session. Based on the drivers' responses, these key findings include the following:

- Driving and loading/unloading are the primary tasks performed by L/SH drivers.
- Stress from Time Pressure and Problems Caused by Drivers of Light Vehicles were the most important safety issues for L/SH drivers.
- Pre-trip and post-trip inspections are not conducted as thoroughly as required.
- Defensive driving is taught to drivers at the expense of the company. Additional tools/cues such as GOAL stickers are provided to help drivers avoid accidents.
- Heat is a fatigue issue that could be remedied through the installation of air conditioners in all trucks.
- Roll doors are preferred to swing (barn) doors. The driver makes fewer trips outside the cab when the trailer is equipped with roll doors.
- Docks that have strobe lights make backing easier.
- Public education for drivers regarding interacting with trucks is recommended and might include public service messages on TV, and truck-related questions on the drivers' license exam.

## **Group 10**

### Session Overview

Attendees of this session included eight drivers, the moderator, and assistant. All drivers worked in the construction industry. The session was held in the afternoon, after the drivers had completed their shifts. The focus group met in a large meeting room of a contractors' association in a large metropolitan area. Participants learned of the focus group from their management, which had been contacted by the project principal investigator.

There was some confusion as to the purpose of the focus group session. Due to apparent miscommunication, the participants believed that the session was to discuss easing the "hours-of-service" requirements and other restrictions for drivers in the construction industry. When the session began, drivers were told that this was not the case. They were informed that the purpose of the focus group was to discuss safety-related issues in the L/SH industry. All of the drivers seemed to provide genuine responses during the session.

### Driver Description

Although the drivers in this focus group worked for different companies, they all hauled construction-related liquids, materials, and equipment. Twenty-five percent of the drivers drove tractor-trailers, 50% drove dump trucks, 12.5% drove flatbed boom trucks, and 12.5% drove both dump trucks and tractor-trailers. Seventy-five percent of the drivers classified themselves as full-time L/SH drivers, and the rest considered themselves L/SH drivers at least half the time. Half of the drivers drove between states on occasion, 37.5% of them drove between states regularly, and 12.5% did not drive between states at all. Sixty-two and one-half percent of the drivers spent about half their workday driving, 25% spent less than half, and 12.5% spent more than half their day driving. On average, drivers reported a 51-hour workweek that ranged from 40 hours to 65 hours. Together, they drove an average of 174 miles per day with a range of 50 miles to 500 miles. The

remaining drivers did not specify the type of company for which they worked. The average number of years of truck-driving experience was 14 years, and the number of years of L/SH truck-driving experience averaged approximately 11 years, both ranging from 2 years to 25 years. All drivers held a CDL with various endorsements. Their ages averaged 43.3 years, with a range of 29 to 52 years.

### Driver Response

#### *Tasks Performed*

The proportion of time spent on various tasks during a typical workday is outlined in Table 62. Driving is the primary task of these drivers, followed by Operating Equipment and Loading/Unloading. The “Other” category consisted of tasks related to construction and included Miscellaneous Labor, Flagging, and Assisting Crews.

**Table 62. Percentage of time per task, as reported by drivers in Group 10.**

Driving (n=8)	Loading/ Unloading (n=4)	Operating Equipment (n=5)	Waiting (n=4)	Other (n=5)
50.4	24.5	26.3	13.8	22.5

#### *General Safety Issues*

General safety issues were ranked in order of importance. The top issues are shown in Table 63. As in several of the other focus group sessions, Problems Caused by Drivers of Light Vehicles was mentioned as the most important issue. Participants noted that the problem with drivers of light vehicles is that they do not understand how to communicate with trucks. The comments from this focus group echoed what drivers in other sessions described. That is, light vehicle drivers do not know how to interact with trucks.

Inattention was also ranked high in importance. Drivers commented that inattention is caused, in part, by the proliferation of roadside signs. That is, drivers commented that there are too many road signs and, because there are so many, they are ineffective.

**Table 63. Ranking of safety issues as described in Group 10.**

SAFETY	
ISSUE	RANKING OF IMPORTANCE
Problems Caused by Drivers of Light Vehicles	1
Inattention	2.5
Carelessness	2.5
Stress Due to Time Pressure	4

The following is a list of paraphrased comments by the participants on general safety issues:

- The radio is used as a means of contacting the mechanic for help if the L/SH driver’s vehicle breaks down on the road.
- Asphalt rollers have a tendency to slide when they are loaded and wet. This causes them to overturn during loading or unloading.

- Weather is a factor in truck safety. Cold weather can cause part of a load to freeze. When unloading (dumping), the frozen part can cause an imbalance and result in the truck tipping over.
- Improper marking of clearance heights for bridges or railroad trestles after re-paving can cause damage to the top of trucks. That is, with re-paving, new pavement is laid atop old pavement. This raises the height of the road, and for areas under a bridge, the actual clearance will be less than the posted clearance.
- Sometimes inattention is the cause of striking low-clearance bridges.
- Most crashes result from trucks being over-height, since most crashes occur with a stationary object such as a bridge or power lines.
- Most close calls result from trucks being over-width.
- It is common for drivers of light vehicles to cut in front of trucks and then hit the brakes because of slow or turning traffic.
- The public needs to be educated on interacting with trucks. Problem areas include improving knowledge on truck blindspots and wide-load truck maneuvers. Drivers suggested that there should be more TV ads to educate the public.
- Wide-load information signs on the back of trucks are ineffective.
- Directional signals that are placed halfway up the trailer are very effective.
- Truck drivers cannot maintain a safe following distance because cars will invariably pull into that space.
- Car drivers are inattentive; they read or talk on their cell-phones while driving.
- Construction is a problem not because of the construction crew, but because drivers do not pay attention to construction zones.
- Heavy traffic is a problem. One driver commented, "We've seen more accidents...from heavy traffic."
- Narrow lanes and short merge and deceleration lanes are problem roadway design issues related to safety.
- Having regular meetings on safety helps refresh the driver's memory on driving hazards. Some companies use the Smith System as a refresher course.
- Private driver's license tests should include truck-related questions.
- The private driver's test should be supplemented with hands-on instruction so car drivers will better understand how to interact with trucks.
- Drivers of light vehicles are not courteous to truck drivers. For example, when a truck is in the right lane and wants to pass a slow vehicle, no one will let him/her out.

### *Fatigue Issues*

The latter part of the session focused on issues related to driver fatigue. Drivers were asked to generate a list and rank fatigue-related causal factors. The rankings are shown in Table 64. Heat was ranked as the greatest causal factor of fatigue for this group. The primary reason for this is that only a few of the trucks are equipped with A/C.

**Table 64. Ranking of fatigue issues as described in Group 10.**

FATIGUE	
ISSUE	RANKING OF IMPORTANCE
Heat	1
Hard Workday	2
Partying	3.5
Not Enough Sleep	3.5

Table 65 shows the mean driver responses to the Likert-type statements. Table 66 shows the results from the other fatigue-related questions.

**Table 65. Mean responses to Likert-type fatigue-related statements. Anchor points on the scale were at 0 (Strongly Disagree), 50, and 100 (Strongly Agree).**

Fatigue-Related Question	Mean Response
In my job, I do the same thing day after day.	49.4
I feel like my job is exciting.	53.1
I do too much driving at my job.	14.4
I feel tired when I'm on the job.	31.9
My job involves too much physical exertion.	32.5
My job involves too much mental exertion.	26.9

**Table 66. Mean, percentage, or range for responses to fatigue-related questions.**

Fatigue-Related Question	Mean Response	Range
How many hours of sleep do you get per night?	7.00	5-9
Typical part of workday most tired?	50% "end of shift," 50% "after lunch"	NA
Number of days feels sluggish.	1.06	0-2
Reason for being tired at work.	25% listed "not enough sleep" or "too much physical work" as first response.	NA

### *Miscellaneous Findings*

The following are additional comments (paraphrased) made during the focus group session that are related to the L/SH industry in general:

- Within this particular state, L/SH drivers are allowed to work 80 hours in eight days. However, if they cross state boundaries or drive beyond their 100-mile radius, then they must revert back to the 70 hours in seven days work rule.
- Keeping a pre-trip checklist allows another driver to know the history of the truck.
- In the construction business, driving is the primary task. If needed, drivers will also help in the construction work.
- Two-way radios are the preferred means of communication.
- Many L/SH drivers are of "lesser quality" and are not skilled drivers. The reason for this is that there is a big demand for L/SH drivers and a limited supply of quality drivers.
- There is no training specifically for L/SH drivers; drivers are trained on-the-job.

## Summary

Based on the drivers' responses, there were several key findings in this session. They include the following:

- Driving, operating equipment, and loading/unloading are the primary tasks performed by L/SH drivers.
- The safety issues ranked most important were Problems Caused by Drivers of Light Vehicles, Inattention, Carelessness, and Stress Due to Time Pressure.
- Fatigue seemed to be an issue after-the-job and after lunch rather than on-the-job; 50 % reported feeling fatigue at the end of the shift, and the other 50 % felt tired after lunch.
- Heat, a Hard Workday, Partying, and Not Enough Sleep were the highest-ranked fatigue factors.
- The need for public education on how to interact with trucks was discussed. Drivers in the present session suggested TV ads, hands-on instruction for car drivers, and adding truck-related questions on drivers' tests.
- Directional signals that are placed halfway up the trailer are very effective.
- There was positive sentiment towards refresher driver education courses (such as the Smith System) and regular safety meetings for truck drivers.

## **Group 11**

### Session Overview

Seven drivers, along with the moderator and assistant, attended this session. Participants learned of this focus group from newspaper advertisements placed in the local newspaper. The session was held on a Saturday, on the drivers' day-off. The focus group met in a conference room at a hotel in a large city.

### Driver Description

The drivers in this focus group were diverse in terms of the types of products they hauled. These products included general freight, air freight, small packages, seafood, and people. Over half the drivers drove tractor-trailers, while the remaining drove either a cargo van, straight truck, or a charter bus. All but one of the participants considered themselves to be full-time L/SH drivers. Eighty-six percent of the drivers reported that they drove within the state. Twenty-nine percent of the drivers spent about half their workday driving, while the remaining spent more than half the day driving. On average, drivers reported that they had a 46-hour workweek that ranged from 40-50 hours. Together, they drove an average of 188 miles per day, with a range of 3-400 miles. One driver was employed by an independent trucking company. A second driver worked for a charter bus company. All other drivers were employed by different private delivery companies. Fifty-seven percent of the drivers were union members. The average number of years of truck-driving experience was 16 years, and the number of years of L/SH truck driving experience averaged about 13 years, both ranging from 2 months to 40 years. All drivers held a CDL, except the cargo van and straight truck drivers who only held a regular driver's license. Only three drivers provided their ages. The mean age of these three drivers was 40.3 years, and ranged from 33 years to 49 years.

## Driver Response

### *Tasks Performed*

The proportion of time spent on various tasks during a typical workday is outlined in Table 67. Driving is the primary task of these drivers, followed by Loading and Unloading. Miscellaneous Work includes Vehicle Inspection and Maintenance, Paperwork, Checking In and Out, and Waiting.

**Table 67. Percentage of time per task, as reported by drivers in Group 11.**

Driving (n=7)	Loading/ Unloading (n=6)	Miscellaneous Work (n=7)	Breaks (n=3)
65	21.3	12.5	10

### *General Safety Issues*

General safety issues were ranked in order of importance. The issues listed and ranked are shown in Table 68. Problems Caused by Drivers of Light Vehicles and Inattention were the issues ranked as being most important.

**Table 68. Ranking of safety issues as described in Group 11.**

SAFETY	
ISSUE	RANKING OF IMPORTANCE
Problems Caused by Drivers of Light Vehicles	1.5
Inattention	1.5
Carelessness	3
Stress/Time Pressure	4
Road/Dock Design	5.5
Driver Education	5.5

Following is a list of paraphrased comments made by the participants on general safety issues:

- Drivers of light vehicles lack an understanding of a truck's limitations in terms of stopping distance and lane merging.
- Acceleration lanes should be longer and wider.
- Drivers of light vehicles do not want to let trucks change lanes or merge onto a highway. They also try to beat a truck to an off-ramp.
- Drivers of light vehicles are inattentive when on their cell-phones and do not reliably use their turn signals. They "will do anything they can to make my life miserable."
- L/SH drivers who are paid "per load" have a tendency to speed and cause crashes. They also tend to work longer hours.
- Delivery areas are not designed with the truck driver in mind.
- Closely positioned on- and off-ramps that handle high volumes of traffic are problematic. Drivers of light vehicles will speed from the on-ramp to the off-ramp and try to cut trucks off in the process. One driver commented, "trucks are the last consideration to highway engineers."

- Lifting cargo is hazardous. One driver commented, “If you lift the freight up wrong, you’re gonna screw your back up...”
- Forklifts are something to watch out for. One driver commented, “A couple of toes [were] run over by forklifts.”
- Poorly marked lanes during construction can be confusing because they alter traffic patterns.
- It was mentioned that both truck drivers and light vehicle drivers need more driver education. For truck drivers, they need education in maintenance and the dangers of tailgating.
- Fatal crashes involving backing are not common. Property damage crashes that result from backing are more common.

*Fatigue Issues*

Table 69 shows the fatigue-related issues generated by the drivers, along with an associated ranking of importance. Working Different Hours every day or every week was ranked as the greatest cause of fatigue for this group. They also felt that not being able to eat lunch at the same time every day contributed greatly to fatigue. Interestingly, they also mentioned that eating lunch made them tired, so many would refrain from eating lunch at all. Regarding rest breaks, the drivers preferred to take short breaks, when they could get them, and drink coffee.

**Table 69. Ranking of fatigue issues as described in Group 11.**

FATIGUE	
ISSUE	RANKING OF IMPORTANCE
Irregular Hours	1
Irregular Mealtimes	2
Temperature Changes	4
Physical Exertion	4
Quality/Newness of Equipment	4

The results of the Likert-type scale ratings to assess fatigue are shown in Table 70. Table 71 shows the results of the fatigue-related questions as a mean or percentage, as appropriate.

**Table 70. Mean responses to Likert-type fatigue-related statements. Anchor points on the scale were at 0 (Strongly Disagree), 50, and 100 (Strongly Agree).**

Fatigue-Related Question	Mean Response
In my job, I do the same thing day after day.	74.3
I feel like my job is exciting.	61.4
I do too much driving at my job.	42.9
I feel tired when I’m on the job.	38.6
My job involves too much physical exertion.	45.7
My job involves too much mental exertion.	45.7

**Table 71. Mean, percentage, or range for responses to fatigue-related questions.**

Fatigue-Related Question	Mean Response	Range
How many hours of sleep do you get per night?	6.86	5-8.5
Typical part of workday most tired?	43% responded "end of shift"	NA
Number of days feels sluggish.	2.14	0-7
Reason for being tired at work.	57% listed "not enough sleep" as first response.	NA

To gain a more complete understanding of how drivers felt about fatigue-related issues, it is worthwhile to note some of their comments:

- Unloading heavy freight causes fatigue. One driver commented that this is aggravated by alternating temperatures while going in and out of the truck.
- Some drivers mentioned that their trucks did not have A/C, and that hot weather causes fatigue while driving.
- A/C, the radio, and good suspension helped "tremendously" with fatigue. However, the drivers do not always get the same truck every day, so one day they may have A/C and the next day they may not.
- Some trucks are equipped with contingent A/C, meaning that the A/C will only run when the engine is running.
- L/SH drivers do not experience fatigue from boredom as do long-haul truckers. Rather, the shorter distances and exercise they get from getting in and out of the truck alleviate some of their fatigue.
- As indicated by the second question in Table 71, the drivers said that fatigue kicks in when they are returning home from work.

#### *Miscellaneous Findings*

The following are additional comments (paraphrased) made during the focus group session that are related to the L/SH industry in general:

- In addition to loading and unloading the truck, some drivers must break down and re-stack their palletized load to satisfy customer demands.
- Container haulers, who haul containers that come off ships, find it difficult to negotiate around corners. This can lead to rollover accidents.
- Participants felt that drivers of light vehicles were largely responsible for truck-car accidents.
- In L/SH, driving-related accidents are more common than non-driving-related accidents.
- Drug testing is not frequent enough. "UAs (urine analyses) are a waste of time and...money" because drivers know that once they've been tested, they won't be tested again for some time, so they can start using drugs right after testing.
- Lack of respect from customers causes anger and stress.
- There is a need for more on-the-job training or mentoring of new drivers.
- Truck drivers need to be trained for longer periods of time so they will be quality drivers.
- Both truck drivers and drivers of light vehicles need to be better educated. The Smith System is seen favorably.

- Drivers commented that metered traffic signals at on-ramps are effective in improving traffic flow on roadways.
- Not driving the same truck every day can affect motivation and morale. Drivers never know which truck they will be driving that day. If they are assigned a truck that is in poor condition, their motivation and morale is reduced.

### Summary

Based on the drivers' responses, there were several key findings in this session. These findings include the following:

- Driving and loading/unloading are the primary tasks performed by these L/SH drivers.
- The safety issues ranked most important were Problems Caused by Drivers of Light Vehicles, Inattention, Carelessness, and Stress/Time Pressure.
- Fatigue seemed to be an issue after-the-job and after lunch rather than on-the-job; 71% reported feeling fatigued at the end of the shift or after lunch.
- Irregular Hours and Irregular Mealtimes were the greatest factors of fatigue affecting this group.
- Traffic-related factors were a frequent topic of discussion. Drivers blamed poor road designs for many accidents.
- The need for public education on how to interact with trucks was frequently mentioned, particularly regarding lane merging and truck limitations on stopping distances.
- Participants reported that truck drivers need better training.

## SUMMARY

The purpose in conducting the focus groups was to gain insight, from the L/SH drivers' perspective, on the following: typical tasks performed, general safety issues, and issues related to fatigue.

### TYPICAL TASKS PERFORMED

When the data from all of the sessions were consolidated, it was determined that, on average, drivers spend approximately one-half of their day driving, one-third of their time loading and unloading, and the remaining time waiting and performing miscellaneous tasks. From the individual sessions, it was determined that the tasks performed varied substantially from one L/SH industry to another. While drivers in some industries, such as beverage haulers, spend less time driving and more time in the stores merchandising, drivers in other industries, such as public utility companies, spend nearly 70% of their day driving.

### GENERAL SAFETY ISSUES

Across the eleven sessions, drivers generated 15 general safety issues. It must be noted that not all issues were raised in each session. Drivers were also asked to rank the issues in terms of importance. A weighting factor was applied to account for the frequency with which an issue was raised. The top five critical issues/causal factors, ranked in terms of importance, are listed below. The frequency with which an issue was raised is also shown.

1. Problems Caused by Drivers of Light Vehicles (n=11),
2. Stress Due to Time Pressure (n=10),
3. Inattention (n=8),
4. Problems Caused by Roadway/Dock Design (n=6), and
5. Fatigue (n=4).

The highest-ranked critical issue, and the only issue mentioned in all eleven sessions, was Problems Caused by Drivers of Light Vehicles. According to focus group participants, the problems caused by these drivers stem from two sources. The first is a poor attitude, where light vehicle drivers are discourteous to truck drivers and show them little respect. The second source is a lack of education on the part of light vehicle drivers. As one L/SH driver noted, "four-wheelers need to be educated on how to interact with trucks."

Stress Due to Time Pressure was the second highest-ranked issue and was raised in all but one of the sessions. This finding of the high importance of stress echoes the results of Orris et al. (1997), who found that package drivers had significantly higher measures of psychological distress as compared to the U.S. working population. A number of comments highlighted the stressful nature of the L/SH industry. One such comment was, "(We are) always working against the clock." In addition, one group of drivers felt that the stress due to time pressure was the most important factor affecting driver safety, and was the primary reason for accidents and near-misses. The impact of stress may also be

exacerbated by the type of compensation package provided. For example, the nature of “pay per load” pits the driver against the clock and increases time stress. In this situation, a driver’s pay is reflected in quick, rather than safe, completion of work. On several occasions, drivers mentioned that this type of pay structure “should be outlawed.”

Inattention was the third highest-ranked issue and was mentioned in 73% of the focus group sessions. Drivers commented that they experience inattention while driving when they think ahead to their next stop/delivery. One group of drivers mentioned that they believed inattention was caused, in part, by the proliferation of roadside signs. They noted that there are too many roadside signs and, because there are so many, they are ineffective. Another factor that may result in inattention to driving is related to time stress. Drivers are often in a rush to make delivery times and, as such, may not have time to stop for rest or lunch breaks. Many drivers noted that they typically eat or use a computer while driving. Although there were no reported critical incidents caused by performing other tasks while driving, it is highly probable that such behavior may reduce attention to the driving task.

Problems Caused by Roadway/Dock Design was the fourth highest-ranked critical issue, and was mentioned in 55% of the focus group sessions. Over the course of the eleven sessions, drivers reported several critical incidents that had been caused by poor roadway design or poor dock design. In terms of poor roadway design, drivers mentioned examples of short merge lanes, narrow roads, and closely positioned on- and off-ramps. Drivers also noted problems with loading docks, and indicated that many newer buildings had docks that were designed more for aesthetics than for function. Given that backing accidents are reportedly the most frequent type of accident in the L/SH industry, dock design should not be undertaken haphazardly.

Fatigue was the fifth highest-ranked issue, and was raised in 36% of the focus group sessions. Follow-up analyses were conducted to determine if differences existed between those groups that raised Fatigue as an issue and those that did not. As part of the background data collected on the participants, drivers were asked to indicate how much sleep they typically received per night. The results indicated that drivers who raised “fatigue” as an issue reported receiving, on average, 6.1 hours of sleep. Drivers who did not raise “fatigue” as an issue reported receiving, on average, 6.7 hours of sleep. A t-test confirmed that this 0.6 hours (36 minutes) was statistically significant. Put another way, drivers who received more sleep per night were not apt to raise fatigue as an issue as compared to drivers who received comparatively less sleep.

### **FATIGUE-RELATED ISSUES**

To further investigate issues related to fatigue, drivers were asked to generate and rank a list of fatigue-related issues. Across all sessions, 22 issues were raised. The top five issues, ranked in terms of importance, were:

1. Not Enough Sleep,
2. Hard/Physical Workday,
3. Heat/No Air Conditioning,

4. Waiting to Unload, and
5. Irregular Meal Times.

These findings support past research that has suggested that Not Enough Sleep is the single best predictor for fatigue (Wierwille, 1997).

Another result meriting highlight is in reference to a question asked as part of a Likert-type questionnaire administered during the session. A statement read, "I feel tired when I'm on the job." Drivers provided their response on a scale from 0 (Strongly Disagree) to 100 (Strongly Agree). Across all eleven sessions, the drivers' mean response to this question was 35.3. This finding, in combination with other results related to fatigue, suggests that fatigue may not be the most critical issue in L/SH. Nonetheless, across all eleven sessions, it was still ranked as one of the top five issues.

In discussing the impact of fatigue, drivers provided several reasons why fatigue is not as critical an issue in L/SH as it is in long-haul. For example, unlike long-haul drivers, L/SH drivers typically work during daylight hours, have work breaks that interrupt their driving, end their shift at their home base, and sleep in their own beds at night. Perhaps, when it comes to fatigue, L/SH drivers are more like workers of non-driving professions where fatigue may not result from their work, as in long-haul, but may be impacted by their personal life (such as not getting enough sleep at night).

### **TAXONOMY OF CRITICAL ISSUES**

One of the major findings from the development of the taxonomy was that drivers discussed non-fatigue critical issues more frequently than fatigue or potentially fatigue-related issues. This result echoes the findings of the other analyses where general safety issues other than fatigue (e.g., problems caused by light vehicle drivers) were viewed by L/SH drivers as more important to their industry than fatigue. The similarity of the results from the listing/ranking exercises and the review of the taped discussions provides converging evidence to support the findings. That is, a similar set of critical issues was raised in different exercises and determined from various analyses. In addition, these findings were found consistently across multiple focus group sessions.

### **DRIVERS' RECOMMENDATIONS AND COMMENTS**

During the course of the sessions, drivers were given the opportunity to describe and discuss issues that they felt were important to the L/SH industry. Listed below are highlights of several of the main issues, along with a brief paraphrased description or quotation that describes the issue.

#### **Private Driver Education**

- Educating the public is the most important thing that can be done to improve L/SH safety.
- Drivers feel that the public does not know how to interact with trucks.

- An example of private drivers' not knowing how to interact with trucks was given in reference to backing accidents. Many four-wheelers (i.e., light vehicle drivers) do not know that four-way flashers mean that a truck is backing up.
- Drivers of light vehicles need to be educated regarding trucks. They need to learn about a truck's blindspots (which vary from truck to truck), safe following distance, and wide turns.
- There is a need for public education on how to interact with trucks. Among the suggestions were airing TV ads during prime time; having a section pertaining to truck interaction on the driver's license test; driving in a truck as part of driver training; and using tax incentives to encourage companies to advertise public education messages on trucks.
- It would be beneficial to have signs on the backs of trailers that communicate messages to the public on how to interact with trucks. Currently, there is advertising on the backs of trailers. The drivers suggested that there could be different educational messages on the backs of different trailers. Also, drivers suggested that cartoon messages would be effective. An example of the types of messages that need to be communicated is "Yield to four-way flashers" (L/SH drivers turn on their four-way flashers when backing).
- Elderly private drivers are seen as problem drivers. Drivers felt that the problem of elderly drivers could be alleviated by providing more public transportation and more frequent driver testing.

### **Truck Driver Education**

- There needs to be more on-the-job training or mentoring for new drivers.
- Truck drivers indicated that they want more extensive training so that they will be quality drivers.
- Inexperienced drivers have a false sense of confidence about their driving abilities. An analogy was made to teen drivers.
- Truck drivers need education in maintenance. Also, drivers need to be educated on the hazards caused by tailgating.
- All drivers should be required to attend defensive driver training on an annual basis, not just when the driver is involved in an accident.
- Having regular meetings on safety helps refresh the driver's memory on driving hazards. Some companies use the Smith System as a refresher course.

### **Respect**

- Drivers feel that they do not get any respect from the driving public.
- Drivers of light vehicles do not let trucks change lanes or merge onto a highway. Drivers frequently commented that light vehicle drivers also try to beat them to an off-ramp.
- Sometimes drivers are required to "make (their) own right of way," as light vehicles do not let them enter or cross the traffic flow.

### **Stress Due to Time Pressure**

- "(We are) always working against the clock."

- One group of drivers felt that the stress due to time pressure was the most important factor affecting their safety, and was the primary reason for accidents and near-misses.
- Participants said that drivers who are “paid per load” have increased time stress. They allege that this has a negative effect on safety and “should be outlawed.”
- Related to time stress, a scheduling plan (i.e., a plan of the delivery order) is important for drivers making multiple deliveries.

### **Inattention**

- In trying to be efficient, drivers are thinking about their next stop while driving to it.
- Drivers commented that inattention is caused, in part, by the proliferation of roadside signs: there are too many road signs and, because there are so many, they are ineffective.
- Sometimes, inattention is the cause of striking low-clearance bridges.
- Drivers often eat, use a Qualcomm system, or use a computer to print orders while driving.
- Pagers are not useful for the driver because the displays are “impossible” to read while driving.

### **Road Design**

- Closely positioned on- and off-ramps that handle high volumes of traffic are problematic. Drivers of light vehicles will speed from the on-ramp to the off-ramp and try to cut trucks off in the process.
- The size of trailers impacts safety. The size of trailers has been increasing, but the size of city roads has not.
- Acceleration lanes should be longer and wider.
- Poorly marked lanes in construction areas can be confusing because they alter traffic patterns.
- The rule that trucks must stay in the right two lanes makes it difficult when the right lane is an exit-only lane. It is difficult for trucks to get into the left lane because of traffic. It is also difficult to exit off left-hand off-ramps.
- Drivers commented that carpool lanes were a hindrance.
- Some drivers feel it would be safer if the middle lane of a three-lane highway was the primary truck lane. In addition, drivers commented that the center lane should be wider.

### **Dock Design**

- Docks are not designed for drivers, but rather for aesthetics.
- The design of some loading docks should be improved. Many docks are hard to get into and have blind spots that hamper backing.
- Docks that have strobe lights make backing easier.

## **Fatigue**

- Fatigue in L/SH operations is considered an issue of only moderate importance. Contrast this with long-haul operations where drivers drive longer distances and get tired due to inactivity.
- No A/C on hot days leads to fatigue; “heat is a killer.” (Note that focus groups were conducted during the late spring and summer months of 1997).
- A/C, the radio, and good suspension help “tremendously” with fatigue. However, the drivers do not always get the same truck every day, so one day they may have A/C and the next day they may not.
- Fatigue occurs when drivers are delayed due to waiting to unload freight. One driver recommended that researchers look into improving the efficiency of shipping and receiving.
- Drivers speculated that higher hourly pay and fewer hours (e.g., 9 hours max.) might lead to fewer fatigue-related accidents.

## **Vehicle Design**

- Barn doors (swing doors) on trailers obscure the driver’s vision when backing. Roll-up doors are preferred.
- Trucks should be equipped with daytime running lamps so they are more visible to others during dawn/dusk hours.
- Directional signals that are placed halfway up the trailer are very effective.
- To improve safety, Jake (engine) brakes “should be standard equipment on all vehicles.”
- High-mounted brake lights for trucks should be mandated. The cost for this would be minimal. These brake lights seem to be effective because they are visible to cars.
- Cell-phones in the cab would make drivers’ jobs easier because regular phones are not always very accessible.
- Mirrors could be better placed to combat the truck driver’s blindspots. Windshield wipers are typically of poor quality.
- “No-slip strips” on the floors of the trucks help prevent falls.
- Despite having to haul heavy loads, the brakes on panel vans do not seem well-equipped to handle heavy loads.
- Wide-load information signs on the back of trucks are ineffective.

## **Road Signs**

- It was reported that certain states have no phone number for drivers to call and check for clearances or for information on how to enter a weight class limit road.
- Weight class limit road signs are posted after a driver commits to a road.
- Railroad crossings in the area do not have arms/barriers, only flashing lights. On sunny days, drivers cannot see these lights.
- Drivers recommended installing pedestrian crossing lights at crosswalks. Currently, pedestrians will walk on the driver’s green light, making the driver wait through a number of lights before he or she can turn left.
- Lack of road signs is problematic for drivers not familiar with a road.

- Improper marking of clearance heights for bridges or railroad trestles after re-paving can cause damage to the top of trucks. That is, with re-paving, new pavement is laid atop old pavement. This raises the height of the road, and for areas under a bridge, the actual clearance will be less than the posted clearance.

### **Pay Structure**

- There are several compensation methods for L/SH drivers including being paid hourly, salary, per load, per mile, percentage, and commission. The preferred compensation method for most drivers is hourly.
- Drivers who are paid per load or percentage end up doing as many loads as possible; they felt that this method of paying drivers gives them an “incentive to speed.”
- “Pay per load” drivers tend to speed and run yellow lights (i.e., they take chances).
- “Pay per load” pay structure leads to excessive wear-and-tear on the trucks.

### **Rest Breaks**

- Typically, drivers get few or no breaks.
- “The sooner you get done, the sooner you get off.”
- “Riding from stop to stop is my break.”

### **Backing Accidents**

- Backing accidents are common in the L/SH industry.
- Back-up alarms are present, but drivers cannot hear horns honking at them over alarms or their loud truck.
- There are backing alarms on many trucks, but there are no reverse lights on trailers.

### **Rules and Regulations**

- Drivers do not want added regulation.
- One driver reported that the L/SH industry wants to change hours-of-service, making it similar to long-haul. L/SH companies want to be able to re-set the driver’s clock after 24 hours so they can go out again. This idea would not be good for drivers.
- Companies need to communicate the L/SH rules and laws to the drivers.
- There is a need to develop a manual specific for L/SH drivers on the “do’s and don’ts” and on “weight class rules.”
- Regulations should be left alone. Just as the airline industry experienced safety problems as a result of deregulation, so did the trucking industry.

### **Drug Testing**

- Drug testing is not frequent enough. “UAs (urine analyses) are a waste of time and...money” because drivers know that once they’ve been tested, they won’t be tested again for some time. As such, they start using drugs right after testing.

### **Speed**

- Separate speed limits for cars and trucks cause crashes. It encourages cars to enter the truck’s safety zone, which causes rear-end crashes.

- Speed governors are seen as the cause of many accidents because the trucker cannot keep his/her speed up or drive with the traffic flow.
- Slow-moving drivers are more hazardous than those who go too fast; this sentiment applies to both private drivers and truckers.

### **Morale**

- Not driving the same truck every day can affect motivation and morale. Drivers never know which truck they will be driving that day. If they are assigned a truck that is in poor condition, their motivation and morale is reduced.

### **Illiteracy**

- Illiteracy is a factor that can affect safety. Accidents are caused by drivers who cannot read English/instructions at loading docks.

### **Hours**

- Drivers begin very early in the morning because of supermarkets' delivery policies. Drivers would like to see receiving hours revised to 9 AM-5 PM so they can work "normal" hours.

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## APPENDIX A

*(This appendix was contributed by Jim York of the National Private Truck Council)*

### **DESCRIPTION OF THE LOCAL/SHORT HAUL TRUCKING INDUSTRY**

The purpose of this appendix is to provide a description of the Local/Short Haul (L/SH) segment of the trucking industry in support of the FHWA-sponsored project entitled, *Impact of Local/Short Haul Operations on Driver Fatigue*. The following paragraphs provide a definition and classification of the L/SH industry and brief descriptions of typical L/SH operations.

#### **Industry Definition**

Local trucking operations have been traditionally defined as *transportation of goods less than 50 miles from origination to destination for one carrier* (FHWA, 1995). This definition has been long-used by major transportation census studies such as the Truck Inventory and Use Survey (TIUS) that is produced every five years by the Bureau of Census within the Department of Commerce's Economics and Statistics Administration. More recently, the TIUS census incorporated additional range of operations classifications and currently uses the five shown below (U.S. Dept. of Commerce, 1992):

- Local: trips less than 50 miles from the vehicle's home base (i.e., farm, terminal, factory, mine, or other place where the vehicle is stationed).
- Short range: Trips between 50 and 100 miles from the vehicle's home base.
- Short range-medium: Trips between 100 and 200 miles from the vehicle's home base.
- Long range-medium: Trips between 200 and 500 miles from the vehicle's home base.
- Long range: Trips beyond 500 miles from the vehicle's home base.

Based on these definitions, combining the local and short-range trip classifications would provide a local/short haul industry definition of *trips less than 100 miles from the vehicle's home base*.

Another definition of the local trucking industry has been developed by the FHWA for its Motor Carrier Identification Report. All for-hire motor carriers submit this report<sup>1</sup>. The report provides a space for carriers to specify the number of drivers that are employed in either Interstate or Intrastate operations and those that operate within or beyond a 100 air-mile radius of the normal work reporting location. The information supplied in that response is partly used to determine the number of commercial vehicle drivers that are required to comply with various rules in the Federal Motor Carrier Statute of Regulations (FMCSRs). This definition is consistent with the combined local and short-range classification used in the TIUS report.

Since many companies routinely conduct mixed trucking operations consisting of local, short, and long-range trips, the L/SH industry definition should not be confined to those companies that

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<sup>1</sup> The Form MCS-150, Motor Carrier Identification Report, must be filed by all motor carriers operating in interstate or foreign commerce. A new motor carrier must file Form MCS-150 within 90 days after beginning operations.

exclusively engage in trips less than 100 miles from the vehicle's home base. Rather, it should consider those companies that *primarily* conduct local/short haul trips.

### **Classification of the Local/Short Haul Industry**

Three trucking industry structure studies were reviewed to establish a practical classification system for the L/SH industry. The following paragraphs provide a brief summary of those studies and an adapted taxonomy that could be used by the investigators of the L/SH fatigue study in organizing focus groups and selecting study participants.

#### For-Hire Industry Size Study

One recent study developed a classification system for the trucking industry that included local trucking operations (FHWA, 1995). This system, shown below, includes four major divisions for type of operation, scope of operation, type of organization, and economic regulatory structure:

##### *Level A: Type of Operation*

- Less-Than-Truckload (LTL)
- Truckload
- Package
- Personnel
- Non-Goods
- Household Goods

##### *Level B: Scope of Operation*

- International
- National (Line haul)
- Regional
- Local
- Off-highway

##### *Level C: Type of Organization*

- For Hire (Including Owner-Operators)
- Private
- Government
- Postal
- Military
- State and local
- All other government fleets

##### *Level D: Economic Regulatory Structure*

- Regulated by ICC
- Class I
- Class II
- Class III
- Non-ICC regulated (Exempt)

There are several concerns in using the above classification for the L/SH industry. First, the study's authors defined local operations as *transportation of goods less than 50 miles from origination to destination for one carrier*. While this definition is generally consistent with the TIUS definition of local operations, it does not include short-range operations and is therefore inconsistent with the scope of trucking operations as defined under the FMCSR 100 air-mile definition. Second, the *Level D: Economic Regulatory Structure* classification is somewhat irrelevant since closure of the ICC by the ICC Termination Act on December 29, 1995.

#### Office of Motor Carriers Review of 100 Air-Mile Radius Carriers

The Office of Motor Carriers recently conducted an examination of the L/SH industry.<sup>2</sup> This analysis revealed that 84,914 of the 390,711 registered motor carriers operated exclusively within a 100 air-mile radius of their terminal or place of reporting to work. These carriers operated 431,078 power units comprised of:

- Non-articulated (i.e., straight trucks)- 280,969
- Truck Tractors- 111,195
- Hazardous Material (Hazmat) cargo/tank trucks (petroleum/LP Bobtail)- 12,195
- Motorcoach- 16,888

Additionally, this analysis revealed that 70% of all L/SH operations are private trucking concerns and that 95% of all L/SH operations are classified as small-size carriers (e.g., 19 or fewer drivers). This examination provided the number of L/SH (exclusive 100 air-mile radius) carriers in each of 12 operational and 26 cargo categories shown in Tables 1A & 1B.

Several terms in Table 1 require clarification and are defined below:

*Authorized for-hire*: The carrier hauls regulated products (e.g., most general freight commodities) and has common and/or contract authority.

*Exempt for-hire*: The carrier hauls unregulated products (e.g., produce or unprocessed agricultural products) and does not necessarily have common or contract authority.

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<sup>2</sup> This analysis of exclusive "100 air-mile radius" carriers was conducted by Sean Cassidy of OMC's Office of Research and Standards on December 05, 1996. A table entitled "Census and Review Data On 100 air-mile Carriers" and census highlights were extracted from that analysis.

**Table 1A. 100 air-mile radius, carrier census data outlining the different operational categories.**

<b>Operational Category</b>	<b>Number of Carriers</b>	<b>Percent of Carriers</b>
Private property	59,658	67.45%
Authorized for-hire	15,653	17.70%
Exempt for-hire	7,830	8.85%
U.S. Mail	2,321	2.62%
Other	1,721	1.95%
Private passenger (non-business)	587	0.66%
Private passenger (business)	544	0.62%
Migrant	51	0.06%
Federal Government	29	0.03%
Local Government	24	0.03%
State Government	22	0.02%
Indian Tribe	4	0.00%
<b>Total</b>	<b>88,444</b>	<b>99.99%</b>

**Table 1B. 100 air-mile carrier census data outlining the different cargo classification schemes.**

<b>Cargo Classification</b>	<b>Number of Carriers</b>	<b>Percent of Carriers</b>
Machinery or large objects	10,428	8.25%
Building materials	9,980	7.90%
Logs, Poles, Beams, Lumber	9,744	7.71%
General freight	8,676	6.87%
Grain, feed, or hay	7,637	6.05%
Liquids or gases	4,710	3.73%
Motor vehicles	4,261	3.37%
Commodities (dry bulk)	4,097	3.24%
Metal (sheets, coils, or rolls)	3,597	2.85%
Paper products	3,123	2.47%
Livestock	2,574	2.04%
U.S. Mail	2,579	2.04%
Fresh produce	2,421	1.92%
Household goods	2,178	1.72%
Refrigerated food	2,138	1.69%
Garbage	2,012	1.59%
Passengers	1,970	1.56%
Chemicals	1,965	1.56%
Drive-away/Tow-away	1,740	1.38%
Beverages	1,140	0.90%
Coal/Coke	905	0.72%
Meat	890	0.70%
Inter-modal	691	0.55%
Oilfield equipment	642	0.51%
Mobile homes	567	0.45%
Other Cargo	35,666	28.23%
<b>Total</b>	<b>126,331</b>	<b>100.00%</b>

Although the above L/SH industry analysis is helpful, there are several concerns. First, the sum of the carriers in Tables 1A and 1B equals more than the number of exclusive 100 air-mile carriers reported earlier in the analysis (i.e., 84,914). This is primarily due to the fact that carriers classify themselves under more than one type of operation or cargo classification. Second, the "Other Cargo" classification in Table 1B represents the largest percentage of carriers and therefore does not provide a definite picture of the industry. However, it is useful to note that construction-related materials (e.g., building materials, logs, poles, beams, and lumber), machinery, grain products (e.g., grain, feed, hay, and dry-bulk commodities) and liquids or gases represent a significant portion of the products carried in the L/SH industry.

## Commercial Carrier Journal's Census of the Professional Fleet Market

The Professional Fleet Market (1996) has developed one trucking industry classification. Entitled *Commercial Carrier Journal*, this document provides a more in-depth analysis of the L/SH industry. This analysis, shown in Table 2 and Figure 1, is part of an on-going census of the professional fleet market that has been designed to evaluate and assess fleets of ten or more trucks. Managers of these fleets submit census data to this organization that describe fleet size, scope of operation, vocation or business, and nature and extent of equipment used. A national summary of this census data is published biannually.

Three major operational categories (e.g., For-hire, Private Industry, and Private-Type) are shown in the professional fleet census data. Table 3 provides a comparison of these categories with those used in the Office of Motor Carriers review of 100 air-mile radius carriers.

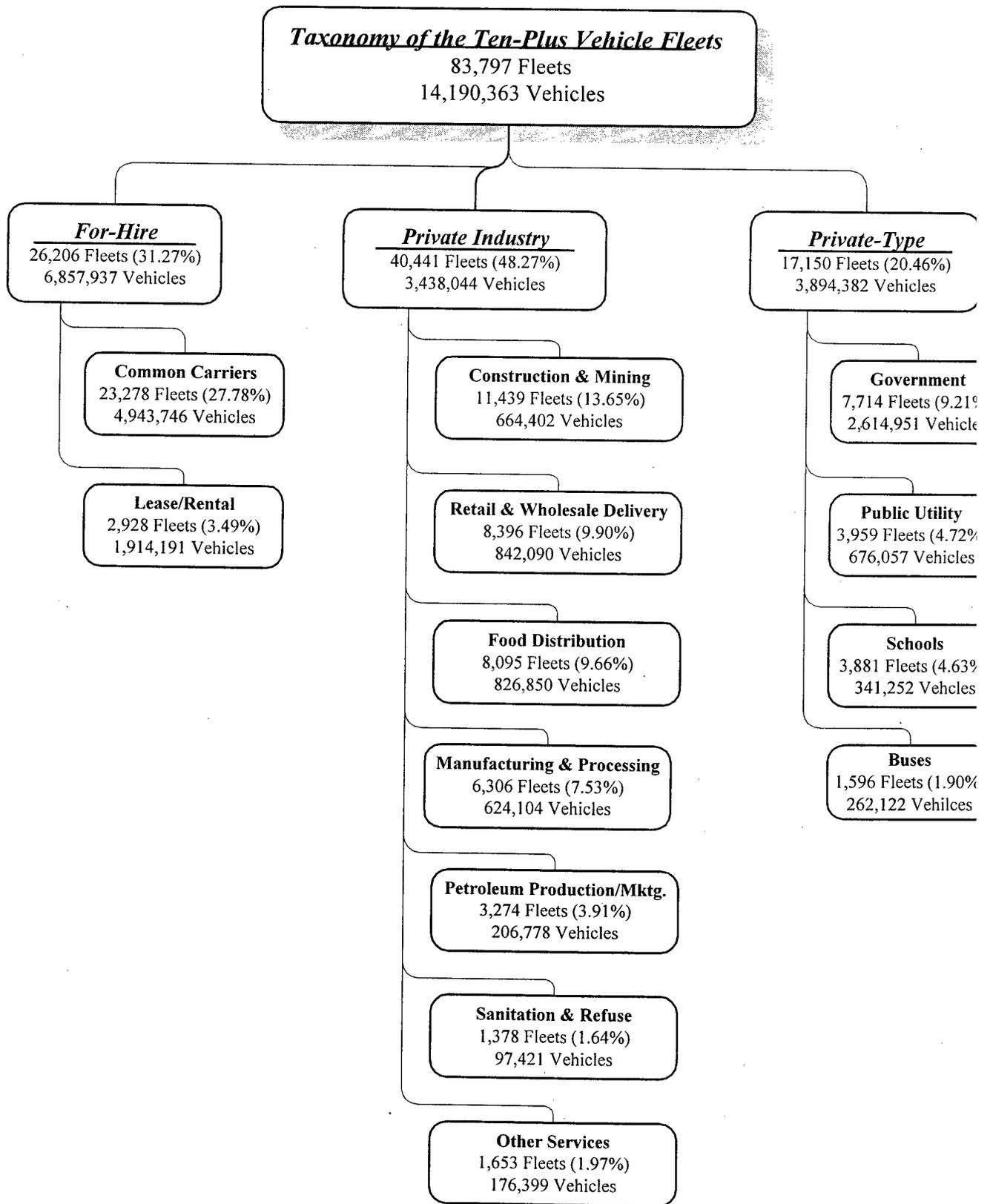
**Table 2. Fleet vocation analysis.**

### Total Vehicles Operated By Type of Vehicle

Vocation or Business	Fleets	% Total	Vehicles	Trucks	Tractors	Trailers	Buses	Off-Road	Cars
Common Carrier	23,278	27.78%	4,943,746	596,167	1,236,061	2,863,297	30,522	114,953	102,746
Construction & Mining	11,439	13.65%	664,402	222,694	66,519	121,887	3,296	192,807	57,199
Retail & Wholesale Delivery	8,296	9.90%	842,090	218,092	141,340	236,373	5,976	46,126	194,183
Food Distribution	8,095	9.66%	826,850	191,069	197,527	305,043	5,237	41,214	86,760
Govt: Local/State/Federal	7,714	9.21%	2,614,951	1,062,752	172,827	283,813	58,912	343,407	693,240
Manufacturing & Processing	6,306	7.53%	624,104	160,258	107,844	241,414	4,238	42,792	67,558
Public Utility	3,959	4.72%	676,057	347,379	20,197	88,032	4,592	63,291	152,566
Schools	3,881	4.63%	341,252	41,325	7,252	10,500	235,143	10,804	36,228
Petroleum	3,274	3.91%	206,778	59,535	40,824	66,342	1,027	14,867	24,183
Lease/Rental	2,928	3.49%	1,914,191	397,633	343,141	731,643	9,013	38,623	394,138
Other Services	1,653	1.97%	176,399	58,731	25,322	39,057	4,602	19,261	29,426
Buses	1,596	1.90%	262,122	14,033	4,546	6,135	194,064	5,632	37,712
Sanitation & Refuse	1,378	1.64%	97,421	51,835	9,262	18,770	308	8,480	8,766
<i>Totals</i>	83,797	100%	14,190,363	3,421,503	2,372,662	5,012,306	556,930	942,257	1,884,705

### Fleet Composition

Vocation or Business	Fleets w/ Trucks	Fleets w/ Tractors	Fleets w/ Trailers	Fleets w/ GVW 6,7,8	Fleets w/ GVW 3-5	Fleets w/ Buses
Common Carrier	13,476	21,616	20,899	10,260	7,800	1,048
Construction & Mining	10,828	8,743	9,556	1,386	7,694	628
Retail & Wholesale Delivery	7,382	5,652	5,741	1,608	4,813	373
Food Distribution	6,714	6,761	6,820	2,019	4,253	435
Govt: Local/State/Federal	7,500	4,327	5,468	345	6,423	2,043
Manufacturing & Processing	5,120	5,440	5,534	1,742	3,055	294
Public Utility	3,868	1,927	2,987	202	3,351	247
Schools	2,077	544	823	550	2,618	3,634
Petroleum	2,882	2,682	2,694	667	1,841	139
Lease/Rental	2,413	2,399	2,394	637	1,892	244
Other Services	1,488	988	1,036	191	1,157	294
Buses	543	226	217	398	915	1,570
Sanitation & Refuse	1,311	904	949	260	829	44
<i>Totals</i>	65,602	62,209	65,118	20,265	46,641	10,993



**Figure 1. Ten-plus vehicle fleet taxonomy.**

**Table 3. Comparison of operational categories.**

<b>Professional Fleet Market Category</b>	<b>OMC 100 Air-Mile Category</b>
Private industry	Private property
For-hire	Authorized for-hire Exempt for-hire
Private-type	No corresponding term

As Table 3 illustrates, the private-type category has no corresponding term in the OMC 100 air-mile census. These fleets are similar to private fleets in that they are primarily used by institutions or organizations whose principal mission is not trucking (e.g., Virginia Dept. of Transportation, or Chicago Public Schools). This category is not included in the OMC census because these publicly-owned organizations are not required to submit the MCS-150 Motor Carrier Identification Report to OMC. If private-type fleets were removed from the Professional Fleet Market Census, the distribution of fleets between private industry and for-hire categories would be similar (e.g., 39.3% for-hire and 60.7% private industry).

There are also similarities between the Professional Fleet Market Census and the OMC 100 air-mile census in fleet distribution among cargo classifications. Table 4 provides the distribution of fleets among similar cargo categories in the two census reports.

**Table 4. Comparison of market segments and cargo classifications.**

<b>Professional Fleet Market Census</b>		<b>OMC 100 Air-Mile Census</b>	
<b>Market segment</b>	<b>Percent of fleets</b>	<b>Cargo classification</b>	<b>Percent of fleets</b>
Construction & Mining	13.65%	Building materials Logs, poles, beams, lumber	16.15%
Petroleum Production/Mktg.	3.91%	Liquids or gasses	3.73%
Sanitation & Refuse	1.64%	Garbage	1.59%

Expanded L/SH Industry Taxonomy

Using the above sections and the NPTC member database, an expanded L/SH taxonomy has been developed and is presented below. This taxonomy, shown in Table 5, provides a more-detailed depiction of the nature and extent of L/SH industries included in each of the previous classifications.

**Table 5. Expanded L/SH industry taxonomy.**

<b>Classification</b>		<b>Example Companies</b>
I:	For-hire	
	Parcel Delivery	United Parcel Service
	Drayage or cartage	
II:	Private industry	
	A. Construction & Mining	
	1. Building/General Contractors	Hartford Concrete Products
	2. Road/Utility Contractors	
	B. Retail & Wholesale Delivery	
	1. Retail	
	Department/General Merchandise Store	Wal-Mart Stores, Inc.
	Hardware/Lumber/Building Materials	Payless Cashways, Inc.
	Pharmacies/Drug Stores	Eckerd Drug Company
	Furniture/Household Durables	Heilig-Meyers Furniture
	Newspaper/Books	Chicago Sun Times
	Office	Staples Office Products
	2. Wholesale	
	Paper	Paper Corporation of America
	Hardware/Lumber/Building Materials	Cotter and Company
	Medical Supplies/Equipment	Baxter Healthcare Corporation
	Truck/Auto Repair	
	C. Lease/Rental	Ryder Dedicated Logistics
	D. Food/Food Distribution	
	1. Agriculture	Green Products Company
	2. Food Processing	Smithfield Foods
	3. Processed Goods	
	Diary	Borden, Inc.
	Baked Goods	Pepperidge Farms, Inc.
	Candy/Confections	Russel Stover Candies, Inc.
	Poultry	Perdue Farms, Inc.
	4. Beverages	Perrier Group of America
	Wineries	
	Breweries	Annheuser-Busch Companies, Inc.
	Soft Drinks	Coca Cola Bottling Company of New York

<b>Table 5 Continued</b>	
<b>Classification</b>	<b>Example Companies</b>
5. Food Wholesalers	
6. Food Service Distributors	Domino's Pizza
7. Retail Grocery/ Convenience Stores	Giant Food, Inc.
<b>E. Manufacturing &amp; Processing</b>	
1. Farm/Agricultural Equipment	Case Corporation
2. Machinery/Industrial Equipment	The Gates Rubber Co.
3. Automobiles/Trucks/Vehicle Parts	Eaton Corporation
4. Garden Equipment/Supplies	The Scotts Company
5. Clothing/Fabrics/Textiles	Lee Apparel Company, Inc.
6. Plastics/Rubber	Oliver Rubber Company
7. Building Materials (Non-wood)	Senco Products
8. Paper/Forest Products	Ailing and Cory Company
9. Furniture/Household Durables	Ashley Furniture Ind., Inc.
10. Glass	American Flat Glass
11. Metal/Steel	Lone Star Steel Company
12. Appliances/Electrical Products	Circuit City Stores, Inc.
<b>F. Petroleum and Chemicals</b>	
1. Oil/Petroleum Products	
Manufacturer	B. P. Oil Company
Wholesale/Retail	CITGO Petroleum Co.
2. Industrial Gases	B.O.C. Gases
3. Chemicals	Occidental Chemical Corp.
<b>G. Sanitation &amp; Refuse</b>	
<b>H. Other Services</b>	
1. Landscaping/Lawn/Tree Maintenance	Davey Tree Expert Co.
2. Home Improvement/Repair/Maintenance	
3. Commercial Building Services	
4. Printer/Mailing Services	Print Pack, Inc.
5. Vehicle Repair Services	
6. Airline Support	
<b>III. Private Type</b>	
<b>A. Government</b>	
1. Federal	U.S. Postal Service
2. State	
3. Local	
<b>B. Public Utility</b>	
<b>C. Schools</b>	
<b>D. Buses</b>	

### **Typical L/SH Descriptions**

The following is a description of the daily tasks performed by L/SH drivers in one particular industry.

#### Typical On-Duty Cycle of a Beverage Industry Local/Short Haul Driver

- Report to work at 5:00 AM and review daily route assignment sheet
- Inspect beverage bays to ensure the proper loading of product
- Correct any product shortages or overages
- Conduct pre-trip vehicle inspection
- Complete necessary pre-trip paperwork
- Drive 15-30 miles to first delivery stop (e.g., small grocery or convenience store)
- Check route assignment sheet to verify quantity and type of requested delivery
- Unload product from beverage bays onto two-wheel cart
- Rotate display stock as required
- Place delivered product on display shelves
- Collect recycled cans and bottles and load in appropriate truck bay
- Complete sales invoice and give copy to customer
- Drive on; perhaps three miles to next stop
- Repeat steps 7-13 for the balance of assigned route (e.g., 30-50 stops per on-duty cycle is not uncommon)
- Drive 30-50 miles back to terminal
- Unload recycled containers, and empty pallets/waste from beverage bays
- Assist in reloading as necessary (Note: many beverage operations have dedicated crews to reload these vehicles during the evening hours. However, the driver may perform some or all of the reloading in some instances.)
- Complete daily route summary and other required paperwork
- Depart for home sometime after 6:00 PM

#### Typical On-Duty Cycle of Beverage Industry Over-the-Road Driver

- Arise from sleeper-berth at 5:00 AM
- Perform pre-trip inspection and update record of duty status (logbook)
- Drive 50-100 miles to consignee's delivery facility
- Notify consignee of shipment arrival and provide appropriate shipping papers
- Supervise unloading of the vehicle
- Obtain load delivery receipt from consignee and complete appropriate paperwork
- Drive 30-50 miles to beverage bottling facility
- Provide order information to beverage shipping department
- Supervise loading of the vehicle and ensure adequate load securement
- Obtain shipping papers and complete appropriate paperwork
- Drive 300-400 miles to beverage distribution facility or to the end of a ten-hour duty cycle
- Notify consignee of shipment arrival
- Supervise the unloading of the vehicle
- Update record of duty status and end of shift at approximately 6:00 PM

### **Summary of Available Safety Data for the L/SH Industry**

Ultimately, motor carrier safety performance has been traditionally measured in the context of the number and severity of truck accidents. For example, the National Highway Traffic Safety Administration's (NHTSA) Center for Statistics and Analysis compiles annual reviews of accidents for passenger cars, light trucks, large trucks, and motorcycles (National Highway Safety Administration, 1996). The data sources used for these reviews are the Fatal Accident Reporting System (FARS) and the General Estimates System (GES). The FARS data is a census of fatal traffic crashes involving vehicles on public highways that occurred within the 50 states, the District of Columbia, and Puerto Rico. The GES data is a national statistical sampling from all the police-reported crashes. Crashes included in the GES data must result in property damage, involve at least one motor vehicle, and occur on public highways. A summary of the NHTSA truck crash data is provided in Table 6.

**Table 6. Involvement in fatal and injury crashes and involvement rates for large trucks, 1985-1995 (NHTSA, 1995).**

Year	Number of Large Trucks Involved in Fatal Crashes	Number of Large Trucks Registered	Vehicle Involvement Rate *	Vehicle Miles Traveled (millions)	Vehicle Involvement Rate **
1985	5,153	5,330,678	96.7	126,580	4.1
1986	5,097	5,249,102	97.1	130,141	3.9
1987	5,108	5,303,094	96.3	135,601	3.8
1988	5,241	5,433,560	96.5	141,397	3.7
1989	4,984	5,692,148	87.6	148,318	3.4
1990	4,776	5,854,337	81.6	149,810	3.2
1991	4,347	5,868,817	74.1	150,729	2.9
1992	4,035	5,970,925	67.6	152,803	2.6
1993	4,328	6,191,889	69.9	159,402	2.7
1994	4,644	6,303,313	73.7	170,415	2.7
1995	4,453	6,435,965	69.2	178,160	2.5

Year	Number of Large Trucks Involved in Injury Crashes	Number of Large Trucks Registered	Vehicle Involvement Rate *	Vehicle Miles Traveled (millions)	Vehicle Involvement Rate **
1988	96,000	5,433,560	1,764	141,397	68
1989	110,000	5,692,148	1,887	148,318	74
1990	107,000	5,854,337	1,830	149,810	72
1991	78,000	5,868,817	1,332	150,729	52
1992	95,000	5,970,925	1,586	152,803	62
1993	97,000	6,191,889	1,564	159,402	61
1994	95,000	6,303,313	1,507	170,415	56
1995	83,000	6,435,965	1,287	178,160	47

The NHTSA summary data defines large trucks as those over 10,000 pounds gross vehicle weight rating, including single unit trucks and truck-tractors.

\* Rate per 100,000 registered vehicles.

\*\* Rate per 100 million vehicle miles traveled.

NA = not available.

## REFERENCES FOR APPENDIX A

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## APPENDIX B – TAXONOMY RESULTS

### Taxonomy of Issues Raised by Participants<sup>1</sup>

#### A. Safety-Related Issues (Causal Factors of Accidents and Near-Misses) (814)

1. Non-Fatigue: Causal Factors Other than Fatigue that Negatively Impact Safety (572)
  - 1.1. Behavior Problems of Motorists/Non-Motorists (165)
  - 1.2. Suggestions for Accident Prevention (114)
  - 1.3. Poor Roadway Design/Signage Problems/Road Hazards (98)
  - 1.4. Vehicle-Related Factors/Equipment (58)
  - 1.5. Lack of Education/Training/Experience (57)
  - 1.6. Inattention/Carelessness/Poor Communication (L/SH Driver) (48)
  - 1.7. Other (19)
  - 1.8. Weather Problems (13)
2. Fatigue: Causal Factors of Fatigue that Negatively Impact Safety (139)
3. Potentially Fatigue-Related: Causal Factors, Potentially Related to Fatigue, that Negatively Impact Safety (103)

#### B. Non Safety-Related Issues (261)

1. Informational (240)<sup>2</sup>
2. Non-Relevant Accident Descriptions (21)<sup>3</sup>

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<sup>1</sup> Numbers in parentheses indicate number of occurrences of the issue types.

<sup>2</sup> This category is not classified further.

<sup>3</sup> This category is not classified further.

## APPENDIX B-1 – DETAILED ANALYSIS OF NON-FATIGUE, SAFETY-RELATED ISSUES

### Detailed Analysis of Category A.1.

## A. SAFETY-RELATED ISSUES (CAUSAL FACTORS OF ACCIDENTS AND NEAR-MISSES) (814)

### 1. NON-FATIGUE: CAUSAL FACTORS OTHER THAN FATIGUE THAT NEGATIVELY IMPACT SAFETY (572)

#### 1.1. BEHAVIOR PROBLEMS OF MOTORISTS/NON-MOTORISTS (165)

##### 1.1.1. Passenger Car/Non-Professional Truck Drivers (136)

###### *Vehicle maneuvers/driver actions (85)*

- Invading the truck driver's safety/buffer zone (46)
  - ◆ Cutting off the truck/pulling in front of the truck (i.e., in general, in construction zones, in a merge area) (28)
  - ◆ Cutting in front of the truck and stopping/slowng down (not in a merge area) (5)
  - ◆ Pulling behind a trucker who is backing up (getting out and checking beforehand is ineffective) (5)
  - ◆ Improperly merging (not further specified) (4)
  - ◆ Cutting in front of the truck and stopping/slowng down in a merge area (3)
  - ◆ Not further specified (1)
- Aggressive driving (24)
  - ◆ Hurried/Reckless driving (impatience) (10)
  - ◆ Using the curb/shoulder/median/sidewalk to pass (6)
  - ◆ Driving too fast for the conditions (losing control of the vehicle) (2)
  - ◆ Tailgating (2)
  - ◆ Swerving into the trucker's lane (1)
  - ◆ Frequent lane changing (1)
  - ◆ Not letting the truck driver get in the passing lane (1)
  - ◆ Passing around the truck driver while they are backing (1)
- Other (15)
  - ◆ Driving too slowly (in general, older driver issue) (3)
  - ◆ Driving/parking in the trucker's blind spot areas (3)
  - ◆ Unreliable or no signal use (2)
  - ◆ Encroaching/driftng into the trucker's lane (2)
  - ◆ Sudden stopping/braking (2)
  - ◆ Crossing the center line (1)
  - ◆ Driving slowly in the passing lane (1)
  - ◆ Not using headlights during dawn hours (1)

###### *Inattention (24)*

- Talking on the cell phone (6)

- Reading books/paper (5)
- Applying makeup (3)
- Inattentive (not further specified) (2)
- Listening to loud music (1)
- Attending to children in the car (1)
- Shaving (1)
- Not paying attention in construction zones (1)
- Inattention by older drivers (1)
- Running stop signs (inattention) (1)
- Distracted by stopped police cars on the side of the road (1)
- Daydreaming (1)

*Passenger car/non-professional truck drivers are a problem (not further specified) (15)*

*Attitude/mentality (11)*

- Disrespect to truckers on the road (5)
- Not showing common courtesy/sense (not further specified) (4)
- Displaying “road rage” (1)
- Not wanting to drive behind a truck (they must be in front) (1)

*Driving while fatigued (1)*

### **1.1.2. L/SH and Long-Haul Drivers (27)**

*L/SH or other professional truck driver actions (25)*

- Aggressive driving (16)
  - ◆ Speeding on the roadway (8)
    - Reasons for speeding (4)
      - Wants to get as many jobs done as possible (time pressure) (2)
      - Does not want to have to work overtime (1)
      - Strict delivery hours (1)
    - Speeding (not further specified) (2)
    - During poor weather conditions (1)
    - Dump and cement truckers drive too fast (1)
  - ◆ Reasons for aggressive driving (4)
    - Other drivers are not courteous (2)
    - Time pressures (1)
    - Lack of respect from light vehicle drivers (1)
  - ◆ Not letting the truck driver into a lane (2)
  - ◆ Tailgating (1)
  - ◆ Cutting off the truck driver (1)
- Other (9)
  - ◆ Negotiating a corner too quickly (rollover) (2)
  - ◆ Poor job of backing (1)
  - ◆ Backing into an area too quickly (1)
  - ◆ Other truck drivers who lose control of their vehicle (1)
  - ◆ Bus drivers are a problem (not further specified) (1)
  - ◆ Buses do not obey stoplights (Trucker’s perception that bus drivers can do whatever they want) (1)
  - ◆ Drivers who empty garbage dumpsters and place them poorly in the dock area (1)

- ◆ Forklift drivers run over the truck driver's toes (1)

*Long-haul driver actions (2)*

- Using OTC drugs to stay awake (1)
- Poor job of backing (1)

### **1.1.3. Pedestrians/Bicyclists (2)**

*Pedestrian walking in the driver's blind spot area (1)*

*Bicyclist standing in the trucker's blind spot area (1)*

## 1.2. SUGGESTIONS FOR ACCIDENT PREVENTION (114)

### 1.2.1. "Other Driver" Education (41)

*Light vehicle drivers need education on understanding truck drivers and on interacting with trucks (15)*

*Advertising (10)*

- Broadcast public service announcements (PSAs) on TV (during prime hours) (5)
- Signs on trailers (5)
  - ◆ Post various educational signs on the trailers/trucks (4)
    - In general (1)
    - "Lights on in bad weather" (1)
    - "Yield to 4-way flashers" (1)
    - Use cartoons (1)
  - ◆ Not effective (1)

*Behind-the-wheel (9)*

- Require drivers to undergo defensive driving training (3)
- Require drivers to get behind the wheel of a truck (first-hand experience) (3)
- Provide drivers with hands-on experience on interacting with a truck (2)
- Mandate a safe driving course (1)

*Driver testing/manual (6)*

- Have truck-related/truck interaction questions on the driver's test (4)
- Require more frequent driver testing to get older drivers off the road (1)
- Include a section in the driver's manual on interacting with trucks (1)

*Other (1)*

- Have a truck awareness program for every state (1)

### 1.2.2. Truck Equipment (20)

*Communication equipment (5)*

- CB radios and hands-free cell phones reduce the workload (1)
- Cell phones are useful in an emergency where a phone is not available (1)
- Address the problem of other drivers using cell phones (not further specified) (1)
- Two-way radios are ideal (not further specified) (1)
- CB radios are not very useful (1)

*Headlights (3)*

- Should be used with wipers/should be automated to go on when the wipers are used (2)
- Mandate head light use during dawn/dusk hours (1)

*Backing alarm (2)*

- Install backing alarms on all trailers (1)
- Sounders should not be installed on trailers – they will be ineffective (1)

*Brakes (2)*

- Air brakes as standard equipment (1)
- Install high-mounted brake lights (1)

*Doors (2)*

- Roll doors are easier to work with than barn doors (2)

*Other (2)*

- No-slip strips on the floor of trucks provide better traction (1)
- Install high-mounted directional signals (1)

*Air conditioning (1)*

- Install A/C in all trucks (heat causes fatigue which increases accident likelihood) (1)

*Trailer size (1)*

- Should not exceed 45 feet (1)

*Mirrors (1)*

- Develop mirrors that will enable one to see dark backing areas on sunny days (1)

*Speed governors (1)*

- Install speed governors in all OTR tractor-trailers (1)

### **1.2.3. Training for L/SH Drivers (19)**

*Regular training (10)*

- Provide regular defensive driver education for truck drivers (i.e., Smith system) (9)
- Provide regular safety meetings as they are beneficial for drivers (1)

*Other (4)*

- Educate drivers (type not specified) (3)
- Provide training for new drivers (1)

*Specific training/material (3)*

- Provide education to combat aggressive driving by truck drivers (i.e., tailgating) (1)
- Provide manuals on the “do’s and don’ts” and “weight class rules” (1)
- Educate drivers on the importance of maintenance (1)

*CDL-related (2)*

- Have a CDL probationary period with companies testing the drivers (1)
- Require Canadian truckers to pass CDL tests in the U.S. (to promote standardization) (1)

### **1.2.4. Design of Roads and Delivery Areas/Signs (11)**

*Lanes (markings, restrictions, width, length) (5)*

- On a 3-lane highway, make the center lane a truck-only lane during heavy traffic (2)
- Reflective lane markings are beneficial (1)
- Make the center lane a wider lane (1)
- Need longer merging lanes (1)

*Rumble strips (1)*

- Woke up a driver who fell asleep behind the wheel (1)

*Strobe lights (1)*

- Useful when attached to the side of docks to help guide the driver when backing (1)

*Signs (1)*

- Post a “Watch for Slow Trucks Entering and Exiting” at the weigh station areas (1)

*On- and off-ramps (1)*

- Fix ramps that are spaced too closely together (1)

*Crosswalk lights (1)*

- Install a light at the crosswalks so drivers have a chance to turn left (1)

*Medians (1)*

- Soft medians slow down a trucker who has drifted off the road (1)

#### **1.2.5. Pay/Incentives/Deterrents (10)**

*Pay structure (6)*

- Pay drivers hourly (3)
- Eliminate the pay per load/mile system (1)
- Pay overtime for extra hours or extra loads (1)
- Pay drivers on a base pay scale (1)

*Safety bonus (2)*

- Awarded when they have no “preventable” accidents (1)
- Offered if the driver maintains a speed of less than 55 mph (1)

*Tax incentives for companies to provide better equipment and spend money on advertising (1)*

*Drug testing (1)*

- Urinalysis testing is not effective (1)

#### **1.2.6. Defensive Driving Strategies (4)**

*Maintain a safe following distance (4)*

- Follow the 4-second rule to improve traffic flow (2)
- Drive 2 or more standard lengths apart (1)
- Travel in the left passing lane to avoid cars traveling on the on- and off-ramps (1)

#### **1.2.7. Other (3)**

*Pedestrian should look a truck driver in the eye before crossing in front of the truck (1)*

*Provide better public transportation to get older drivers off the road (1)*

*Reduce traffic volume by encouraging carpooling (1)*

#### **1.2.8. Regulations (3)**

*Don't add more regulations (there are too many regulations) (2)*

*Set up a non-political group whose emphasis is on safety and not money (1)*

#### **1.2.9. Delivery Time (2)**

*Extend store hours to include a 9-5 schedule so drivers can have normal working hours (1)*

*Investigate the inefficiency of shipping and receiving (tie-ups and delays) (1)*

#### **1.2.10. Safety Clothing (1)**

*Provide steel-toed shoes (1)*

### 1.3. POOR ROADWAY DESIGN/SIGNAGE PROBLEMS/ROAD HAZARDS (98)

#### 1.3.1. Road Design (56)

##### *On- and off-ramps (14)*

- On- and off-ramps spaced too closely together (6)
- Acceleration lanes are not long enough (3)
- Poorly designed (not further specified) (1)
- Acceleration lanes are not wide enough (1)
- Shared acceleration and deceleration lanes (1)
- Merging lanes are not long enough (not further specified) (1)
- Deceleration lanes are not long enough (1)

##### *Poor road design (not further specified) (7)*

##### *Roadside structures/lighting (7)*

- Poor lighting in tunnels (2)
- Power lines are placed too low for the truck's height (1)
- Hitting tree limbs can cause vehicle damage (1)
- Fire escapes on city streets (1)
- Street hole covers on city streets (1)
- Bridges that only have a 3-inch clearance on either side for trucks (1)

##### *Lanes (HOV, Exit Lanes, Lane Assignment, Number of Lanes) (7)*

- Right lane restrictions (4)
  - ◆ Need to change lanes when the right lane is an exit only lane (2)
  - ◆ Difficult to get over into the left hand exit lane (1)
  - ◆ A problem with cars entering and exiting the road (1)
- Reducing the number of lanes on a heavily traveled roadway (1)
- Prohibiting trucks from traveling in HOV lanes (1)
- Inconveniently placed HOV lanes for truckers (1)

##### *Narrow roads (6)*

- Roads/lanes that are not wide enough to accommodate trucks (in general, in the city) (2)
- Residential roads have narrow streets and parked cars (Difficult to maneuver) (2)
- Driving down narrow alleys (1)
- Industrial parks have narrow roads (1)

##### *Lane markings (5)*

- Poor lane markings make it difficult to keep one's lane (2)
- Poorly re-marked lanes during construction (1)
- Certain types of lane markings are a problem (not further specified) (1)
- The asphalt color makes it difficult to see the lane markings due to lack of contrast (1)

##### *Other (5)*

- Undivided roadway (1)
- No arm barrier to stop traffic at railroad tracks (1)
- Flashing lights at a railroad area are not visible on sunny days (1)
- Road crowning on a curve makes it hard to turn these corners (1)
- Roadways do not support the heavy volume of traffic (1)

##### *Parking areas (3)*

- Parking can be difficult in some places (not further specified) (1)

- Parking is a challenge in residential areas (1)
  - Lack “thoroughfare” areas (1)
- Intersections (2)*
- Intersections with double left turns (1)
  - Intersections are not designed with truckers in mind (1)

### 1.3.2. Signs/Traffic Signals (17)

*Poor/lack of signs (3)*

- A problem in areas with many unfamiliar drivers (2)
- Difficult to choose the correct lane to be in when not properly indicated by signs (1)

*Poor clearance signs (3)*

- A problem in dock areas/railroad trestles (2)
- Not clearly marked for underpass/overpasses (height) (1)

*Other (3)*

- Ramp areas do not have “merge,” “lane ends,” or “no yield” signs (1)
- Signs are not properly maintained (1)
- Lower truck speed limits cause speed variation between trucks and cars (1)

*Metered signals (2)*

- Make it difficult to build up speed when entering a highway (1)
- Are effective (1)

*Location (2)*

- Traffic signals are placed where it is difficult for the truck driver to see (1)
- Restricted roads cannot be avoided when weight class signs are not posted in advance (1)

*Advanced knowledge (2)*

- Truckers are not informed of new road signs that will affect them (1)
- No means for getting road information in advance (i.e., information on clearance, road restriction, etc.) (1)

*Poor road signs (not further specified) (2)*

### 1.3.3. Dock/Store Delivery Area (15)

*Dock areas (8)*

- Designed with blind side areas (2)
- Poor lighting in dock area (2)
- Designed for aesthetics rather than for practicality (1)
- Dock plates are too small for the electric jack (1)
- Not enough space (1)
- Garbage dumpsters placed in a poor location (1)

*Dock and store delivery areas are poorly designed (not further specified) (5)*

*Store delivery areas (2)*

- Store delivery area not designed with a truck in mind (1)
- Poor store location (1)

### 1.3.4. Road Hazards/Maintenance (10)

*Construction zones (6)*

- Presence of construction (not further specified) (3)
- Dealing with new traffic patterns (2)

- Reduction in traffic flow (1)  
*Heavy traffic (2)*
- Causes hurried driving by light vehicle and L/SH drivers (2)  
*Poor road conditions (1)*  
*Animals in the road cause sudden braking (1)*

## 1.4 VEHICLE-RELATED FACTORS/EQUIPMENT (58)

### 1.4.1. Truck Design/Equipment (40)

#### *Size (6)*

- Trucks are too large for the roads on which they have to travel (2)
- Trucks/trailers are too wide (2)
- Trucks/trailers are too tall (1)
- Large trailers are difficult to maneuver (1)

#### *Blind spots (5)*

- Blind spots associated with driving a truck (not further specified) (3)
- Cannot see over the nose of the truck (1)
- Poorly designed vehicles have more blind spots (makes it difficult to back into an area) (1)

#### *Communication equipment (5)*

- Cell phones (3)
  - ◆ Encourage longer conversations and personal communications (2)
  - ◆ Distracting when a handset is needed (1)
- Communicating in general is distracting (1)
- Pager displays are impossible to read while driving (1)

#### *Mirrors (3)*

- Improperly/poorly placed on cabs (2)
- Lack of mirrors, particularly on older trucks (1)

#### *Backing/white reverse lights (3)*

- Trailers do not have backing/white reverse lights (3)

#### *Sounder/backing alarms (2)*

- Too loud to hear other drivers honking their horns (1)
- Some trailers are not equipped with them (1)

#### *Barn doors (2)*

- Reduce visibility while driving (1)
- Require the driver to go in and out of the truck frequently (1)

#### *Brakes (2)*

- City drivers do not have air brakes (1)
- Brake performance is insufficient for the loads they haul (1)

#### *Vehicle familiarity (2)*

- Unfamiliar with the handling of and equipment on truck (never getting the same truck or trailer) (2)

#### *Poor vehicle design (not further specified) (2)*

#### *Steps on the dump trucks (1)*

- Too small to climb up and down on (1)

#### *Asphalt rollers on the vehicle (1)*

- The metal rollers have no traction and they tend to slide or overturn when going up a lowboy or ramp during wet conditions (1)

#### *Windshield wipers (1)*

- Poor quality windshield wipers (1)

#### *Mounted cameras (1)*

- Downplay the importance of using the side view mirrors while backing (1)

#### *Sleeper berths (1)*

- Not conducive to sleeping (1)

*Speed governors (1)*

- Forces speed variation to exist between trucks and cars (1)

*Tailgates (operating these can cause finger injuries) (1)*

*Underride guard (ICC bar) (1)*

- Not effective for preventing underride by other car drivers (1)

#### **1.4.2. Vehicle Inspection/Maintenance (13)**

*Poorly maintained equipment (9)*

- Dirty windshield (3)
  - ◆ No washer fluid (1)
  - ◆ Cannot see a dark area during a sunny day through dirty windshield (1)
  - ◆ Broken washer fluid pump (poor visibility from the dirty windshield) (1)
- Company failing to fix equipment on the trucks in their fleet (2)
- Driving vehicles with poorly maintained equipment (not further specified) (1)
- “Hot seating” (truck that is used by multiple drivers) wears heavily on equipment (1)
- Broken tail lights (1)
- Broken rollers and hinges on the roll doors (1)

*Neglecting to adjust brakes (3)*

- Reducing their autonomy (they don’t want to wait for someone to do it when they could do it themselves) (2)
- Lack of enforcement (management does not enforce their maintenance responsibilities) (1)

*Neglecting to do the inspection (1)*

#### **1.4.3. Other Equipment (5)**

*Safety clothing/devices (4)*

- Lifting belts are not worn (3)
  - ◆ Uncomfortable (2)
  - ◆ Weakens the back muscles (1)
- Most drivers don’t wear hard hats (1)

*Work-related equipment (1)*

- Backhoes can cause back and finger injuries when replacing the bucket attachment (1)

## 1.5. LACK OF EDUCATION/TRAINING/EXPERIENCE (57)

### 1.5.1. Lack of Education for Passenger Car Drivers or Non-Professional Truck Drivers (34)

#### *Unaware of a truck's limitations/needs (16)*

- Not aware that trucks cannot stop on a dime (need longer stopping distances) (9)
- Not aware that trucks need more than one lane to make a wide turn (2)
- Not aware of a truck's limitations/needs (not further specified) (1)
- Not knowing that a truck's maximum speed is 65 mph (1)
- Do not know that trucks cannot accelerate like a car (1)
- Do not know that trucks cannot make quick maneuvers (1)
- Not aware of a truck driver's blind spot areas (which varies from truck to truck) (1)

#### *Uneducated on trucks/interacting with trucks (not further specified) (9)*

#### *Misinterpreting truck driver signals (6)*

- Do not know that 4-way flashers mean a truck is in reverse gear (3)
- Do not know that flashing signals mean a truck is proceeding through a narrow road passage (1)
- Misinterpret the creating of a safety zone by the truck driver as an invitation to come over (1)
- Misunderstanding signs/markings on the trailer (i.e., "Wide turn" or blind spot signs) (1)

#### *Other (3)*

- Not required to answer truck-related questions on the driver's license test (1)
- Defensive driving is not required for drivers of light vehicles (1)
- Operating a large vehicle they have not been trained to drive (e.g., U-haul) (1)

### 1.5.2. Inadequate Training/Education for L/SH Drivers (11)

#### *Lack of specialized training (4)*

- Techniques on the best way to load and unload a truck are not provided (1)
- Drivers do not receive instruction for backing techniques (a difficult maneuver) (1)
- Construction drivers do not receive special training (1)
- There are no courses on blind spot awareness and techniques for dealing with them (1)

#### *Other (4)*

- Length of training/education is too short (2)
- Illiteracy (unable to read instructions at docks) (1)
- Low standards for obtaining a CDL produce unqualified drivers (1)

#### *On-the-job training (3)*

- Companies do not provide regular defensive driving courses (2)
- Road tests are not required for new drivers (CDL is sufficient) (1)

**1.5.3. Lack of Experience (L/SH Driver) (10)**

*Characteristics of inexperienced drivers (6)*

- Have false confidence (4)
- Do not use their peripheral vision (1)
- Drive irresponsibly (1)

*Unfamiliarity (2)*

- Not accustomed to driving a truck (1)
- Unfamiliar with a new route (1)

*Other (2)*

- Shortage of experienced/quality drivers (2)

**1.5.4. Lack of Experience for Passenger Car Drivers (2)**

*Insufficient driving experience to handle weekend driving (1)*

- Disproportionately more miles driven on the weekends than during the week (1)

*Other (1)*

- Young drivers (1)

1.6. INATTENTION/CARELESSNESS/POOR COMMUNICATION (L/SH DRIVERS) (48)

**1.6.1. Inattention (23)**

*Other (9)*

- Unaware of objects and people in surroundings (pedestrians, other workers, other drivers, doors) (4)
- Familiarity with environment breeds inattention to new objects in the environment (2)
- Not using mirrors as often as one should (1)
- Sensory overload from too many signs on the road (many are ignored) (1)
- Feeling rushed (1)

*Inattentive (not further specified) (7)*

*Attending to an object inside the vehicle (4)*

- Retrieving a fallen radio (1)
- Reading a bill pertaining to the next few stops (1)
- Operating Qualcomm (a computer/satellite/digital link) while driving (1)
- Printing tickets using the on-board computers while driving (1)

*Mental distractions (3)*

- Mentally preoccupied with other things (thinking/planning ahead) (2)
- Daydreaming (1)

**1.6.2. Carelessness (17)**

*Improper execution (8)*

- Improperly loading cargo (results in the load shifting and ramming into the trailer from sudden braking) (2)
- Insufficiently secured hand cart or load (2)
- Improperly entering/exiting the truck – falling accident (1)
- Dropping a case on a hand cart so that it flips up and strikes the head (1)
- Dropping valves on the fingers while manually transporting them (1)
- Improperly lifting freight (1)

*Time pressures (4)*

- Hurried driving in loading areas (2)
- Hurrying to load/unload truck and being unfamiliar with the truck (not related to pay structure) (1)
- Neglecting to set the brake lock (personal injury-fatality) (1)

*Other (3)*

- Complacency (becoming too relaxed and not being vigilant) (2)
  - ◆ Complacency (not further specified) (1)
  - ◆ Due to mental/work underload conditions (1)
- Poor habits (not taking time to make sure everything is done correctly) (1)

*Carelessness (not further specified) (2)*

**1.6.3. Poor Communication (8)**

*Not letting the driver know when worker is about to move behind the truck (2)*

*Companies do not communicate all of the rules to their drivers (2)*

*Lack of communication between truck drivers on the road (2)*

*Drivers not monitoring the CB radio during poor weather conditions (2)*

## 1.7. OTHER (19)

### 1.7.1. Pay Structure (Time Pressures) (9)

*Pay-per-load system (5)*

- Speeding (trying to do as many loads per shift as possible) (5)

*Salary and percentage-pay system (3)*

- Hurrying to load/unload (causing falls/personal injury) (2)
- Speeding (1)

*Mileage-based pay (1)*

- Speeding (1)

### 1.7.2. Physical Labor (7)

- Loading/Unloading (7)
  - ◆ Broken fingers (1)
  - ◆ Sliced open hands (1)
  - ◆ Back injuries (1)
  - ◆ Carbon monoxide poisoning (1)
  - ◆ Crushed foot (1)
  - ◆ Leg laceration from metal wire (1)
  - ◆ Using improper equipment to pull pallets (1)

### 1.7.3. Past Deregulation Caused Safety Problems (2)

### 1.7.4. Frequency of Task/Maneuver (1)

*Performing a task or maneuver more frequently leads to a higher likelihood for having an accident (1)*

## 1.8. WEATHER PROBLEMS (13)

### 1.8.1. Weather in General (5)

*Weather (not further specified) (4)*

*Poor weather (1)*

- *Slipping on the stairs while moving cargo (1)*

### 1.8.2. Snow/Ice/Cold (3)

*Braking on icy roads leads to jack-knifing (1)*

*Sheet of ice can form on the floor of the truck causing falls (1)*

*Unloading the unfrozen portion of a load can cause a weight imbalance (truck may tip over) (1)*

### 1.8.3. Wind (2)

*Blowing off large cargo (1)*

*Can be strong enough to push the trailer (1)*

### 1.8.4. Rain (2)

*Reduces road traction (oil on the road) (2)*

### 1.8.5. Good Weather (1)

*Drivers (car and truck) tend to speed more during good weather (i.e., summer) (1)*

## APPENDIX B-2 – DETAILED ANALYSIS OF FATIGUE, SAFETY-RELATED ISSUES

### Detailed Analysis of Category A.2

## A. SAFETY-RELATED ISSUES (CAUSAL FACTORS OF ACCIDENTS AND NEAR-MISSES) (814)

### 2. FATIGUE: CAUSE FACTORS OF FATIGUE THAT NEGATIVELY IMPACT SAFETY (139)

#### 2.0.1. Working Hours (23)

##### *Long hours (16)*

- Long work hours (8+ hours per day) (11)
- Working 2 jobs (3)
- 6-day work week (1)
- 4-day work week causes longer workdays (1)

##### *Odd hours (7)*

- Irregular hours (odd shifts) (5)
- Adjusting between normal hours on weekends and night shift hours during the weekday (1)
- Shift work (1)

#### 2.0.2. Time of Day/Week (21)

##### *Time of shift (10)*

- At the end of a shift (5)
- During the commute home (3)
- At the beginning of a shift (2)

##### *Time of day (9)*

- Driving at night (4)
- Working early in the morning (3)
- Driving during the night-to-dawn period (2)

##### *Time of week (2)*

- At the end of the work week (2)

#### 2.0.3. Stressors (leading to fatigue) (20)

##### *Frustration (10)*

- Frustration (not further specified) (2)
- Interacting with other drivers (2)
- Waiting to load/unload (not related to pay structure) (2)
- Dealing with heavy traffic (2)
- Maneuvering truck into poorly designed loading docks (1)
- Getting behind schedule (1)

##### *Disruption in routine (4)*

- Starting a new job (2)
- Driving an unfamiliar route (2)

*Hard day at work (4)*

*Poor working relationships (2)*

- Poor working relationships (not further specified) (1)
- Being reproached by management (1)

*Pressures (2)*

- Speed governors increase travel time (1)
- Pressure to “perform” (to haul under any conditions) (1)

#### **2.0.4. Lack of Rest or Sleep/Personal Life (18)**

*Lack of rest/sleep (15)*

- Not getting enough sleep (7)
- Partying the night before (4)
- Being sick (2)
- Loss of sleep due to sick family member (1)
- Spending the “day off” doing house chores (don’t feel rested) (1)

*Personal life (3)*

- Difficulty in balancing work and personal life (3)

#### **2.0.5. Weather Conditions (that lead to fatigue) (16)**

*Heat (15)*

- Heat (not further specified) (6)
- Lack of air conditioning in the truck (6)
- Alternating between the cold (the truck) and warm (outdoors) temperature (2)
- Unable to wear shorts in hot weather (1)

*Rain and snow (1)*

#### **2.0.6. Physical Labor (10)**

- Physical labor (not further specified) (5)
- Unloading heavy parcels (1)
- Rolling many cases (1)
- Operating barn doors (1)
- Operating a forklift (1)
- Putting chains on tires during winter (1)

#### **2.0.7. Mealtime (9)**

*Irregular mealtimes (4)*

*Eating lunch (3)*

*Not eating (1)*

*Eating big meals (1)*

#### **2.0.8. Comparison to Long-Haul Drivers (8)**

*More of a problem in the long-haul industry (7)*

*Better rested than long-haul drivers (1)*

#### **2.0.9. Fatigue is Generally a Problem in the L/SH Industry (not further specified) (6)**

### **2.0.10. Inactivity (5)**

- Driving for long stretches (3)
- Taking a long break/Resting (2)

### **2.0.11. Pay Structure (3)**

*Percentage-based pay/pay per load (2)*

- Higher workload (1)
- Working extra hours to earn decent money (1)

*Salary-based (fixed)/non-hourly pay (1)*

- Waiting to be loaded/unloaded means fewer dollars earned per hour (not paid overtime) (1)

## APPENDIX B-3 – DETAILED ANALYSIS OF POTENTIALLY FATIGUE-RELATED, SAFETY-RELATED ISSUES

### Detailed Analysis of Category A.3

## A. SAFETY-RELATED ISSUES (CAUSAL FACTORS OF ACCIDENTS AND NEAR-MISSES) (814)

### 3. POTENTIALLY FATIGUE-RELATED: CAUSAL FACTORS, POTENTIALLY RELATED TO FATIGUE, THAT NEGATIVELY IMPACT SAFETY (103)

#### 3.0.1. Stressors (51)

##### *Time pressure (24)*

- Stress caused by time pressures (not further specified) (12)
- Trying to deliver goods during each store's delivery times/Meeting deadlines (10)
- Waiting (not related to pay structure) (1)
- Trying to accomplish both work responsibilities and personal errands during the day (1)

##### *Poor working relations (9)*

- Crew members (co-workers) are uncooperative and encourage unsafe behavior (7)
- Dispatchers have a poor attitude towards truckers (2)

##### *Other (6)*

- Dealing with heavy traffic (4)
- Weather (not further specified) (1)
- Concentrating on the job all day (1)

##### *Customer relations (4)*

- Poorly treated by customers (3)
- Generally dealing with customers (1)

##### *Concern for personal safety (3)*

- Driving in dangerous areas (3)

##### *Disruption in routine (2)*

- Driving an unfamiliar route (1)
- Change in scheduled route due to unexpected pickup (1)

##### *Stress (not further specified) (2)*

##### *Extraneous tasks (1)*

- Checking their voice mail 3 times a day (1)

#### 3.0.2. Work Schedule (24)

##### *Long work hours (12)*

- Long work hours (not further specified) (7)
- Working 10+ hours to earn decent money (2)
- Working 6 days per week (2)
- Working 2 jobs (1)

*Lack of time to take breaks/lunch (10)*

- Taking breaks/lunch only if or when there is time (not further specified) (8)
- Eating while driving (1)
- Interruptions during mealtime (i.e., being paged) (1)

*Time of day (2)*

- Night driving (1)
- Starting work early in the morning (before 5 a.m.) (1)

### **3.0.3. Physical Labor (16)**

*Frequent lifting (7)*

*Lifting heavy cargo (4)*

*Restacking/shuffling cargo throughout the day (4)*

*Ignoring maximum lifting standards of 300 cases per 8 hours (1)*

### **3.0.4. Pay Structure (10)**

*Salary- and percentage-based pay (5)*

- Work extra hours each day (3)
- Waiting to load/unload means earning less money for the day (2)

*Hourly pay (3)*

- Low hourly pay with unlimited working hours (2)
- Work extra hours with no overtime pay (1)

*Mileage-based pay (1)*

- Drive more miles than the air-miles they are paid to drive (1)

*Pay structure (not further specified) (1)*

### **3.0.5. Regulation/Deregulation (2)**

*Past deregulation lead to bidding for contracts which overworked drivers (1)*

*Regulation that resets the clock after 24 hours will lead to long work hours (1)*

## APPENDIX C

### DESCRIPTION OF FOCUS GROUP PARTICIPANTS PRESENTED IN RANDOM ORDER<sup>3</sup>

#### Participant #1

- Full-time L/SH driver
- Occasionally drives between states
- Occasionally drives outside 100 air-mile radius (once two months)
- Day consists of approximately 50% driving
- Work week is approximately 58 hours
- Works approximately 12 hours per day
- Work day begins at 8:00 AM
- Drives an average of 400 miles per day
- Hauls dry cargo such as paper
- Works for a for-hire company and private company on the side
- Truck driver for 2 years
- L/SH driver for 1 1/2 years
- Holds CDL Class A, Hazmat, Doubles
- Drives tractor-trailer
- Does not drive with a partner
- Duties primarily drop and hook (hands off)
- Job requires minimal lifting of hooking and unhooking trailer
- Breaks taken as needed or as time permits
- Other responsibilities include customer relations

#### Participant #2

- L/SH driver at least half the time
- Does not drive outside home state
- Does not drive outside 100 air-mile radius
- Day consists of more than 50% driving
- Work week is 45-50 hours
- Works about 8 hours per day
- Usually begins work at 7:00 AM
- Drives 50-160 miles per day
- Hauls snack products
- Works for a private delivery company
- Does not drive with a partner
- Truck driver for 2 years
- L/SH driver for 2 years
- Holds a regular driver's license
- Drives a step van
- Other responsibilities include stocking shelves and sales

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<sup>3</sup> When information about a given participant is missing, the information was not available because the participant did not complete the corresponding section of the questionnaire.

- 26 years old

**Participant #3**

- Full-time L/SH driver
- Does not drive outside home state
- Does not drive outside 100 air-mile radius
- Day consists of more than 50% driving
- Work week is 40 hours
- Works 8 hours per day
- Usually begins work at 7:30 AM
- Drives 10-200 miles per day
- Hauls dirt, gravel, broken concrete
- Works for a public utility company
- Does not drive with a partner
- Truck driver for 15 years
- L/SH driver for 15 years
- Holds a CDL Class A, Doubles, Triples, and Hazmat
- Drives a dump truck
- 55 years old
- Other responsibilities include assisting as safety representative to larger group

**Participant #4**

- L/SH driver at least 50% of the time
- Does not drive outside home state
- Drives outside 100 air-mile radius about once a week
- Day consists of about 50% driving
- Work week is 40-50 hours
- Works about 8-10 hours per day, on average
- Usually begins work at noon or 8 to 5; it varies (is a demand driver)
- Drives 75-200 miles per day
- Hauls people and luggage (tour bus driver)
- Works for a bus company charter
- Truck driver for 40 years
- L/SH driver for almost 40 years
- Holds a CDL Class B (air)
- Drives a 40-foot charter bus (holds 47 passengers)
- Occasionally drives with a tour guide
- Loads and unloads luggage when needed
- Other responsibilities include narrating on city trips
- Takes breaks while waiting on the group

**Participant #5**

- Full-time L/SH driver
- Does not drive outside home state
- Does not drive outside 100 air-mile radius
- Day consists of about 50% driving
- Work week is 45-50 hours
- Works about 9 hours per day
- Usually begins work at 4:00 AM
- Drives 50-160 miles per day
- Hauls snack products
- Works for a private delivery company
- Does not drive with a partner
- Truck driver for 9 years
- L/SH driver for 2 years
- Holds a CDL Class A
- Drives a Volvo conventional with a 48 foot trailer
- Other responsibilities include unloading cargo
- 28 years old

**Participant #6**

- Full-time L/SH driver
- Does not drive outside home state
- Does not drive outside 100 air-mile radius
- Entire day consists of driving
- Work week is 40+ hours
- Works 8 hours per day
- Usually begins work at 6:45 AM
- Drives 10-200 miles per day
- Hauls dump truck with tongue & trailer
- Works for a construction company
- Does not drive with a partner
- Truck driver for 4 years
- L/SH driver for 4 years
- Holds a CDL Class A with Hazmat
- Drives a Mack
- 38 years old
- Other responsibilities include operating the front loader on occasion

**Participant #7**

- Full-time L/SH driver
- Does not drive outside home state
- Does not drive outside 100 air-mile radius
- Day consists of about 50% driving
- Work week is 45-53 hours
- Works about 8-12 hours per day
- Usually begins work at 3:30 AM
- Drives 45-180 miles per day
- Hauls chips and dips
- Works for a private delivery company
- Does not drive with a partner
- Truck driver for 18.5 years
- L/SH driver for 18 years
- Holds a CDL with Hazmat, tanker, combination
- Drives a tractor-trailer
- Unloads the truck
- 40 years old
- Other responsibilities include picking up empty carts and cartons and taking them back to the plant

**Participant #8:**

- Full-time L/SH driver
- Occasionally drives between states
- Does not drive outside 100-air mile
- Day consists of approximately 50% driving
- Work week is approximately 54 hours
- Works approximately 11 hours per day
- Work day begins at 7:30 AM
- Drives approximately 100-150 miles per day
- Hauls all commodities
- Works for a private company
- Truck driver for 24 year
- L/SH driver for 15 year
- Holds CDL Class A
- Drives tractor-trailer
- Does not drive with a partner
- Required to load and unload
- Job requires lifting
- Allowed 1/2-hour lunch break
- 50 years old
- Also does dock work

**Participant #9**

- Full-time L/SH driver
- Does not drive outside home state
- Does not drive outside 100 air-mile radius
- Day consists of about 50% driving
- Work week is about 50 hours
- Works about 9 hours per day
- Usually begins work at 4:00 AM
- Drives 45-180 miles per day
- Hauls potato chips
- Works for a private delivery company
- Does not drive with a partner
- Truck driver for 5 years
- L/SH driver for 5 years
- Holds a CDL Class A and Bus license
- Drives a 48-foot single axle truck
- Unloads freight from the truck
- 31 years old
- Other responsibilities include checking contents of the order with security

**Participant #10:**

- Full-time L/SH driver
- Occasionally drives between states
- Does not drive outside 100-air mile
- Day consists of less than 50% driving
- Work week is approximately 53 hours
- Works approximately 10 hours per day
- Work day begins at 8:30 AM
- Drives less than 100 miles per day
- Hauls all commodities
- Works for a private company
- Truck driver for 9 years
- L/SH driver for 3 years
- Holds CDL Class A, Hazmat
- Drives tractor-trailer
- Does not drive with a partner
- Required to load and unload
- Job requires lifting
- Allowed 1/2-hour lunch break
- 33 years old

**Participant #11**

- Full-time L/SH driver
- Does not drive outside home state
- Does not drive outside 100 air-mile radius
- Day consists of more than 50% driving
- Work week is 40 hours
- Works 8 hours per day
- Usually begins work at 7:30 AM
- Drives 10-200 miles per day
- Hauls dirt, gravel, broken concrete
- Works for a public utility company
- Does not drive with a partner
- Truck driver for 3.5 years
- L/SH driver for 3 years
- Holds a CDL Class A for all endorsements
- Drives a dump/boom scoop truck
- 33 years old
- Other responsibilities include operating heavy equipment

**Participant #12**

- Full-time L/SH driver
- Day consists of more than 50% driving
- Works anywhere from 10-15 hours per day
- Usually begins work at 2:00 AM
- Drives about 450 miles per day
- Hauls grocery products
- Does not drive with a partner
- Drives a truck-tractor semi
- Small amount of lifting involved (uses pallet jacks)
- Takes 1 hour break during a 10-hour day plus 15 minutes

**Participant #13**

- Full-time L/SH driver
- Occasionally drives between states
- Does not drive outside 100 air-mile radius
- Day consists of about 50% driving
- Work week is 50 hours
- Works about 10 hours per day
- Usually begins work at 3:00 AM
- Drives 45-180 miles per day
- Hauls chips, cardboard, carts
- Works for a private delivery company
- Does not drive with a partner
- Truck driver for 15 years
- L/SH driver for 4 years
- Holds a CDL Class A
- Drives a Ford tractor
- 31 years old
- Other responsibilities include checking in product, and organizing storage areas

**Participant #14:**

- Full-time L/SH driver
- Does not drive outside home state
- Does not drive outside 100-air mile
- Day consists of less than 50% driving
- Work week is approximately 52 hours
- Works approximately 11 hours per day
- Work day begins at 8:30 AM
- Drives less than 100 miles per day
- Hauls all commodities
- Works for a private company
- Truck driver for 2 1/2 years
- L/SH driver for 2 1/2 years
- Holds CDL, Hazmat
- Drives tractor-trailer and straight trucks
- Does not drive with a partner
- Required to load and unload
- Job requires lifting
- Allowed 1/2-hour lunch break
- 35 years old
- Also does dock work

**Participant #15**

- L/SH driver at least half the time
- Does not drive outside home state
- Does not drive outside 100 air-mile radius
- Day consists of more than 50% driving
- Work week is 50-60 hours
- Works about 10 hours per day
- Usually begins work at 3:30 AM
- Drives 50-160 miles per day
- Hauls snack products
- Works for a private delivery company
- Does not drive with a partner
- Truck driver for 15 years
- L/SH driver for 15 years
- Holds a CDL
- Drives an 18-wheeler
- Other responsibilities include unloading and checking in products
- 47 years old

**Participant #16**

- Full-time L/SH driver
- Occasionally drives outside home state
- Does not drive outside 100 air-mile radius
- Day consists of about 50% driving
- Work week is 45-50 hours
- Works about 9 hours per day
- Usually begins work at 4:00 AM
- Drives 45-180 miles per day
- Hauls potato chips
- Works for a private delivery company
- Does not drive with a partner
- Truck driver for 21 years
- L/SH driver for 6 years
- Holds a CDL Class A with Hazmat
- Drives a tractor-trailer
- Unloads the truck
- 55 years old
- Other responsibilities include picking up empty carts

**Participant #17**

- Full-time L/SH driver
- Does not drive outside home state
- Does not drive outside 100 air-mile radius
- Day consists of approximately 50% driving
- Work week is 45 hours
- Works approximately 9 hours per day, on average
- Work day begins at 9:00 AM
- Drives approximately 50-200 miles per day
- Hauls general commodities
- Works for an independent trucking company
- Truck driver for 8 years
- L/SH driver for 6 years
- Holds CDL for triples, Hazmat, and tankers
- Drives tractor-trailer; doubles
- Does not drive with a partner
- Loads and unloads products occasionally
- Lifting involved
- Allowed 2 breaks plus lunch
- Other responsibilities include dock work
- 33 years old

**Participant #18**

- Full-time L/SH driver
- Drives between states
- Always drives outside 100 air-mile radius
- Day consists of approximately 50% driving
- Work week is approximately 60 hours
- Works approximately 11-12 hours per day
- Work day begins at 3:00 AM
- Drives approximately 370 miles per day
- Hauls chemical lime, coal
- Works for a private delivery company
- Truck driver for 18 years
- L/SH driver for 14 years
- Holds CDL and all endorsements except school, passenger
- Drives tractor-trailer
- Does not drive with a partner
- Loads and unloads product (using blower)
- Job does not require lifting
- Breaks taken as needed or as time permits
- Other responsibilities include customer relations

**Participant #19**

- Full-time L/SH driver
- Does not drive outside home state
- Does not drive outside 100 air-mile radius
- Day consists of less than 50% driving
- Work week is 68 hours
- Works approximately 12 hours per day
- Work day begins at 5:00 AM
- Drives approximately 10-60 miles per day
- Hauls beer
- Works for a private delivery company
- Truck driver for 8 years
- L/SH driver for 8 years
- Holds CDL Class A
- Drives tractor-trailer
- Does not drive with a partner
- Unloads product
- Lifting involved
- Does not drive with partner
- 30 years old
- “Driver/Salesman”

**Participant #20**

- Full-time L/SH driver
- Drives between states
- Drives outside 100 air-mile radius
- Day consists of approximately 50% driving
- Work week is 65 hours
- On the road for approximately 14 hours per day
- Work day begins at 4:00 PM
- Drives an average of 425 miles per day
- Hauls pizza products
- Works for a private delivery company
- Truck driver for 20 years
- L/SH driver for 15 years
- Holds CDL Class A, Hazmat, Passenger
- Drives tractor-trailer
- Drives with a partner
- Unloads product
- Lifting involved
- Shares driving and other duties with partner
- 41 years old

**Participant #21**

- Full-time L/SH driver
- Does not drive outside home state
- Does not drive outside 100 air-mile radius
- Day consists of about 50% driving
- Work week is 30 hours
- Works about 8 hours per day
- Usually begins work at 4:00 AM
- Drives 50-160 miles per day
- Hauls snack products
- Works for a private delivery company
- Does not drive with a partner
- Truck driver for 11 years
- L/SH driver for 11 years
- Holds a CDL Class A
- Drives a single axle cab with 48 foot trailer
- Other responsibilities include loading and unloading, and delivery and pickup
- 32 years old

**Participant #22**

- Full-time L/SH driver
- Does not drive outside home state
- Does not drive outside 100 air-mile radius
- Day consists of approximately 50% driving
- Work week is 50-60 hours
- Works approximately 12 hours per day
- Work day begins at 5:00 AM
- Drives approximately 10-60 miles per day
- Hauls beer
- Works for a private delivery company
- Truck driver for 3 years
- L/SH driver for 3 years
- Holds CDL Class A
- Drives tractor-trailer
- Does not drive with a partner
- Unloads product
- Lifting involved
- Does not drive with partner
- 24 years old
- "Driver/Salesman"

**Participant #23**

- Full-time L/SH driver
- Does not drive outside home state
- Does not drive outside 100 air-mile radius
- Day consists of about 50% driving
- Work week is 40+ hours
- Works 8 hours per day
- Usually begins work at 7:30 AM
- Drives 10-200 miles per day
- Hauls dirt
- Works for a public utility company
- Does not drive with a partner
- Truck driver for 7 years
- L/SH driver for 7 years
- Holds a CDL (all)
- Drives a dump truck with tilt trailer and hydalift
- 31 years old
- Other responsibilities include operating a crane, backhoe, and loader; flagging; assisting ditch crews

**Participant #24**

- Full-time L/SH driver
- Does not drive outside home state
- Does not drive outside 100 air-mile radius
- Day consists of less than 50% driving
- Work week is 55-60 hours
- Works about 12 hours per day
- Usually begins work at 4:30 AM
- Drives 45-180 miles per day
- Hauls potato chips
- Works for a private delivery company
- Does not drive with a partner
- Truck driver for 4 years
- L/SH driver for 2 years
- Holds a regular driver's license
- Drives a box van
- Other responsibilities include making orders and stocking store shelves
- 27 years old

**Participant #25**

- L/SH driver at least 50% of the time
- Drives between states
- Drives outside 100 air-mile radius
- Day consists of approximately 50% driving
- Work week is 50-60 hours
- On the road for approximately 18 hours per day
- Work day begins at 3:00 PM
- Drives an average of 400 miles per day
- Hauls pizza products
- Works for a private delivery company
- Truck driver for 15 years
- L/SH driver for 15 years
- Holds CDL Class A
- Drives tractor-trailer
- Drives with a partner
- Unloads product
- Lifting involved
- Shares driving and other duties with partner
- 36 years old

**Participant #26**

- Full-time L/SH driver
- Does not drive outside home state
- Drives outside 100 air-mile radius
- Day consists of less than 50% driving
- Work week is 50-57 hours
- Works about 11 hours per day
- Usually begins work at 3:00 AM
- Drives 50-160 miles per day
- Hauls snack products
- Works for a private delivery company
- Does not drive with a partner
- Truck driver for 1.5 years
- L/SH driver for 1.5 years
- Holds a CDL Classes A,H,N,T and M
- Drives an 18 foot box van
- Other responsibilities include being a salesman and unpacking products
- 25 years old

**Participant #27**

- Full-time L/SH driver
- Drives between states
- Drives outside 100 air-mile radius
- Day consists of more than 50% driving
- Work week is 45 hours
- Works approximately 15 hours every other day (3 days/week)
- Work day begins at 12:00 midnight
- Drives 530 miles return trip
- Hauls produce
- Works for a private delivery company
- Truck driver for 7 years
- L/SH driver for 3 years
- Holds CDL Class A with Hazmat
- Drives tractor-trailer
- Does not drive with a partner
- Assists in unloading and breakdown of pallets
- Job requires some lifting
- Breaks taken as needed

**Participant #28**

- Full-time L/SH driver
- Occasionally drives between states
- Occasionally drives outside 100 air-mile radius (once every week or two weeks)
- Day consists of approximately 50% driving
- Work week is approximately 45 hours
- Works approximately 8-9 hours per day
- Work day begins at 9:30 AM
- Drives approximately 150 miles per day
- Is a LTL common carrier hauling all commodities
- Works for a for-hire company
- Truck driver for 14 years
- L/SH driver for 14 years
- Holds CDL and all endorsements
- Drives tractor-trailer; doubles
- Does not drive with a partner
- Assists in unloading
- Job requires lifting (moving freight using pallet jack and hand truck)
- Breaks taken as needed or as time permits
- Other responsibilities include customer relations

**Participant #29**

- Full-time L/SH driver
- Does not drive outside home state
- Does not drive outside 100 air-mile radius
- Day consists of approximately 50% driving
- Work week is 65 hours
- Works approximately 13.5 hours per day
- Work day begins at 4:00 AM
- Drives approximately 10-60 miles per day
- Hauls beer
- Works for a private delivery company
- Truck driver for 2 years
- L/SH driver for 2 years
- Holds CDL Class A
- Drives tractor-trailer
- Does not drive with a partner
- Unloads product
- Lifting involved
- Does not drive with partner
- 25 years old
- “Driver/Salesman”

**Participant #30**

- Full-time L/SH driver
- Drives between states
- Drives outside 100 air-mile radius
- Day consists of about 50% driving
- Work week is 50 hours
- Works 10-12 hours per day
- Usually begins work at 7:00 AM
- Drives 150-300 miles per day
- Hauls heavy equipment
- Works for an independent trucking company
- Does not drive with a partner
- Truck driver for 20 years
- L/SH driver for 5 years
- Holds a CDL Class A with Hazmat and for Tanker
- Drives a 7-axle with lowboy
- Other responsibilities include operating equipment and labor
- 47 years old

**Participant #31**

- Full-time L/SH driver
- Drives between states
- Does not drive outside 100 air-mile radius
- Day consists of less than 50% driving
- Work week is 50 hours
- Works about 10 hours per day
- Usually begins work at 4:00 AM
- Drives 45-180 miles per day
- Hauls potato chips
- Works for a private delivery company
- Does not drive with a partner
- Truck driver for 22 years
- L/SH driver for 22 years
- Holds a CDL Class A
- Drives a tractor-trailer
- Other responsibilities include delivering and unloading
- 49 years old

**Participant #32**

- Full-time L/SH driver
- Occasionally drives between states
- Drives outside 100 air-mile radius once or twice a year
- Day consists of about 50% driving
- Work week is 40-45 in the summer; 65 in the winter
- Works 9 hours per day
- Usually begins work at 7:00 AM
- Drives 100-500 miles per day
- Hauls construction materials and equipment
- Works for a construction company
- Does not drive with a partner
- Truck driver for 25 years
- L/SH driver for 25 years
- Holds a CDL Class A with X endorsement
- Drives a flatbed dump truck or tractor with lowboy trailer
- Other responsibilities include being an equipment operator, purchasing supplies and providing supervision
- 52 years old

**Participant #33:**

- Full-time L/SH driver
- Drives between states
- Drives outside 100-air mile
- Day consists of approximately 50% driving
- Work week is approximately 55 hours
- Works approximately 11 hours per day
- Work day begins at 7:00 AM
- Drives approximately 100-150 miles per day
- Hauls all commodities
- Works for a private company
- Truck driver for 28 years
- L/SH driver for 20 years
- Holds CDL, TX, Hazmat
- Drives tractor-trailer
- Does not drive with a partner
- Required to load and unload
- Job requires lifting
- Allowed 1/2-hour lunch break
- 47 years old

**Participant #34**

- Full-time L/SH driver
- Does not drive outside home state
- Does not drive outside 100 air-mile radius
- Day consists of more than 50% driving
- Work week is 40 hours
- Works 8 hours per day
- Usually begins work at 7:30 AM
- Drives 10-200 miles per day
- Hauls dirt, gravel, broken concrete
- Works for a public utility company
- Does not drive with a partner
- Truck driver for 10 years
- L/SH driver for 6 years
- Holds a CDL Class A
- Drives a dump truck
- 47 years old

**Participant #35**

- Full-time L/SH driver
- Occasionally drives between states
- Never drives outside 100-air mile radius
- Day consists of approximately 50% driving
- Work week is 50 hours
- Works approximately 12 hours per day
- Work day begins at 8:00 AM
- Drives less than 100 miles per day
- Hauls all commodities
- Works for a private company
- Truck driver for 1 year
- L/SH driver for 1 year
- Holds CDL with Hazmat
- Drives straight truck
- Does not drive with a partner
- Required to load and unload
- Job requires lifting
- Allowed 1/2-hour lunch break
- 39 years old

**Participant #36**

- Full-time L/SH driver
- Does not drive outside home state
- Does not drive outside 100 air-mile radius
- Day consists of about 50% driving
- Work week is 50-55 hours
- Works about 10 hours per day
- Usually begins work at 5:00 AM
- Drives 50-160 miles per day
- Hauls snack products
- Works for a private delivery company
- Does not drive with a partner
- Truck driver for 6 years
- L/SH driver for 3 years
- Holds a regular driver's license
- Drives an 18 foot step van
- Loading and unloading is part of the job
- Other responsibilities include delivery, unpacking products, servicing stores, and merchandising
- 43 years old

**Participant #37:**

- Full-time L/SH driver
- Occasionally drives between states
- Does not drive outside 100-air mile
- Day consists of approximately 50% driving
- Work week is approximately 53 hours
- Works approximately 11 hours per day
- Work day begins at 7:30 AM
- Drives less than 100 miles per day
- Hauls all commodities
- Works for a private company
- Truck driver for 10 years
- L/SH driver for 10 years
- Holds CDL, Hazmat, doubles and triples
- Drives tractor-trailer
- Does not drive with a partner
- Required to load and unload
- Job requires lifting
- Allowed 1/2-hour lunch break
- 37 years old

**Participant #38**

- Full-time L/SH driver
- Drives between states
- Occasionally drives outside 100-air mile radius (once per month)
- Day consists of approximately 50% driving
- Work week is 48 hours
- Works approximately 12 hours per day
- Work day begins at 8:00 AM
- Drives approximately 100-150 miles per day
- Hauls all commodities, less-than-truckload freight
- Works for a private company
- Truck driver for 10 year
- L/SH driver for 8 year
- Holds CDL Class A, doubles/triple trailers, tank/Hazmat, passenger
- Drives straight truck
- Does not drive with a partner
- Required to load and unload
- Job requires lifting
- Allowed 1/2-hour lunch break
- 39 years old

**Participant #39:**

- Full-time L/SH driver
- Drives between states
- Does not drive outside 100-air mile
- Day consists of approximately 50% driving
- Work week is approximately 50 hours
- Works approximately 10 hours per day
- Work day begins at 8:00 AM
- Drives approximately 50-300 miles per day (driver consensus)
- Hauls all commodities
- Works for a private company
- Truck driver for 14 years
- L/SH driver for 5 years
- Holds CDL Class B
- Drives straight truck
- Does not drive with a partner
- Required to load and unload
- Job requires lifting
- Allowed 1/2-hour lunch break
- 47 years old

**Participant #40**

- Full-time L/SH driver
- Does not drive outside home state
- Does not drive outside 100-air mile radius
- Day consists of more than 50% driving
- Work week is 48-50 hours
- Works approximately 10 hours per day
- Work day begins at 7:30 AM
- Drives approximately 50-300 miles per day (driver consensus)
- Hauls all commodities
- Works for a private company
- Truck driver for 5 years
- L/SH driver for 5 years
- Holds CDL Class B, airbrake, tanker, Hazmat
- Drives straight truck (22 ft)
- Does not drive with a partner
- Required to load and unload
- Job requires lifting
- Allowed 1/2-hour lunch break
- 32 years old

**Participant #41:**

- Full-time L/SH driver
- Occasionally drives between states
- Does not drive outside 100-air mile
- Day consists of less than 50% driving
- Work week is approximately 45 hours
- Works approximately 9 hours per day
- Work day begins at 8:00 AM
- Drives less than 100 miles per day
- Hauls all commodities
- Works for a private company
- Truck driver for 8 years
- L/SH driver for 5 years
- Holds CDL Class A
- Drives tractor-trailer
- Does not drive with a partner
- Required to load and unload
- Job requires lifting
- Allowed 1/2-hour lunch break
- 32 years old

**Participant #42**

- Full-time L/SH driver
- Does not drive outside home state
- Does not drive outside 100 air-mile radius
- Day consists of approximately 50% driving
- Work week is 50 hours
- Works about 10 hours per day
- Begins work at 7:00 or 8:00 AM
- Drives 3-500 miles per day
- Hauls seafood
- Works for a private delivery company (union shop as indicated during focus group)
- Truck driver for 33 years
- L/SH driver for 21 years
- Holds a CDL Class A for all endorsements
- Drives a tractor-trailer
- Does not drive with a partner
- Loads and unloads truck
- Lifting is infrequent (uses a pallet jack)
- 49 years old

**Participant #43**

- Full-time L/SH driver
- Occasionally drives between states
- Does not drive outside 100 air-mile radius
- Day consists of less than 50% driving
- Work week is 50-60 hours
- Works 10-12 hours per day
- Usually begins work at 7:00 AM
- Drives 50-75 miles per day
- Hauls fuel, oil, water, and grease
- Works for a construction company
- Does not drive with a partner
- Truck driver for 10 years
- L/SH driver for 2 years
- Holds a CDL with all endorsements
- Drives a straight truck
- Other responsibilities include flagging, and working around a paver
- 52 years old

**Participant #44**

- Full-time L/SH driver
- Drives between states
- Seldom drives outside 100 air-mile radius
- Day consists of more than 50% driving
- Work week is 20-36 hours (2-3 days per week)
- Works approximately 10-12 hours per day
- Work day begins at 8:00 AM
- Drives an average of 425 miles per day
- Hauls pre-hung doors
- Works for a private delivery company
- Truck driver for 15 years
- L/SH driver for 2 years
- Holds CDL
- Drives tractor-trailer; doubles; straight
- Does not drive with a partner
- Assists in loading and unloading (before heart surgery)
- Job requires some lifting
- Breaks taken as needed or as time permits
- No other responsibilities

**Participant #45**

- Full-time L/SH driver
- Occasionally drives outside home state
- Does not drive outside 100 air-mile radius
- Day consists of less than 50% driving
- Work week is 50 hours
- Works about 10 hours per day
- Usually begins work at 4:00 AM
- Drives 45-180 miles per day
- Hauls potato chips
- Works for a private delivery company
- Does not drive with a partner
- Truck driver for 7 years
- L/SH driver for 7 years
- Holds a CDL with Hazmat, doubles, tanker
- Drives a tractor-trailer
- Unloads products
- 36 years old

**Participant #46**

- Full-time L/SH driver
- Does not drive outside home state
- Does not drive outside 100 air-mile radius
- Day consists of approximately 50% driving
- Work week is 50 hours
- Works approximately 12+ hours per day; hours vary; is on-call (as indicated during the focus group)
- Beginning of work day varies
- Drives approximately 300-400 miles per day
- Hauls air freight (e.g. cherries, computers)
- Works for a union shop
- Truck driver for 10-12 years
- L/SH driver for 10 years
- Holds CDL Class A including Hazmat
- Drives combination truck/tandem
- Does not drive with a partner
- Loads and unloads products occasionally
- No lifting involved
- Other duties include paperwork
- Takes one long break
- Was a shop steward at one time

**Participant #47**

- Full-time L/SH driver
- Drives between states
- Drives outside 100-air mile radius
- Day consists of approximately 50% driving
- Work week is 50 hours
- Works approximately 10 hours per day
- Work day begins at 7:30 AM
- Drives approximately 50-300 miles per day (driver consensus)
- Hauls all commodities
- Works for a private company
- Truck driver for 17 years
- L/SH driver for 10 years
- Holds CDL, with all endorsements (TX)
- Drives tractor-trailer
- Does not drive with a partner
- Required to load and unload
- Job requires lifting
- Allowed 1/2-hour lunch break
- 38 years old

**Participant #48**

- L/SH driver at least 50% of the time
- Does not drive outside home state
- Drives outside 100 air-mile radius
- Day consists of about 50% driving
- Work week is 45 hours
- Works 8.5 hours per day
- Usually begins work at 7:00 AM
- Drives a maximum of 100 miles per day
- Hauls equipment
- Does not drive with a partner
- Truck driver for 10 years
- L/SH driver for 10 years
- Holds a license for a combination truck (& air brakes)
- Drives a flatbed dump truck
- Other responsibilities include being an operator and carpenter
- 33 years old

**Participant #49**

- Full-time L/SH driver
- Occasionally drives outside home state
- Does not drive outside 100 air-mile radius
- Day consists of less than 50% driving
- Works about 9 hours per day
- Usually begins work at 5:00 AM
- Drives 45-180 miles per day
- Hauls snack-related products
- Works for a private delivery company
- Does not drive with a partner
- Truck driver for 40 years
- L/SH driver for 30 years
- Holds a regular driver's license
- Drives a van truck
- Other responsibilities include being a salesman
- 60 years old

**Participant #50**

- Full-time L/SH driver
- Drives between states
- Drives outside 100 air-mile radius on rare occasions
- Day consists of more than 50% driving
- Work week is 50-60 hours
- Works 10 hours per day
- Usually begins work at 7:00 AM
- Drives 250 miles per day
- Hauls stone, sand, and dirt
- Works for an independent trucking company
- Does not drive with a partner
- Truck driver for 2 years
- L/SH driver for 2 years
- Holds a CDL Class B license
- Drives a quad-axle dump truck
- Other responsibilities include training new drivers
- 29 years old

**Participant #51**

- Full-time L/SH driver
- Does not drive outside home state
- Does not drive outside 100 air-mile radius
- Day consists of more than 50% driving
- Work week is 50 hours
- Works about 10 hours per day
- Usually begins work at 3:00 AM
- Drives 45-180 miles per day
- Hauls salty snacks
- Works for a private delivery company
- Does not drive with a partner
- Truck driver for 20 years
- L/SH driver for 20 years
- Holds a CDL Class A
- Drives a tractor-trailer
- Unloads products
- 48 years old
- Other responsibilities include checking in, reloading empty racks and cardboard

**Participant #52**

- Full-time L/SH driver
- Does not drive outside home state
- Does not drive outside 100 air-mile radius
- Day consists of less than 50% driving
- Work week is 45 hours
- Works approximately 10 hours per day
- Work day begins at 4:30 AM
- Drives approximately 10-60 miles per day
- Hauls beer
- Works for a private delivery company
- Truck driver for 6 years
- L/SH driver for 6 years
- Holds CDL Class A
- Drives tractor-trailer
- Unloads product
- Lifting involved
- Does not drive with partner
- 31 years old
- “Driver/Salesman”

**Participant #53**

- Full-time L/SH driver
- Does not drive outside home state
- Does not drive outside 100 air-mile radius
- Day consists of approximately 50% driving
- Work week is 55 hours
- Works approximately 11 hours per day
- Work day begins at 6:00 AM
- Drives approximately 10-60 miles per day
- Hauls beer
- Works for a private delivery company
- Truck driver for 9 years
- L/SH driver for 9 years
- Holds CDL Class A and all endorsements except Hazmat
- Drives tractor-trailer
- Does not drive with a partner
- Unloads product
- Lifting involved
- Does not drive with partner
- 34 years old
- “Driver/Salesman”

**Participant #54**

- Full-time L/SH driver
- Occasionally drives out of state
- Does not drive outside 100 air-mile radius
- Day consists of about 50% driving
- Work week is 50 hours
- Works about 10 hours per day
- Begins work at 7:00 AM
- Drives 50-150 miles per day
- Hauls general freight
- Works primarily for a private delivery company; LTL - less than truck load lot
- Truck driver for 21 years
- L/SH driver for 9 years
- Holds a CDL Class A for all endorsements
- Drives a tractor-trailer (“city van”)
- Does not drive with a partner
- Worked as a yard jockey earlier in his career
- Constant lifting is required (breaks down pallets sometimes)
- Does not eat lunch
- Other responsibilities include being a night hostler; checks brakes
- 39 years old

**Participant #55**

- Full-time L/SH driver
- Does not drive outside home state
- Does not drive outside 100 air-mile radius
- Day consists about 50% driving
- Work week is 40+ hours
- Works 8 hours per day
- Usually begins work at 7:30 AM
- Drives 10-200 miles per day
- Hauls dirt, gravel, broken concrete
- Works for a public utility company
- Does not drive with a partner
- Truck driver for 15 years
- L/SH driver for 15 years
- Holds a CDL Class A
- Drives a Peterbuilt, Kenworth
- 45 years old
- Other responsibilities include operating backhoe and hydalift cranes

**Participant #56**

- Full-time L/SH driver
- Does not drive outside home state
- Does not drive outside 100 air-mile radius
- Day consists of about 50% driving
- Work week is 40+ hours
- Works 8 hours per day
- Usually begins work at 7:30 AM
- Drives 10-200 miles per day
- Hauls dirt, gravel, broken concrete
- Works for a public utility company
- Does not drive with a partner
- Truck driver for almost 18 years
- L/SH driver for 11 years
- Holds a CDL
- Drives a Ryder Kenworth
- 41 years old
- Other responsibilities include operating a backhoe, wheel loaders, fork lifts, and hand tools
- Assists crews in completion of their work

**Participant #57**

- Full-time L/SH driver
- Does not drive outside home state
- Does not drive outside 100 air-mile radius
- Day consists of less than 50% driving
- Work week is approximately 53 hours
- Works approximately 10 hours per day
- Work day begins at 5:30 AM
- Drives approximately 25-100 miles per day
- Is a beer hauler
- Works for a private company
- Truck driver for 7 months
- L/SH driver for 7 months
- Holds CDL Class A and Class B
- Drives tractor-trailer
- Infrequently drives with a partner
- Unloads beer at stores and merchandises
- Job requires lifting (moving beer cases using dolly)
- Breaks taken as needed or as time permits
- Primary responsibility is merchandising and customer relations

**Participant #58**

- Full-time L/SH driver
- Does not drive outside home state
- Does not drive outside 100 air-mile radius
- Day consists of about 50% driving
- Work week is 45-50 hours
- Works about 10 hours per day
- Usually begins work at 5:00 AM
- Drives 45-180 miles per day
- Hauls potato chips
- Works for a private delivery company
- Does not drive with a partner
- Truck driver for 2 years
- L/SH driver for 2 years
- Does not hold a CDL
- Drives a 18-footer
- Loads the truck
- 24 years old

**Participant #59**

- Full-time L/SH driver
- Occasionally drives between states
- Drives outside 100 air-mile radius once a week
- Day consists of less than 50% driving
- Work week is 40 hours
- Works 11 hours per day
- Usually begins work at 7:30 AM
- Drives 150-160 miles per day
- Hauls clam buckets, concrete buckets, and bridge building material
- Works for a private delivery company
- Does not drive with a partner
- Truck driver for 13 years
- L/SH driver for 13 years
- Holds a CDL Class B
- Drives a flatbed and boom truck
- Other responsibilities include being a construction coordinator
- 43 years old

**Participant #60**

- Full-time L/SH driver
- Does not drive outside home state
- Does not drive outside 100 air-mile radius
- Day consists of more than 50% driving
- Work week is 40 hours
- Works about 8 hours per day, on average
- Begins work at 8:00 AM
- Drives 150+ miles per day
- Hauls truck parts, and general commodities
- Works for a private delivery company
- Truck driver for 2 years
- L/SH driver for 2 years
- Holds a regular driver's license
- Drives a straight/panel truck
- Does not drive with a partner
- Loads and unloads truck
- Lifting required (does not use any tools)
- Allowed lunch plus 2 breaks, but does not take them
- Other responsibilities include working in the warehouse

**Participant #61**

- Full-time L/SH driver
- Occasionally drives between states
- Occasionally drives outside 100-air mile radius (once per month)
- Day consists of more than 50% driving
- Work week is 50 hours
- Works approximately 10 hours per day
- Work day begins at 8:00 AM
- Drives approximately 50-300 miles per day (driver consensus)
- Hauls all commodities, less-than-truckload freight
- Works for a private company
- Truck driver for 6 years
- L/SH driver for 6 years
- Holds CDL Class A, Hazmat, airbrake
- Drives straight truck
- Does not drive with a partner
- Required to load and unload
- Job requires lifting
- Allowed 1/2-hour lunch break
- 45 years old

**Participant #62**

- Full-time L/SH driver
- Does not drive outside home state
- Sometimes drives outside 100 air-mile radius
- Day consists of more than 50% driving
- Work week is 45 hours
- Works about 12 hours per day
- Begins work at either 9:00 AM or 11:00 AM (does shift work)
- Drives approximately 200 miles per day
- Hauls small packages
- Works for a private delivery company
- Truck driver for 2 months
- L/SH driver for 2 months
- Holds a driver's license for vans (no CDL)
- Drives a cargo van
- Does not drive with a partner
- Loads and unloads the truck
- Light lifting is required
- Takes breaks (no mention of lunch)

**Participant #63**

- Full-time L/SH driver
- Does not drive outside home state
- Does not drive outside 100 air-mile radius
- Day consists of approximately 50% driving
- Work week is approximately 52 hours
- Works approximately 12-14 hours per day
- Work day begins at 4:00 AM
- Drives approximately 100 miles per day
- Hauls beer
- Works for a private delivery company
- Truck driver for 20+ years
- L/SH driver for 20+ years
- Holds CDL and all endorsements except tanker and bus
- Drives tractor-trailer
- Does not drive with a partner
- Duties include loading, unloading, preparing trucks
- Job requires lifting (stacking beer on pallets and stocking shelves)
- Breaks taken as needed or as time permits
- Other responsibilities include customer relations

**Participant #64**

- Full-time L/SH driver
- Does not drive outside home state
- Does not drive outside 100 air-mile radius
- Day consists of more than 50% driving
- Work week is approximately 45 hours
- Works approximately 12-15 hours per day
- Work day begins at 9:00 AM
- Drives an average of 350 miles per day
- Hauls liquid chemicals and fertilizer
- Works for a private delivery company
- Truck driver for 4 years
- L/SH driver for 3 years
- Holds CDL Class A, and all endorsements except bus
- Drives tractor-trailer and straight
- Does not drive with a partner
- Duties include unloading, clean-up
- Job requires lifting (shoveling fertilizer)
- No breaks; driving is the break
- No other responsibilities

**Participant #65**

- Full-time L/SH driver
- Drives between states
- Does not drive outside 100 air-mile radius
- Day consists of about 50% driving
- Work week is 50-60 hours
- Works 10-12 hours per day
- Usually begins work at 7:00 AM
- Drives 150-200 miles per day
- Hauls construction equipment
- Works for a construction company
- Does not drive with a partner
- Truck driver for 20 years
- L/SH driver for 17 years
- Holds a CDL Class A with Hazmat, Tankers, Double Trailers
- Drives a tractor with lowboy trailer
- Other responsibilities include assisting crew, operating an asphalt roller or loader
- 42 years old

**Participant #66**

- L/SH driver at least 50% of the time
- Occasionally drives between states
- Does not drive outside 100 air-mile radius
- Day consists of about 50% driving
- Work week is 55 hours
- Works 10-11 hours per day
- Usually begins work at 7:00 AM
- Drives 100-150 miles per day
- Hauls asphalt and stone
- Works for construction company
- Does not drive with a partner
- Truck driver for 15 years
- L/SH driver for 15 years
- Holds a CDL Class A
- Drives a dump truck
- 48 years old

**Participant #67**

- Full-time L/SH driver
- Does not drive outside home state
- Does not drive outside 100 air-mile radius
- Day consists of less than 50% driving
- Work week is approximately 45 hours
- Works approximately 9 hours per day
- Work day begins at 6:00 AM
- Drives approximately 25-100 miles per day
- Is a beer hauler
- Works for a private company
- Truck driver for 7 months
- L/SH driver for 7 months
- Holds CDL Class A with no endorsements
- Drives tractor-trailer; straight
- Infrequently drives with a partner
- Unloads beer at stores and merchandises
- Job requires lifting (moving beer cases using dolly)
- Breaks taken as needed or as time permits
- Primary responsibility is merchandising and customer relations

**Participant #68**

- Full-time L/SH driver
- Does not drive outside home state
- Occasionally drives outside 100 air-mile radius
- Day consists of less than 50% driving
- Work week is approximately 50 hours
- Works approximately 10 hours per day
- Work day begins at 5:00 AM
- Drives approximately 25-100 miles per day
- Is a beer hauler
- Works for a private company
- Truck driver for 2 years
- L/SH driver for 2 years
- Holds CDL Class A
- Drives tractor-trailer
- Infrequently drives with a partner
- Unloads beer at stores and merchandises
- Job requires lifting (moving beer cases using dolly)
- Breaks taken as needed or as time permits
- Primary responsibility is merchandising and customer relations

**Participant #69**

- Full-time L/SH driver
- Occasionally drives outside home state
- Drives outside 100 air-mile radius
- Day consists of approximately 50% driving
- Work week is 40-45 hours
- Works approximately 8-9 hours per day
- Work day begins at 8:00 AM
- Drives an average of 200-425 miles per day
- Hauls chemicals
- Works for a private delivery company
- Truck driver for 6 years
- L/SH driver for 5 years
- Holds CDL Class A, Hazmat, Tanker, Doubles and Triples
- Drives tractor-trailer, combination tanker, and package
- Does not drive with a partner
- Assists in loading and unloading
- Very little lifting
- Breaks taken as needed; typically none taken

**Participant #70**

- L/SH driver at least 50% of the time
- Does not drive outside home state
- Does not drive outside 100 air-mile radius
- Day consists of more than 50% driving
- Work week is 45-48 hours
- Works approximately 9 hours per day
- Work day begins at 9:00 AM
- Drives between 200-550 miles per day
- Hauls general commodities
- Works for a private delivery company
- Truck driver for 10 years
- L/SH driver for 1 year
- Holds CDL Class A, with endorsements
- Drives tractor-trailer; straight
- Does not drive with a partner
- Assists in loading and unloading
- Job requires some lifting
- Breaks taken as needed or as time permits

**Participant #71**

- Full-time L/SH driver
- Does not drive outside home state
- Does not drive outside 100 air-mile radius
- Day consists of less than 50% driving
- Work week is approximately 45 hours
- Works approximately 9 hours per day
- Work day begins at 6:00 AM
- Drives approximately 25-100 miles per day
- Is a beer hauler
- Works for a private company
- Holds CDL Class A
- Drives tractor-trailer (bulk trailer)
- Infrequently drives with a partner
- Unloads beer at stores and merchandises
- Job requires lifting (moving beer cases using dolly)
- Breaks taken as needed or as time permits
- Primary responsibility is merchandising and customer relations

**Participant #72**

- Full-time L/SH driver
- Does not drive outside home state
- Drives outside 100 air-mile radius about once a month
- Day consists of more than 50% driving
- Work week is 40-60 hours
- Works anywhere from 2-15 hours per day
- Usually begins work at 6:00 AM
- Drives 20-300 miles per day
- Hauls building materials (hardware)
- Does not drive with a partner
- Works for a private delivery company
- Truck driver for 17 years
- L/SH driver for 3 years
- Holds a CDL Class A with Hazmat
- Drives a tractor with flatbed
- No lifting is required
- Other responsibilities include operating a forklift and training
- Takes breaks whenever needed (as long as they get the job done)

**Participant #73**

- Full-time L/SH driver
- Does not drive between states
- Does not drive outside 100 air-mile radius
- Day consists of about 50% driving
- Work week is 20-48 hours
- Works anywhere from 8-14 hours per day
- Usually begins work at 7:00 PM (sometimes 3:00 PM); works nightshift
- Drives 20 miles per day
- Hauls concrete
- Works for a private delivery company
- Does not drive with a partner
- Truck driver for 30 years
- L/SH driver for 10 years
- Holds a CDL Class A for all endorsements
- Drives a concrete/straight truck
- Lifting is required
- Breaks are not structured
- Other responsibilities include chipping concrete off trucks

**Participant #74**

- Full-time L/SH driver
- Does not drive outside home state
- Does not drive outside 100 air-mile radius
- Day consists of less than 50% driving
- Work week is approximately 45 hours
- Works approximately 9 hours per day
- Work day begins at 6:00 AM
- Drives approximately 25-100 miles per day
- Is a beer hauler
- Works for a private company
- Holds CDL Class A
- Drives tractor-trailer; straight
- Infrequently drives with a partner
- Unloads beer at stores and merchandises
- Job requires lifting (moving beer cases using dolly)
- Breaks taken as needed or as time permits
- Primary responsibility is merchandising and customer relations

**Participant #75**

- Full-time L/SH driver
- Occasionally drives outside home state
- Drives outside 100 air-mile radius on a rare occasion
- Day consists of about 50% driving
- Work week is 50+ hours
- Works anywhere from 8-14 hours per day
- Usually begins work at 7:00 AM
- Drives 20-300 miles per day
- Hauls general commodities
- Works for a private delivery company
- Does not drive with a partner
- Truck driver for 13-14 years
- L/SH driver for 10 years
- Holds a CDL Class A with all endorsements
- Drives a combination truck (single or double)
- Loads and unloads the truck
- Lifting is required (uses pallet jacks)
- Has no official breaks

**Participant #76:**

- Full-time L/SH driver
- Drives between states
- Drives outside 100-air mile radius
- Day consists of approximately 50% driving
- Work week is approximately 59 hours
- Works approximately 12 hours per day
- Work day begins at 7:00 AM
- Drives approximately 50-300 miles per day (driver consensus)
- Hauls all commodities
- Works for a private company
- Truck driver for 32 years
- L/SH driver for 32 years
- Holds CDL, doubles, tanker, Hazmat
- Drives tractor-trailer
- Does not drive with a partner
- Required to load and unload
- Job requires lifting
- Allowed 1/2-hour lunch break
- 54 years old

**Participant #77:**

- Full-time L/SH driver
- Drives between states
- Does not drive outside 100-air mile
- Day consists of less than 50% driving
- Work week is approximately 50-55 hours
- Works approximately 11 hours per day
- Work day begins at 7:00 AM
- Drives approximately 50-300 miles per day (driver consensus)
- Hauls all commodities
- Works for a private company
- Truck driver for 15 years
- L/SH driver for 15 years
- Holds CDL, all endorsements except school bus
- Drives tractor-trailer
- Does not drive with a partner
- Required to load and unload
- Job requires lifting
- Allowed 1/2-hour lunch break
- 35 years old

**Participant #78**

- Full-time L/SH driver
- Drives between states
- Drives outside 100-air mile radius (1-2 times per week)
- Day consists of approximately 50% driving
- Work week is 50-55 hours
- Works approximately 12 hours per day
- Work day begins at 7:30 AM
- Drives approximately 100-150 miles per day
- Hauls all commodities
- Works for a private company
- Truck driver for 8 years
- L/SH driver for 8 years
- Holds CDL, Class A
- Drives tractor-trailer with 45 ft trailer and twin screw
- Does not drive with a partner
- Required to load and unload
- Job requires lifting
- Allowed 1/2-hour lunch break
- 38 years old

**Participant #79**

- Full-time L/SH driver
- Occasionally drives outside home state
- Occasionally drives outside 100 air-mile radius
- Day consists of about 50% driving
- Work week is 40 hours
- Works anywhere from 8-15 hours per day
- Usually begins work at 6:00 AM
- Drives 200-300 miles per day
- Hauls building materials (metal products)
- Works for a private delivery company
- Does not drive with a partner
- Truck driver for 30 years
- L/SH driver for 10 years
- Holds a CDL Class A for all endorsements
- Drives a singles and straight trucks, but mostly doubles
- Unloads the truck
- Lifting is required (uses forklifts)
- Takes breaks when needed
- Other responsibilities include training other drivers
- Is retired and works part-time
- 64 years old

**Participant #80:**

- Full-time L/SH driver
- Occasionally drives between states
- Drives outside 100-air mile
- Day consists of approximately 50% driving
- Work week is approximately 50-55 hours
- Works approximately 11 hours per day
- Work day begins at 7:00 AM
- Drives approximately 50-300 miles per day (driver consensus)
- Hauls all commodities
- Works for a private company
- Truck driver for 6.5 years
- L/SH driver for 6.5 years
- Holds CDL, Class B, airbrake, tanker, Hazmat
- Drives straight truck (22 ft)
- Does not drive with a partner
- Required to load and unload
- Job requires lifting
- Allowed 1/2-hour lunch break
- 38 years old

**Participant #81:**

- Full-time L/SH driver
- Occasionally drives between states
- Does not drive outside 100-air mile
- Day consists of approximately 50% driving
- Work week is approximately 48-50 hours
- Works approximately 10 hours per day
- Work day begins at 7:30 AM
- Drives approximately 50-300 miles per day (driver consensus)
- Hauls all commodities
- Works for a private company
- Truck driver for 40 years
- L/SH driver for 40 years
- Holds CDL, Class A, TX, tanker, Hazmat
- Drives tractor-trailer
- Does not drive with a partner
- Required to load and unload
- Job requires lifting
- Allowed 1/2-hour lunch break
- 57 years old

**Participant #82:**

- Full-time L/SH driver
- Occasionally drives between states
- Drives outside 100-air mile
- Day consists of approximately 50% driving
- Work week is approximately 50 hours
- Works approximately 10 hours per day
- Work day begins at approximately 8:00 AM
- Drives approximately 50-300 miles per day (driver consensus)
- Hauls all commodities
- Works for a private company
- Truck driver for 10 years
- L/SH driver for 10 years
- Holds CDL, Class A, tanker, Hazmat
- Drives tractor-trailer
- Does not drive with a partner
- Required to load and unload
- Job requires lifting
- Allowed 1/2-hour lunch break
- 40 years old

## APPENDIX D

### LOCAL/SHORT HAUL PROJECT: INTERVIEW GUIDE

#### REMINDERS

- Have participants sign consent forms before beginning focus group session.
- Have participants put their name on all materials generated (e.g., pie chart, questionnaire, etc.)
- Call on participants that do not talk very much so that we get their opinions/feedback as well.

#### STATEMENT OF CONFIDENTIALITY

- We will be tape recording the focus group session.
- Please speak loudly and clearly so that we get a good recording of your comments.
- Information gathered from the discussion will be treated with confidentiality.
- Your name will not be connected in any way to the information collected from the tapes.
- Tapes will be kept in a secure location at Virginia Tech, and access to the tapes will be limited to project researchers only.
- After the tapes have been transcribed, they will be erased.
- Does everyone understand this and feel comfortable with this (if not, explain more and address questions/concerns)?

#### PURPOSE OF THIS STUDY

- General goal of this project is to make L/SH trucking safer.
- Purpose for this focus group is to identify tasks performed by L/SH drivers and to determine how they may affect safety; in addition, we are looking for areas of your job that you like, dislike, would like to change, are safe, and unsafe.
- We are focusing primarily on areas of your job related to driving; however, we are also interested in all tasks that you perform during work.
- We would like to generate “discussion” where you describe your responses in as much detail as possible.

#### FOCUS GROUP QUESTIONS

##### Introductory Questions

- (1) Personal introductions: first names and hobby/activity.
- (2) Job description: show list of areas to cover in description (flip chart).
  - What product(s) do you usually haul?
  - How long is a typical workday?
  - What hours do you normally work?
  - What type of truck(s) do you usually drive (size, transmission type)?
  - Do you normally drive with a partner?
  - How many miles do you usually drive in a day?

- Does your job require lifting? If so, what do you lift (size, weight, etc.)? Are there any tools used to help lift? If so, what are they?
  - How many breaks do you normally have during a shift?
  - Is there anything unique about your job or responsibilities that distinguishes it from others in your company (e.g., are you a supervisor)?
- (3) Work day description and routine outline: generate task list; consolidate into general list.
- (4) Chart job tasks: generate individual pie charts on note pads (flip chart).

### **General Job-Related Critical Incident Questions**

- For the next hour we would like to generate discussion of “accidents” and “close calls” regarding L/SH trucking operations.
  - We would like you to tell us about any “accidents” and/or “close calls” that you know about from your own work experiences.
  - If the event involved you and you don’t want to mention that fact, that’s fine; you can tell the story as if it happened to someone else.
  - We are most interested in “accidents” and “close calls” that are unique to your industry.
  - “Accidents” result in personal injury and/or property damage.
  - “Close calls” could have resulted in personal injury and/or property damage but did not.
  - “Close calls” are also sometimes referred to as “near misses.”
  - Give example of an “accident/close call.”
- (1) Workplace “accidents” both driving and not driving: generate list of types and reasons.
- What happened?
  - How do you think it happened?
  - Why do you think it happened?
  - When did the accident occur (e.g., time of day, length into work shift, etc.)?
  - What was the amount of property damage and/or injuries?
- (2) Complete “accident” types and reasons list: summarize and add additional information.
- (3) Workplace “close calls” both driving and not driving: generate list of types and reasons.
- What happened?
  - How do you think it happened?
  - Why do you think it happened?
  - When did the accident occur (e.g., time of day, length into work shift, etc.)?
  - What was the amount of property damage and/or injuries?
- (4) Complete “close call” types and reasons list: summarize and add additional information.
- (5) Describe and explain “accidents” and/or “close calls” while ON the job: caused by...(Note: generate ranking of issues/problems and frequency of occurrence, if possible).
- Other drivers (e.g., passenger vehicle drivers)?

- Fatigue or being tired?
- Inattention to the roadway or day dreaming while driving?
- Roadway design, layout, or geometry (e.g., narrow street, one-way road, poorly laid out loading dock, sharp corner, etc.)?
- Layout of vehicle controls and/or mirrors
- Vehicle breakdown or poor maintenance of trucks?
- Deadlines, time pressures, and/or stress?

(6) Describe and explain “fatigue” related issues/problems while ON the job: generate ranking of issues/problems and frequency of occurrence, if possible.

### **L/SH Job-Fatigue Information Questions**

- Rich has passed out a set of rating-scale questionnaires to everyone (see end of document).
- For each statement on the questionnaire we want you to indicate, on a scale from 0 to 100, whether you agree or disagree with the statement (see flip chart).
- Please make a tick mark on the scale for the corresponding question on your paper based on how you feel about the statement.
- Give example of how to respond to statements.

### **Final Question**

As you already know, the majority of L/SH drivers perform a variety of tasks besides driving. During the course of a typical work day L/SH drivers may receive the day’s driving schedule, plan the driving route, load the vehicle, enter and exit the vehicle numerous times, lift and carry a variety of packages or goods, and perform many other tasks. However, little is known about these additional tasks may affect driving performance and safety. The purpose for our research is to determine the impact of fatigue and inattention in L/SH operations, and to assess the role of fatigue and inattention in relation to driving performance and safety. In general, it is our goal to make L/SH driving safer.

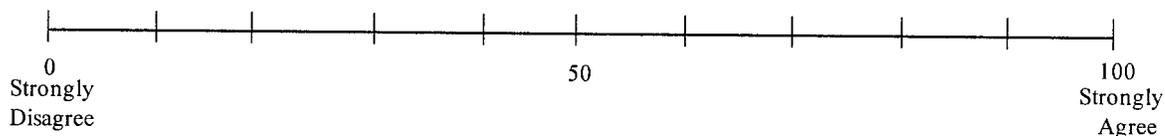
- Based on this project outline and summary, is there anything else you can think of that we have missed that might be important to our project?
- Balancing your needs and the public’s for safety and productivity, what kinds of regulations/policies/procedures/etc. would you recommend for L/SH drivers (or the general driving public)?
- For those drivers with experience driving both over-the-road and local, are there big differences between long-haul and short-haul operations from a safety/fatigue standpoint?

**Thank you for your time and participation. Rich will pay you now.**

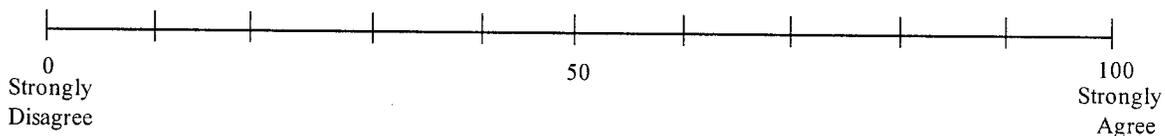
## Local/Short Haul Questionnaire (Focus Group)

Name: \_\_\_\_\_

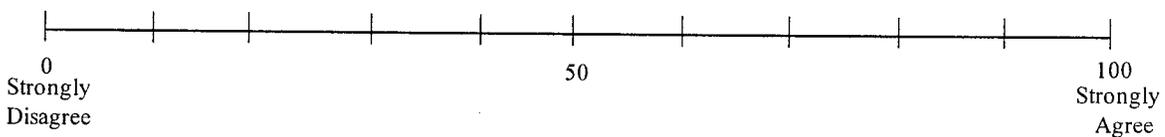
(1) In my job, I do the same thing day after day.



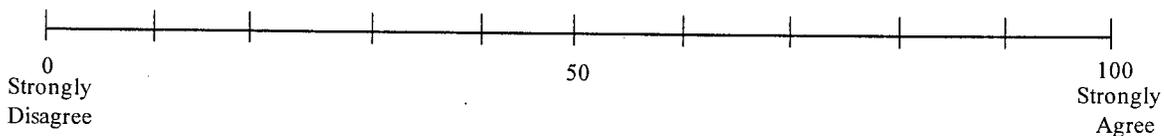
(2) I feel like my job is exciting.



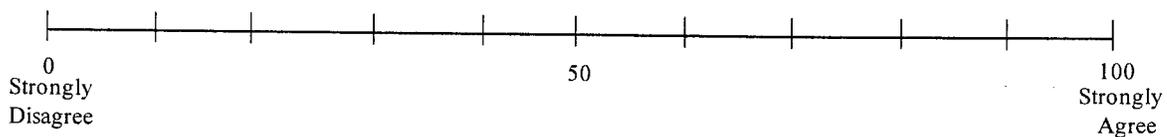
(3) I do too much driving at my job.



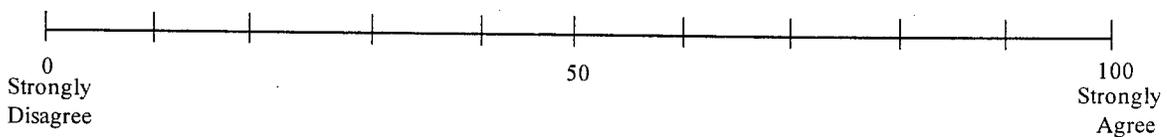
(4) I feel tired when I'm on the job.



(5) My job involves too much physical exertion.



(6) My job involves too much mental exertion.



For the following questions, please write a brief response in the blanks provided under the corresponding questions.

(1) How many hours of sleep do you get per night? \_\_\_\_\_

(2) During what part of a typical work day are you most tired (e.g., when you first start your shift, after lunch-break, at the end of your shift)? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(3) Over the course of a typical work week, how many days would you say you felt sluggish and tired? \_\_\_\_\_

(4) Think of a time when you were driving your truck at work, and you were really tired. What was the reason(s) for you being tired? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(5) Fill in the following statements in the blanks provided:

- The thing I like most about driving my truck at work is... \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

- The thing I dislike most about driving my truck at work is... \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(6) List up to:

- 5 best things about your job.

- 1.
- 2.
- 3.
- 4.
- 5.

- 5 worst things about your job.

- 1.
- 2.
- 3.
- 4.
- 5.

(7) If you could change something about your job, what would it be? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

