LARGE TRUCK CRASH PROFILE: THE 1998 NATIONAL PICTURE

U.S. Department of Transportation

Analysis Division
Federal Motor Carrier Safety Administration

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For More Information:

Information on truck crashes is available from the Federal Motor Carrier Safety Administration (FMCSA), Analysis Division, 400 Seventh Street, S.W., Washington, D.C. 20590, at (202) 366-0324, or from the FMCSA web site at www.fmcsa.dot.gov.

Executive Summary

- In 1998, 4,935 large trucks were involved in **fatal** crashes, an estimated 89,000 were involved in **injury** crashes, and an estimated 318,000 involved in **property-damage-only** crashes.
- Large trucks accounted for 9 percent of all the vehicles involved in **fatal** crashes during the year, 2 percent of the vehicles in **injury** crashes, and 4 percent of the vehicles in **property-damage-only** crashes.
- A total of 5,374 people were killed and an estimated 127,000 were injured in crashes involving at least one large truck. A large percentage of the people killed in the crashes were occupants of the other vehicles involved.
- The crash involvement rate for large trucks in **fatal** crashes (number of vehicles involved per 100 million vehicle miles traveled) was slightly higher than the rate for passenger vehicles. For **injury** crashes, however, the involvement rate for passenger vehicles was more than three times the rate for large trucks.
- Sixty-five percent of the trucks involved in **fatal** crashes, and more than one-half of those involved in **non-fatal** crashes, were tractors pulling single semi-trailers. Three percent of the trucks in **fatal** crashes were doubles, and 0.2 percent were triples. Less than 5 percent of the trucks in **fatal** and **non-fatal** crashes were transporting hazardous materials.
- In two-vehicle **fatal** crashes involving a large truck and a passenger vehicle, 7 percent of the truck drivers were under 26 years old, and 2 percent were over 65. In contrast, 24 percent of the drivers of the passenger vehicles involved were under 26 years old, and 20 percent were over 65.
- In two-vehicle **fatal** crashes involving a large truck and a passenger vehicle, only 0.6 percent of the truck drivers had a blood alcohol concentration (BAC) of 0.10 grams per deciliter or greater, the level for intoxication in most States. In contrast, 14 percent of the drivers of the passenger vehicles involved had a BAC level of 0.10 or greater.
- In two-vehicle **fatal** crashes involving a large truck and a passenger vehicle, driver-related crash factors were coded for 26 percent of the truck drivers involved. In contrast, driver-related crash factors were coded for 82 percent of the passenger vehicle drivers involved.
- A large majority of the **fatal** and **non-fatal** crashes involving large trucks occurred in good weather, on dry road surfaces, during the day, and on weekdays.
- In 79 percent of the **fatal** crashes involving large trucks, the first harmful event was the collision of the truck with another vehicle in transport. In more than two-thirds of the **non-fatal** crashes involving large trucks, the first harmful event was the collision of the truck with another moving vehicle.

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Introduction

This annual edition of the *Large Truck Crash Profile* contains descriptive statistics about fatal and non-fatal (injury and property-damage-only) large truck crashes that occurred in 1998. The profile includes only some of the major aspects of truck crashes and some comparable data on passenger vehicle crashes. Additional crash data for trucks, truck drivers, and motor carriers can be obtained from the Analysis Division, Federal Motor Carrier Safety Administration (FMCSA).

Data Sources

The following are the major sources for data included in this report. Several other sources used sparingly are referred to in the text.

Fatality Analysis Reporting System (FARS). FARS, maintained by the National Highway Traffic Safety Administration (NHTSA), is a census of crashes involving any motor vehicle traveling on a public trafficway, *but only fatal crashes*. FARS is recognized as the most reliable national crash database. According to FARS, 4,935 large trucks were involved in fatal crashes in 1998. A large truck is defined in FARS as a truck with a gross vehicle weight rating (GVWR) of more than 10,000 pounds.

General Estimates System (GES). GES, also maintained by NHTSA, is a probability-based nationally representative sample of all police-reported fatal, injury, and property-damage-only crashes. The data presented from the GES file are national estimates, calculated using an appropriate weighting variable. The GES data cannot be broken down by States, because the crash cases drawn are aimed only at obtaining a valid national sample. Furthermore, because GES is a sample file, estimates are subject to sampling error. According to GES, an estimated 412,000 large trucks were involved in crashes reported to police in 1998. The GES definition of a large truck is the same as the FARS definition.

Motor Carrier Management Information System (MCMIS) Crash File. The MCMIS Crash File, maintained by FMCSA, includes the National Governors' Association (NGA) recommended data elements collected on trucks and buses involved in crashes that meet the NGA recommended threshold. An NGA reportable crash must involve a truck (a vehicle designed, used, or maintained primarily for carrying property that has at least two axles and six tires) or a bus (a vehicle with seats for at least 16 people, including the driver). The crash must result in: at least one fatality; at least one injury for which the person injured is taken to a medical facility for immediate medical attention; or at least one vehicle towed from the scene as a result of disabling crash damage. The crashes are reported by States to FMCSA through the SAFETYNET computer software.

The Crash File is intended to be a census of trucks and buses involved in fatal, injury, and towaway crashes, but some States do not report all NGA-eligible crashes. For 1998, States reported 97,691 trucks involved in crashes through SAFETYNET to the MCMIS Crash File; based on the 1998 GES, an estimated 148,000 trucks involved in crashes should have been reported. Thus, FMCSA received reports on about 66 percent (97,691 out of 148,000) of the trucks involved in 1998 NGA-reportable crashes.

More than one-half of the non-fatal truck crashes in the MCMIS Crash File are injury crashes. In contrast, less than one-fourth of the GES non-fatal truck crashes involved an injury, and more than 75 percent were property-damage-only crashes—many in which no vehicles were towed from the scene. Thus, it can be assumed that the typical GES crash is less severe than the typical MCMIS crash.

Organization of the Report

This *Profile* contains seven sections: Overview and Trends, Vehicles, Drivers, Environment, Crashes, Motor Carriers, and MCMIS Crash File Progress. For the most part, data on trucks and passenger vehicles involved in fatal crashes presented in tables and charts are FARS data. In the few cases where there are no FARS data on a particular variable, the data are taken from fatal crashes in the MCMIS Crash File. Tables on non-fatal crashes include data from MCMIS and GES. Some tables contain only FARS and MCMIS data, when GES data are not available. The level of analysis in most of the tables in the profile is the vehicle. In other words, what is being counted is the number of vehicles involved in crashes, both fatal and non-fatal. The major exception is the driver section, where what is being counted is the number of drivers in each of the various categories.

For FMCSA, the most important questions involving motor carrier crashes are what are the crash problems, why do crashes happen, and how do FMCSA and State programs and activities relate to ameliorating the conditions that lead to crashes. None of the current truck and bus crash databases provides in-depth data on the causes or reasons for truck and bus crashes, although some of the data are suggestive of crash causes. The FMCSA Analysis Division relies on FMCSA field staff and our State partners to suggest ways in which the available data can best be analyzed to support safety efforts in the field. The tables and comments presented in this report are examples of the ways the Analysis Division can examine the existing data.

Neither FARS, GES, nor MCMIS contains information on crash causation or fault. The data can only be suggestive about why truck crashes occur. Even so, the data can point toward problem areas that may need to be addressed and toward possible countermeasures.

Overview and Trends

To put truck crashes in perspective, the following tables and charts compare the crash experience for large trucks with that for other vehicles, in many cases covering 10 years. The data include fatal, injury, and property-damage-only crashes and cover both the vehicles and the people involved.

Large trucks involved in fatal crashes represented 9 percent of all vehicles involved in fatal crashes in 1998 (Table 1). The proportion of large trucks in less severe crashes was appreciably lower: only 2 percent of the vehicles involved in injury crashes and 4 percent of those involved in property-damage-only crashes were large trucks.

Table 1. Motor Vehicles in Crashes, 1998

Crash Severity	Large Trucks	All Vehicles	Percent Large Trucks
Fatal	4,935	56,865	8.7%
Injury	89,000	3,757,000	2.4%
Property Damage Only	318,000	7,587,000	4.2%
Total	**412,000**	**11,401,000**	**3.6%**

Sources: FARS and GES, 1998.

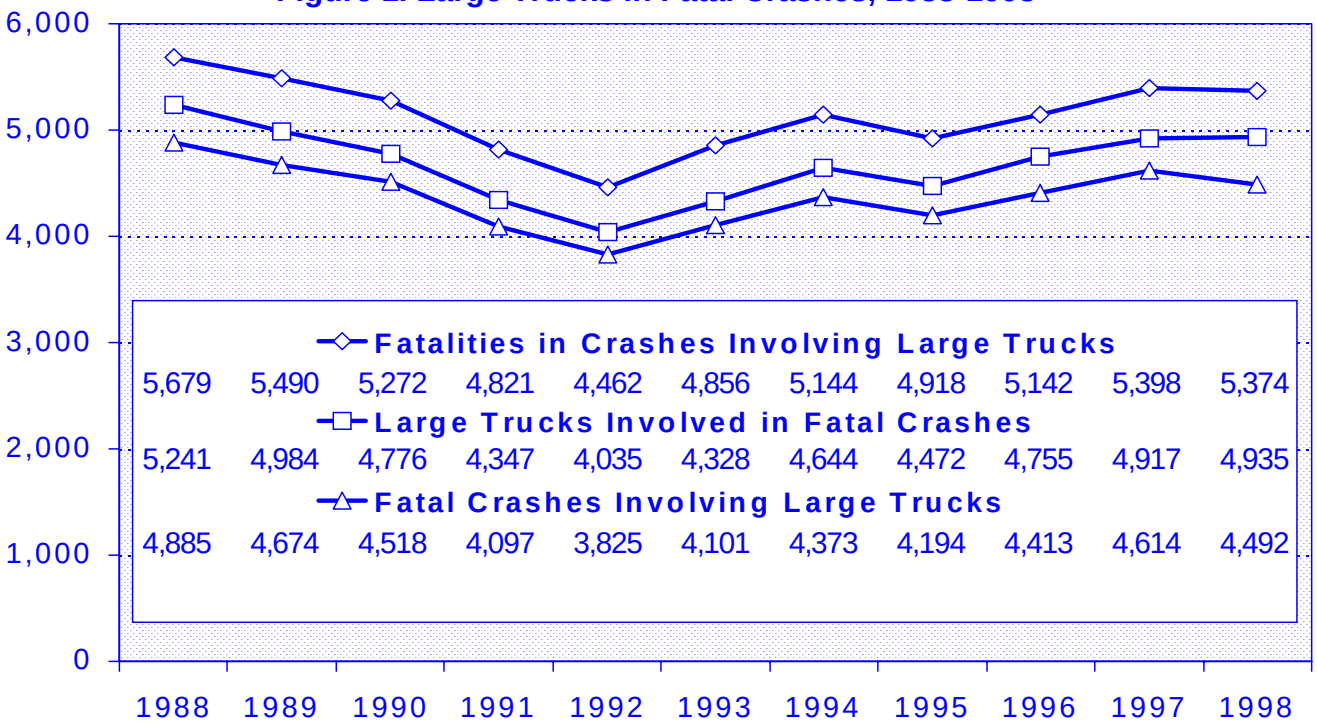
Large Truck Crashes

Data on large truck fatal crashes since 1988 are shown in Figure 1. The lines on the chart represent three ways to measure large truck fatal crash data:

- **Fatalities** in crashes involving large trucks. This number is a count of **people** sustaining fatal injuries in crashes involving large trucks. The number of fatalities is always more than the number of trucks in fatal crashes or the number of fatal crashes, because in some crashes involving large trucks more than one person dies. The fatalities may be occupants of the truck, occupants of the other vehicle, pedestrians, or other nonoccupants.
- **Large trucks** involved in fatal crashes. This number is a count of **vehicles**, which is always smaller than the number of fatalities but larger than the number of fatal crashes involving large trucks. Vehicles are the unit of analysis employed in most tables and charts in this profile.
- **Fatal crashes** involving large trucks. This number is a count of **crashes**. It is always the smallest number, because in some fatal crashes there is more than one large truck involved.

As can be seen in Figure 1, these three numbers are closely related and almost always move in the same direction from year to year. From 1988 to 1992 there was a 4-year decline in all three measures, followed by a 2-year rise to 1994. After a 1-year drop, the three numbers rose again through 1997. From 1997 to 1998 the number of fatalities fell slightly (down 24), and the number of fatal crashes involving large trucks dropped by 53; however, the number of large trucks involved in fatal crashes rose by 18. For all three numbers, the changes from 1997 to 1998 were less than 1 percent.

Figure 1. Large Trucks in Fatal Crashes, 1988-1998



Source: FARS, 1988-1998.

During the 1988-1998 period the estimated number of large trucks involved in injury and property-damage-only crashes did not steadily increase or decrease (Table 2). The number of large trucks in injury crashes reached a high point in 1989 and low point in 1991. The number involved in property-damage-only crashes reached a low in 1991 and a high 3 years later in 1994.

Table 2. Large Trucks Involved in Non-Fatal Crashes, 1988-1998

Year	Injury Crashes	Property-Damage-Only Crashes
1988	96,000	297,000
1989	110,000	300,000
1990	107,000	273,000
1991	78,000	248,000
1992	95,000	277,000
1993	97,000	296,000
1994	95,000	360,000
1995	84,000	289,000
1996	94,000	296,000
1997	97,000	342,000
1998	89,000	318,000

Source: GES, 1988-1998.

Unlike the fatal crash numbers, which change relatively slowly from year to year, the injury and property-damage-only numbers show large changes in some cases. For example, the biggest year-to-year change in the number of trucks involved in fatal crashes was a 9-percent decline from 1990 to 1991. In the two other categories, the largest changes were a 27-percent drop in the number of trucks involved in injury crashes from 1990 to 1991 and a 21-percent rise in the number involved in property-damage-only crashes from 1993 to 1994. Some of the large year-to-year changes in the GES injury estimates may be due to sampling variation. The general trend in injury crashes has been down, while the trend in property-damage-only crashes has been up.

People Killed and Injured in Large Truck Crashes

The following tables show the trends in numbers of people killed and injured in crashes involving at least one large truck. Fatalities in crashes involving at least one large truck increased by 9 percent between 1995 and 1998 (Table 3); however, the 1998 number of 5,374 represents only 13 percent of the total deaths in motor vehicle traffic crashes during the year. The number of people injured in crashes involving large trucks was 6,000 fewer in 1998 than in 1997 (127,000 versus 133,000). For 3 of the past 6 years the GES estimate of people injured in large truck crashes is 133,000. The decline from 1997 to 1998 may reflect a downward trend in injuries, or the 1-year drop may be an artifact of the 1998 GES crash sample.

Table 3. Fatalities and Persons Injured in Large Truck Crashes, 1988-1998

Year	Fatalities	Injuries
1988	5,679	130,000
1989	5,490	156,000
1990	5,272	150,000
1991	4,821	110,000
1992	4,462	138,000
1993	4,849	133,000
1994	5,144	133,000
1995	4,918	117,000
1996	5,142	130,000
1997	5,398	133,000
1998	5,374	127,000

Sources: FARS, 1988-1998; GES, 1988-1998.

Most commercial trucks involved in crashes have a GVWR over 26,000 pounds. All passenger vehicles have a GVWR under 10,000 pounds, and usually they are under 5,000 pounds GVWR. Thus, it is not surprising that when large trucks and passenger vehicles collide, the occupants of the passenger vehicle are more likely to suffer injuries (Table 4).

Table 4. Location of Victims of Large Truck Crashes, 1998

Victim Type	Total Number	Percent Large Truck Occupants	Percent Other Vehicle Occupants	Percent Nonoccupants
Killed	**5,374**	13.5%	78.4%	8.1%
Injured	**123,000**	22.6%	75.8%	1.5%

Sources: FARS and GES, 1998.

In fatal crashes involving large trucks, the occupants of the other vehicles—usually the drivers—accounted for more than three-fourths of the fatalities (78 percent). Truck occupants accounted for only 14 percent of the fatalities, and the other 8 percent were pedestrians or bicyclists. In injury crashes the pattern is the same, but not quite as pronounced: other vehicle occupants accounted for three-fourths of the injured victims (76 percent), and truck drivers accounted for less than one-fourth (23 percent). The largest difference is seen for nonoccupants, who accounted for 8.1 percent of those killed in crashes involving large trucks but only 1.5 percent of those injured.

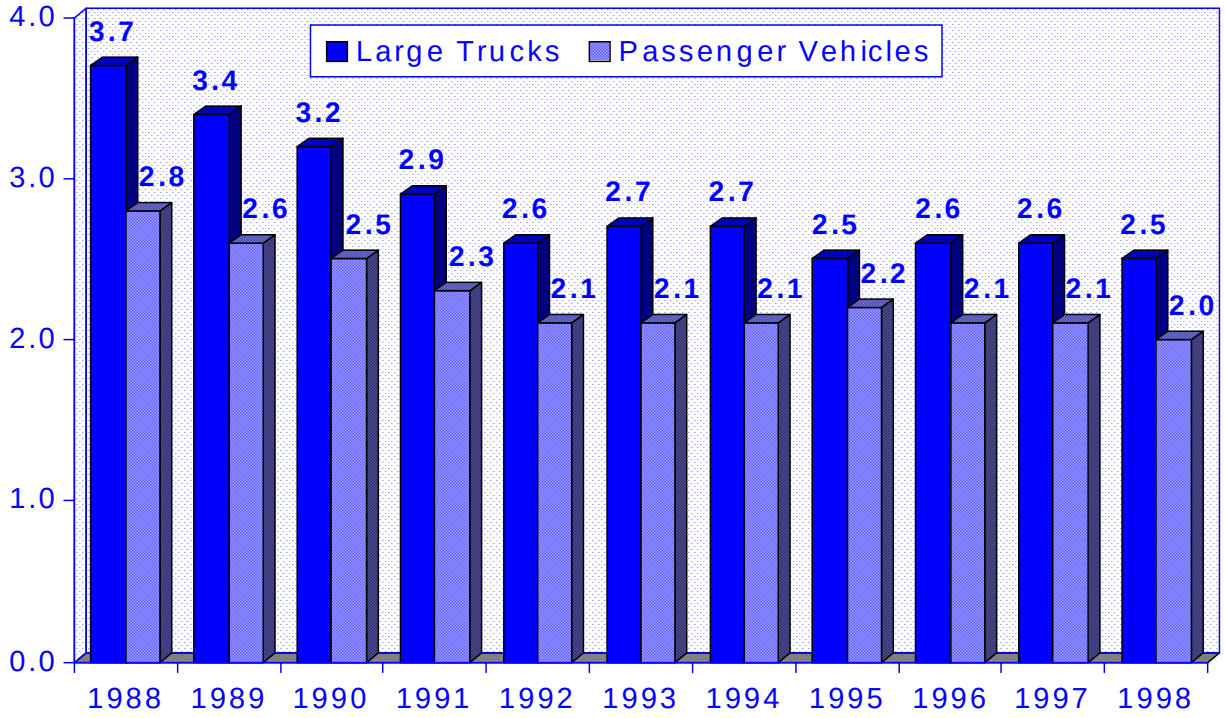
Crash Rates

The two figures that follow compare the fatal and injury crash rates for large trucks and passenger vehicles involved in crashes. Large trucks are those with GVWR over 10,000 pounds. Passenger vehicles include passenger cars, pickup trucks, vans, and sport utility vehicles. Crash rates are the number of vehicles of each type involved in crashes per 100 million vehicle miles traveled (VMT). Both charts cover the years 1988 to 1998.

The fatal crash involvement rates for large trucks and passenger vehicles are similar (Figure 2), but the injury crash involvement rates are very different (Figure 3). The large truck fatal crash rate dropped by 32 percent from 1988 to 1998—from 3.7 to 2.5 per 100 million VMT. The fatal crash rate for passenger vehicles was slightly lower than the rate for large trucks throughout the 1988-1998 period; however, the 29-percent decline for passenger vehicles (from 2.8 to 2.0) was slightly less than the 32-percent decline for large trucks (from 3.7 to 2.5).

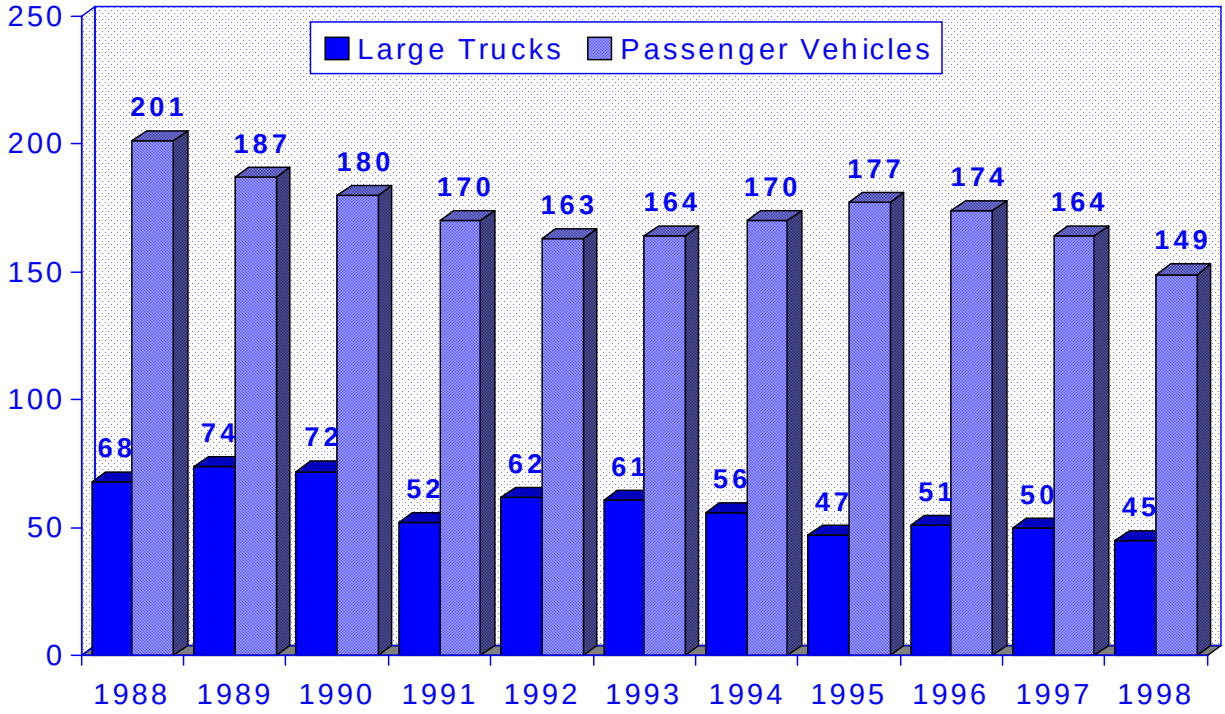
From 1988 through 1994, the crash rates for passenger vehicles involved in injury crashes were more than double those for large trucks, and from 1995 through 1998 the passenger vehicle rates were more than triple the large truck rates for injury crashes. Injury crashes are far more common than fatal crashes. For example, in 1998 large trucks were involved in only 2.6 fatal crashes per 100 million VMT, compared with 45 injury crashes per 100 million VMT. For passenger vehicles the 1998 numbers were 2.0 fatal crashes per 100 million VMT and 149 injury crashes per 100 million VMT.

Figure 2. Large Trucks and Passenger Vehicles Involved in Fatal Crashes per 100 Million Vehicle Miles Traveled, 1988-1998



Sources: FARS, 1988-1998; *Highway Statistics*, 1988-1998.

Figure 3. Large Trucks and Passenger Vehicles Involved in Injury Crashes per 100 Million Vehicle Miles Traveled, 1988-1998



Sources: GES, 1988-1998, and *Highway Statistics*, 1988-1998.

Vehicles

Large trucks (GVWR over 10,000 pounds) in 1998 accounted for:

- **9 percent** of the vehicles involved in fatal crashes,
- **2 percent** of vehicles in injury crashes, and
- **4 percent** of vehicles involved in property-damage-only crashes.

Types of Vehicles

The typical large truck involved in a crash in 1998 in the United States was a truck-tractor pulling a single semi-trailer that was a van/enclosed box or flatbed and capable of carrying a large cargo load. Only a small percentage of the trucks were carrying hazardous materials at the time of the crash.

Sixty-five percent of the trucks involved in fatal crashes in 1998 were tractors pulling semi-trailers, usually an 18-wheeler (Table 5). In non-fatal crashes, 53 percent of the trucks in the MCMIS Crash File and 49 percent of those in the GES file were tractor semi-trailers. (The GES percentage would probably be higher if the unknown number were lower than 34 percent.) The ratio of combination trucks (trucks pulling trailers, truck tractors pulling no trailers, and truck tractors pulling single trailers, double trailers, and triple trailers) to single-unit trucks in fatal and non-fatal crashes was more than 3 to 1. The percentages in Table 5 have varied little over the past 5 years.

Single-unit trucks (two and three or more axles) accounted for only 20 percent of the trucks involved in fatal crashes in 1998. Single-unit trucks accounted for 22 percent of the trucks involved in non-fatal crashes in the MCMIS Crash File and 12 percent in the GES data. (Again, the GES number would probably be higher, but one-third of the sample was coded to the “unknown” vehicle configuration category.)

More than one-third of the large trucks involved in crashes (43 percent of those in fatal crashes and 37 percent in non-fatal crashes) had a van/enclosed box cargo body type (Table 6). The three other highest-ranking cargo body types accounted for less than one-third of the total: flatbeds (14 percent of the large trucks involved in fatal crashes, 13 percent in non-fatal crashes); dump trucks (11 percent in fatal crashes, 9 percent in non-fatal crashes); and cargo tank trucks (8 percent in fatal crashes, 5 percent in non-fatal crashes). Cargo tank trucks are those most likely to carry hazardous materials in bulk. Unfortunately, other, unknown, and missing data for cargo body type add up to 20 percent of the total in FARS and 31 percent in MCMIS. In the GES file, 64 percent of the cargo body types were coded as “unknown,” and so GES data are not reported in Table 6.

Table 5. Large Trucks in Crashes by Vehicle Configuration, 1998

Vehicle Configuration	Fatal: FARS	Non-Fatal	
		MCMIS	GES
Single Unit Truck, 2 Axles	10.8%	12.0%	12.0%
Single Unit Truck, 3+ Axles	9.6%	9.9%	
Truck/Trailer(s)	3.8%	10.9%	0.7%
Truck Tractor (Bobtail)	2.1%	3.2%	2.2%
Tractor/Semi-trailer	64.5%	52.5%	48.8%
Tractor/Double	2.8%	2.9%	1.3%
Tractor/Triple	0.2%	0.1%	0.1%
Unknown	6.3%	2.8%	34.4%
Missing	--	5.7%	--
Total Number	**4,935**	**93,308**	**407,000**

Sources: FARS, MCMIS Crash File, and GES, 1998.

Table 6. Large Trucks in Crashes by Cargo Body Type, 1998

Cargo Body	Fatal	Non-Fatal
Van/Enclosed Box	43.3%	36.5%
Flatbed	13.7%	12.9%
Dump	11.2%	9.2%
Cargo Tank	7.9%	5.1%
Garbage/Refuse	2.4%	2.4%
Concrete Mixer	0.8%	1.6%
Auto Transporter	0.7%	1.0%
Other	9.8%	20.9%
Unknown	10.1%	--
Missing	--	10.4%
Total Number	**4,935**	**93,308**

Sources: FARS and MCMIS Crash File, 1998.

Vehicle Weight

The gross vehicle weight rating (GVWR) is the maximum manufacturer's recommended total weight for the vehicle and its cargo. Trucks involved in crashes are overwhelmingly those that can carry heavy loads.

More than four-fifths (83 percent) of the trucks involved in fatal crashes in 1998 and almost three-fourths (72 percent) of those in non-fatal crashes had GVWRs over 26,000 pounds (Table 7). By comparison, most passenger cars have GVWRs between 2,000 and 4,000 pounds. Fewer than 10 percent of the trucks involved in fatal and non-fatal crashes had GVWRs between 10,000 and 26,000 pounds, and almost all of those were single-unit trucks.

Table 7. Trucks in Crashes by Gross Vehicle Weight Rating, 1998

GVWR	Fatal	Non-Fatal
Under 10,001 lbs	0.3%	1.6%
10,001 - 26,000 lbs	8.4%	8.7%
Over 26,000 lbs	83.0%	71.5%
Unknown	6.9%	--
Missing	1.4%	18.2%
Total Number	**4,935**	**93,308**

Sources: FARS and MCMIS Crash File, 1998.

The University of Michigan Transportation Research Institute (UMTRI) analyzed the size of large trucks involved in fatal crashes from 1991 through 1996 for an FMCSA analysis brief. Of the 15,836 trucks for which weight could be determined, 7,564 (48 percent) weighed more than 60,000 pounds at the time of the crash.

Hazardous Materials Cargo

One note should be mentioned about the following hazardous materials (HM) tables. In the FARS data, large trucks are counted as carrying hazardous materials if they display an HM placard, or if later investigation shows that they were carrying hazardous materials without a placard. For the NGA hazardous materials crash data element, however, the reporting officer records only the presence of an HM placard on the truck. Some observers suspect that a significant number of trucks carry hazardous materials without displaying the required HM placards.

With these caveats in mind, Table 8 indicates that only a small percentage of trucks in crashes carried hazardous materials at the time of a crash. In both fatal crashes in FARS and non-fatal crashes in the MCMIS Crash File, only 4 percent of the trucks involved displayed an HM placard. The large percentage of missing data in the MCMIS Crash File may be the result of police officers not responding to the element on police accident reports when no placard is present, as opposed to checking the "No" response; the overwhelming percentage of unknown data in GES may result from the same problem. In the GES file, 73 percent of the data on the presence of hazardous materials is missing, and so GES data are not reported in Table 8.

Table 8. Trucks in Crashes by Hazardous Materials Cargo, 1998

Hazardous Materials Cargo	Fatal	Non-Fatal
Yes	4.3%	4.3%
No	93.5%	40.5%
Unknown	2.2%	--
Missing	--	55.2%
Total Number	**4,935**	**93,308**

Sources: FARS and MCMIS Crash File, 1998.

Releases of hazardous materials from the cargo compartment were recorded for 33 percent of the trucks displaying an HM placard that were involved in fatal crashes and 22 percent of those involved in non-fatal crashes, according to MCMIS Crash File data (Table 9). Neither FARS nor GES includes HM cargo release data.

Table 9. Trucks in Crashes by Hazardous Materials Cargo Release, 1998

Cargo Release	Fatal	Non-Fatal
Yes	33.3%	22.3%
No	66.7%	77.7%
Total Number	**129**	**2,425**

Source: MCMIS Crash File, 1998.

The Trucks Involved in Fatal Accidents (TIFA) database from UMTRI is the most reliable fatal crash database for trucks; however, final TIFA data for 1998 will not be available for several months. For the years 1991 through 1997 the TIFA data show an average of 200 trucks a year carrying hazardous materials involved in fatal crashes, of which an average of 59 a year (30 percent) released HM cargo as a result of the crash. That figure is slightly lower than the FARS number recorded for trucks carrying hazardous materials in fatal crashes.

For trucks involved in crashes that released hazardous materials, the most common class of material released from the truck cargo compartment (Table 10) was Class 3, flammable liquids (51 percent of the releases in fatal crashes and 42 percent in non-fatal crashes). Flammable liquids include gasoline, the most common hazardous material transported. Most gasoline shipments involve local deliveries from the end of a pipeline or a tank farm to automobile service stations.

The second most common class of hazardous material spilled in 1998 was Class 9, miscellaneous dangerous goods (14 percent in fatal crashes and 18 percent in non-fatal crashes). These goods include liquid and solid hazardous wastes, substances that do not present a transportation safety hazard but are hazardous to the environment (such as PCBs), and substances that are hazardous when raised to a high temperature (such as hot asphalt). For 14 percent of the 43 trucks that released hazardous materials in fatal crashes, and for 22 percent of the 541 in non-fatal crashes, no HM class was recorded.

Table 10. Trucks in Crashes by Class of Hazardous Materials Release, 1998

Class of HM Release	Fatal	Non-Fatal
1 - Explosives	2.3%	3.0%
2 - Gases	9.3%	6.5%
3 - Flammable Liquid	51.2%	42.3%
4 - Flammable Solids	0.0%	0.7%
5 - Oxidizing Substances	2.3%	2.0%
6 - Poison and Infectious Substances	0.0%	1.1%
7 - Radioactive Material	0.0%	0.0%
8 - Corrosives	7.0%	6.5%
9 - Miscellaneous Dangerous Goods	14.0%	17.8%
Missing	14.0%	20.0%
Total Number	**4,300**	**54,100**

Source: MCMIS Crash File, 1998.

In total, hazardous materials are a minor element in truck crashes for two reasons:

- Only a small percentage of trucks involved in crashes carry hazardous materials.
- The materials carried usually stay in the cargo compartment. In fatal crashes reported to the MCMIS Crash File in 1998, only 43 trucks released hazardous materials. Of the more than 93,000 trucks involved in non-fatal crashes reported to the MCMIS database, there were hazardous material releases in only 541 cases.

Releases of hazardous materials in highway crashes rarely play a role in deaths or injuries. The Research and Special Programs Administration (RSPA) of the U.S. Department of Transportation reported an average of only 11 deaths a year attributable to exposure to hazardous materials in highway crashes over the past 10 years. Because the RSPA data come only from interstate carriers, total fatalities are understated, perhaps by a multiple of two or three. In any event, total fatalities related to exposure to hazardous materials in highway crashes would be a small percent of the 5,374 total fatalities in large truck crashes in 1998.

Drivers

Truck drivers involved in fatal crashes in 1998 were generally between 26 and 45 years old. A large majority had valid drivers licenses at the time of the crash and were in apparently normal condition. For most, no driver-related crash factors were recorded. Drivers of passenger vehicles involved in fatal collisions with trucks were more likely than the drivers of the trucks to be under 26 or over 65 years old, to have invalid drivers licenses, to be legally drunk, and to be cited for driver-related crash factors.

Driver Age

The FARS and GES databases have information on all drivers involved in fatal and non-fatal crashes. The MCMIS Crash File has data only on truck drivers. In one-half of fatal and non-fatal truck crashes in 1998, the truck collided with a single passenger vehicle—a passenger car, pickup, van, or sport utility vehicle. Table 11 presents data on the ages of the drivers of large trucks and the drivers of passenger vehicles involved in two-vehicle fatal and non-fatal crashes involving a large truck and a passenger vehicle. The two columns of FARS data show the ages for truck drivers and passenger vehicle drivers involved in two-vehicle fatal crashes with each other. The two columns of GES data show the ages of drivers in non-fatal crashes.

Table 11. Drivers in Two-Vehicle Fatal Crashes Involving a Large Truck and a Passenger Vehicle by Driver Age, 1998

	Fatal		Non-Fatal	
Driver Age	Large Trucks	Passenger Vehicles	Large Trucks	Passenger Vehicles
< 26	7.2%	24.2%	10.3%	19.4%
26-45	57.6%	34.6%	59.1%	45.8%
46-65	32.3%	21.6%	28.2%	25.3%
66-75	2.2%	9.0%	2.1%	5.5%
>75	0.2%	11.1%	0.3%	4.1%
Unknown/Missing	0.5%	0.1%	--	--
Total Number	**2,740**	**2,740**	**227,000**	**227,000**

Sources: FARS and GES, 1998.

Table 11 includes the ages of 2,740 truck drivers and the same number of passenger vehicle drivers who were involved in the two-vehicle fatal crashes. The total represents 56 percent of the total number of trucks involved in fatal crashes. (The other trucks were involved in single-vehicle crashes; two-vehicle crashes with a bus, motorcycle, or another large truck; or multi-vehicle crashes.) In contrast, the 2,740 passenger vehicles involved in fatal crashes with large trucks represent only 6 percent of the 48,209 passenger vehicles involved in all types of fatal crashes in 1998.

The age profiles of the truck drivers involved in two-vehicle fatal crashes with passenger vehicles and those of the drivers of the cars and light trucks involved are very different. Only 7 percent of the truck drivers were younger than 26 years old and only 2 percent were older than 65. In contrast, 24 percent of the drivers of the passenger vehicles were younger than 26, and 20 percent were older than 65. In other words, 44 percent of the passenger vehicle drivers involved were either under 26 or over 65, compared with only 10 percent of the truck drivers involved.

The age profiles for drivers in non-fatal two-vehicle crashes between a large truck and a passenger vehicle are similar to those for drivers in fatal crashes. Only 10 percent of truck drivers in these non-fatal crashes were under the age of 26, and only 2 percent were over 65, whereas 19 percent of passenger vehicle drivers in these crashes were under 25 years old, and 10 percent were over 65.

It should be noted that drivers must be at least 21 years old to obtain a commercial drivers license (CDL). A CDL is needed to operate a truck in commerce with a GVWR over 26,000 pounds, or to drive a truck of any GVWR carrying hazardous materials.

Driver License Status

The FARS database contains information on the driver license status of each driver involved in a crash. A large majority of all the drivers in two-vehicle fatal crashes in 1998 that involved a large truck held valid licenses; however, there were differences between the large truck and passenger vehicle drivers.

Of the 2,740 drivers of large trucks involved in fatal crashes with passenger vehicles, 90 percent (2,454) held valid CDLs and another 6 percent (163) held other valid licenses at the time of the crash, for a total of 96 percent. (Because CDLs are not required to drive all large trucks, the presence of another valid license can be sufficient to comply with the law.) Among the remaining 4 percent of the truck drivers, 28 had suspended, revoked, expired, or canceled licenses; 25 had other invalid licenses; and the license status of the remaining 70 drivers was not known.

Among the drivers of the passenger vehicles involved in fatal crashes with large trucks, 89 percent had valid licenses, compared with 96 percent of the truck drivers. Among the remaining 11 percent of passenger vehicle drivers, 83 had no license; 196 had a suspended, revoked, expired, or canceled license; and the license status of the remaining 25 drivers was not known.

Thus, while 53 truck drivers (1.9 percent) out of the 2,740 involved in two-vehicle large truck-passenger vehicle fatal crashes had invalid drivers licenses, 279 of the passenger vehicle drivers (10.2 percent) out of 2,740 involved had invalid licenses or none at all. The proportion of passenger vehicle drivers with invalid or no licenses in these crashes was more than five times the proportion of truck drivers with invalid or no licenses.

Driver Condition

One NGA crash data element is apparent driver condition, which is based on the reporting police officer's opinion. Of the 3,772 truck drivers involved in fatal crashes in the MCMIS Crash File, "appeared normal" was checked for 72 percent, "unknown" was checked for 14 percent, and no driver condition was recorded for 10 percent. For the remaining 5 percent of the drivers, 56 were affected by fatigue or asleep, 59 had been drinking, 36 had been using illegal drugs, 9 were sick, and another 9 were affected by medication they had taken.

Among the 93,308 truck drivers in non-fatal crashes in the MCMIS Crash File, 82 percent appeared normal, and for 16 percent the driver condition was unknown or not recorded. Among the other 2 percent, 1,231 appeared to be affected by fatigue or were asleep, 513 had been drinking, 100 had been using illegal drugs, and 226 were sick. In sum, there appeared to be nothing wrong with the physical condition of more than 90 percent of the truck drivers involved in fatal and non-fatal crashes.

Driver Restraint Use

Seat belts have proven to have safety benefits in preventing deaths and serious injuries in motor vehicle crashes. Table 12 shows safety belt use rates for drivers in two-vehicle fatal and non-fatal crashes between large trucks and passenger vehicles.

Table 12. Driver Safety Belt Use in Large Truck-Passenger Vehicle Crashes, 1998

Belt Use	Fatal Crashes		Non-Fatal Crashes	
	Large Trucks	Passenger Vehicles	Large Trucks	Passenger Vehicles
Yes	76.4%	48.8%	81.3%	85.3%
No	14.8%	41.5%	5.8%	5.5%
Unknown	8.8%	9.7%	12.9%	9.2%
Total Number	**2,740**	**2,740**	**227,000**	**227,000**

Sources: FARS and GES, 1998.

In the fatal crashes, three-fourths of truck drivers (76 percent) were using their seat belts, compared with only one-half (49 percent) of passenger vehicle drivers. The difference may account, in part, for the disproportionate number of passenger vehicle drivers killed in crashes with large trucks. In non-fatal crashes the belt use rates for large truck and passenger vehicle drivers differ only slightly: 81 percent for truck drivers and 85 percent for passenger vehicle drivers.

Driver Alcohol Use

In two-vehicle fatal crashes between a large truck and a passenger vehicle, a much larger percentage of the passenger vehicle drivers had blood alcohol levels over 0.01 grams per deciliter (g/dl). In these crashes, only 2 percent of the truck drivers had any level of alcohol in their blood (Table 13), and only 0.6 percent had a blood alcohol content (BAC) level greater than 0.10 g/dl, the legal limit in 35 States

and the District of Columbia. In contrast, 19 percent of the passenger vehicle drivers had at least some alcohol in their blood, and 5.3 percent had BAC levels above 0.10 g/dl.

Table 13. Driver Alcohol Use in Large Truck-Passenger Vehicle Crashes, 1998

Driver BAC Level	Fatal Crashes	
	Large Trucks	Passenger Vehicles
0.00	98.2%	81.2%
0.01 to 0.09	1.1%	5.3%
0.10 and Over	0.6%	13.5%
Total Number	**2,740**	**2,740**

Source: FARS, 1998.

In non-fatal crashes between a large truck and a passenger vehicle, no alcohol was reported for the truck driver in 96.5 percent of the cases and for the passenger vehicle driver in 96.8 percent of the cases—both numbers being very high and almost identical. The non-fatal numbers are based on police-reported alcohol involvement from GES and not on BAC test results.

Driver Crash Factors

Driver-related crash factors recorded by police officers at the scene are included in FARS. The three tables that follow show: (1) a comparison of driver-related factors cited for the drivers of large trucks and passenger vehicles in fatal crashes involving one large truck and one passenger vehicle (Table 14); (2) a comparison of factors cited for the drivers of large trucks and passenger vehicles in single-vehicle fatal crashes (Table 15); and (3) a list of driver-related factors cited for passenger vehicle drivers involved in fatal crashes with other passenger vehicles (Table 16). Passenger vehicles include passenger cars, passenger vans, pickup trucks, and sport utility vehicles.

The FARS database includes 98 different driver-related crash factors. In each of the three tables below, only 10 factors are listed. Tables 14 and 15 show the top 10 factors cited for truck drivers in each type of crash, the percentage of truck drivers cited for each of the top 10 factors, and the corresponding percentages of passenger vehicle drivers cited for the same factors. Table 16 shows the top 10 factors cited for passenger vehicle drivers in fatal crashes between two passenger vehicles. The FARS coders may include up to 4 driver-related factors for each driver involved in a crash. The tables show the percentage of drivers cited for each factor, whether that factor was the only one listed for the driver or was the second, third, or fourth factor cited. Thus, when the percentages for the factors cited are added, the total may exceed the percentage of drivers with factors recorded. For example, in Table 14, 82 percent of passenger vehicle drivers involved in fatal crashes with large trucks were assigned driver-related factors, but the percentages of passenger vehicle drivers cited for each of the top 10 factors shown totals 98 percent.

The following is a list of the driver-related crash factors included in the three tables, along with their descriptions in the FARS coding manual:

- **Driving Too Fast:** driving too fast for conditions, or in excess of posted maximum speed limit
- **Ran Off Road/Out of Traffic Lane:** failure to keep in proper lane or running off road
- **Failure To Yield Right-of-Way:** failure to yield to pedestrian, other vehicles, streetcar already in intersection
- **Failure To Obey Traffic Devices:** failure to obey actual traffic sign, traffic control device, or traffic officer; failure to obey safety zone traffic laws
- **Inattentive:** driver distracted by cigarette, children, adjusting radio and other devices, reading, talking, television, etc.
- **Drowsy/Asleep:** drowsy, sleepy, asleep, fatigued not due to other factors, such as drugs
- **Manslaughter, Homicide:** non-traffic violation charged (manslaughter or other homicide offense committed without malice)
- **Erratic/Reckless Driving:** operating a vehicle in an erratic, reckless, careless or negligent manner; operating at erratic or suddenly changing speeds
- **Following Improperly:** following too closely; vehicles in caravan too close to allow entry
- **Vision Obscured by Weather:** vision obscured by rain, snow, fog, smoke, sand, dust
- **Ice, Water, Snow on Road:** ice, snow, slush, water, sand, dirt, oil, wet leaves on road
- **Over Correcting:** based on police officer judgment, with knowledge of driver's intention
- **Hit and Run Vehicle Driver:** no explanation given
- **Making Improper Turn:** too wide a right or left turn; unsafe U-turn
- **Driving on Wrong Side of Road:** driving on wrong side of road intentionally or unintentionally.

In two-vehicle crashes involving a large truck and a passenger vehicle, driver-related crash factors were cited by officers at the scene for 26 percent of the truck drivers involved (Table 14). The five individual factors most frequently cited for the truck drivers were failure to yield right-of-way (5 percent), ran off road or out of traffic lane (5 percent), driving too fast (4 percent), failure to obey traffic devices (3 percent), and inattentive (3 percent). In contrast, police officers cited driver-related crash factors for 82 percent of the passenger vehicle drivers involved—more than three times the percentage for truck drivers. The five factors most often cited for passenger vehicle drivers were the same as those for the truck drivers, but the percentages were much larger, ranging from 28 percent (running off road or out of traffic lane) to 10 percent (inattentive). The percentages of passenger vehicle drivers cited were higher for each of the 10 factors shown, except manslaughter/homicide.

Table 14. Driver-Related Factors Cited in Two-Vehicle Fatal Crashes Between Large Trucks and Passenger Vehicles, 1998

Driver-Related Factors	Large Trucks	Passenger Vehicles
Total Number of Drivers Involved	2,740	2,740
Driver Factor(s) Recorded:		
Yes	26.4%	81.5%
No	73.6%	18.5%
Top 10 Factors Cited:		
Failure To Yield Right-of-Way	5.3%	20.3%
Ran Off Road/Out of Traffic Lane	4.8%	27.8%
Driving Too Fast	3.8%	14.9%
Failure To Obey Traffic Devices	3.0%	12.1%
Inattentive	2.7%	9.8%
Erratic/Reckless Driving	1.6%	5.1%
Manslaughter, Homicide	1.5%	1.3%
Following Improperly	1.4%	2.1%
Making Improper Turn	1.0%	2.6%
Vision Obscured by Weather	0.9%	1.7%

Source: FARS, 1998.

Whereas driver-related crash factors were coded for only 26 percent of the drivers of large trucks in two-vehicle fatal crashes involving a passenger vehicle, they were recorded for 72 percent of the truck drivers in single-vehicle fatal crashes in 1998 (Table 15). For passenger vehicle drivers in single-vehicle crashes, the corresponding percentages were essentially the same—82 percent and 84 percent, respectively. For drivers of both types of vehicles, the two most frequently cited factors, by large margins, were ran off road or out of traffic lane (40 percent of large trucks and 58 percent of passenger vehicles) and driving too fast (20 percent of large trucks and 36 percent of passenger vehicles).

Fatigue-related factors were coded more often for drivers in single-vehicle fatal crashes than for those in two-vehicle crashes. For truck drivers, the third and fourth most frequently recorded factors were inattentive (8 percent) and drowsy/asleep (7 percent), suggesting that a significant number of the 803 single-vehicle fatal crashes for large trucks were fatigue related. Inattentive (10 percent) and drowsy/asleep (5 percent) were the third and sixth most frequently cited driver-related crash factors for the 18,246 passenger vehicles involved in single-vehicle fatal crashes.

Table 15. Driver-Related Factors in Single-Vehicle Fatal Crashes, 1998

Driver-Related Factors	Large Trucks	Passenger Vehicles
Total Number of Drivers Involved	803	18,246
Driver Factor(s) Recorded:		
Yes	71.7%	83.5%
No	28.3%	16.5%
Top 10 Factors Cited:		
Ran Off Road/Out of Traffic Lane	39.6%	57.7%
Driving Too Fast	20.3%	36.2%
Inattentive	8.2%	10.0%
Drowsy/Asleep	7.2%	5.4%
Erratic/Reckless Driving	5.9%	8.1%
Over Correcting	5.0%	7.8%
Failure To Yield Right-of-Way	4.5%	2.4%
Making Improper Turn	3.2%	3.4%
Failure To Obey Traffic Devices	2.9%	2.2%
Hit and Run Vehicle Driver	1.5%	3.2%

Source: FARS, 1998.

Driver-related crash factors were recorded for 54 percent of passenger vehicle drivers when only two passenger vehicles were involved in a fatal crash (Table 16). The five most frequently cited factors for passenger vehicle drivers in two-vehicle fatal crashes were the same whether the other vehicle was a large truck or another passenger vehicle: running off road or out of traffic lane, failure to yield right-of-way, driving too fast, failure to obey traffic devices, and inattentive.

As a note of caution, it should be pointed out that “related factor” does not necessarily imply fault or cause. The second edition of the MCSAFE safety update, published by the Analysis Division in November 1995, noted that related factors are merely the judgment of the officer at the scene and are **not** based on a thorough evaluation of the crash in an attempt to determine the cause of the crash. Some of the factors in the tables above, such as manslaughter/homicide, are charges assessed to drivers after the crash, not descriptions of behavior that may have led to the crash.

Given this caveat, the FMCSA Analysis Division asked UMTRI to investigate driver-related crash factors in light of other data available on large truck fatal crashes. The result was an analysis brief, “Driver-Related Factors in Crashes Between Large Trucks and Passenger Vehicles,” published in April 1999. The analysis found evidence supporting the coding of crash-related factors in the 8,309 two-vehicle fatal crashes involving a large truck and a passenger vehicle during 1994, 1995, and 1996. In 4,262 (51 percent) of the crashes, physical evidence about the vehicles’ maneuvers and positions before

the crash was available to help check the coding of driver-related factors. In those cases, the coding appeared to be consistent with the physical evidence.

For example, in the 1,936 head-on crashes (23 percent of the total), the passenger car encroached into the travel lane of the truck in 1,724 crashes and the large truck crossed over into the travel lane of the passenger vehicle in only 212. In the 1,724 crashes where the passenger vehicle encroached, the passenger vehicle driver was cited for driver-related factors in 98 percent of the crashes, and the truck driver was cited in only 10 percent. In the 212 cases where the large truck encroached, the truck driver was cited for driver-related factors in 93 percent of the crashes, and the passenger vehicle driver was cited in only 9 percent. In the 49 percent of the two-vehicle fatal crash cases for which there was not enough physical data to support or contradict the coding of crash-related factors, the passenger vehicle drivers also were coded with more driver-related crash factors than were the drivers of the large trucks. Copies of this analysis brief are available from the FMCSA Analysis Division.

A final caution is that fatal crashes accounted for less than 2 percent of all large truck crashes in 1998. There are no national data on driver-related crash factors in injury and property-damage-only crashes.

Table 16. Driver-Related Factors in Two-Vehicle Fatal Crashes Between Passenger Vehicles, 1998

Driver-Related Factors	Passenger Vehicles
Total Number of Drivers Involved	18,370
Driver Factor(s) Recorded:	
Yes	54.2%
No	45.8%
Top 10 Factors Cited:	
Ran Off Road/Out of Traffic Lane	16.0%
Failure To Yield Right-of-Way	16.0%
Driving Too Fast	10.2%
Failure To Obey Traffic Devices	8.7%
Inattentive	6.1%
Erratic/Reckless Driving	3.2%
Driving on Wrong Side of Road	3.2%
Manslaughter, Homicide	2.7%
Making Improper Turn	1.7%
Ice, Water, Snow on Road	1.5%

Source: FARS, 1998.

Environment

Most crashes involving large trucks occur in favorable weather conditions, on dry pavement, during the day, and on a weekday. Passenger vehicle crashes also occur overwhelmingly during good weather and on dry pavement, but they are more likely to take place at night and on weekends. In 1998, most fatal truck crashes took place on Interstate highways or other principal arterial highways; however, the overwhelming majority of fatal truck crashes (87 percent) occurred either on highways that were not physically divided or on divided highway without lane barriers.

Weather and Road Surface Conditions

Only a small minority of fatal and non-fatal truck crashes in 1998 occurred during adverse weather conditions (Tables 17 and 18). For 83 percent of the trucks involved in fatal crashes, there were no adverse weather conditions at the time of the crash. Similarly, according to GES data, for 85 percent of the trucks involved in non-fatal crashes weather conditions were good at the time of the crash. The MCMIS number is lower at 69 percent, but the 6 percent missing data in the MCMIS Crash File probably accounts for some of the difference between MCMIS and the other two databases. For 10 percent of the trucks involved in fatal crashes and 12 to 13 percent of those involved in non-fatal crashes, rain was present. Snow ranks a distant second as a crash site adverse weather condition.

Table 17. Large Trucks in Crashes by Weather Condition, 1998

Weather Condition	Fatal: FARS	Non-Fatal	
		MCMIS	GES
No Adverse Conditions	83.0%	69.4%	84.5%
Rain	10.3%	13.1%	11.9%
Snow	2.2%	3.2%	1.9%
Fog	2.9%	1.5%	0.8%
Sleet, Hail	0.5%	0.9%	0.3%
Other	0.9%	5.5%	0.5%
Unknown	0.2%	0.6%	--
Missing	--	5.9%	--
Total Number	**4,935**	**93,308**	**407,000**

Sources: FARS, MCMIS Crash File, and GES, 1998.

The data in Table 18 data are consistent with those in Table 17. For more than three-fourths of trucks involved in fatal crashes and in GES-reported non-fatal crashes in 1998, the crashes occurred on dry pavement. For two-thirds of the trucks involved in non-fatal crashes reported in the MCMIS Crash File, the crashes took place on dry pavement. Wet pavement was cited for 16 percent of trucks involved in

fatal crashes and for 17 to 18 percent of trucks involved in non-fatal crashes, and ice was cited for 2 to 3 percent of trucks involved in fatal and non-fatal crashes.

Table 18. Large Trucks in Crashes by Road Surface Condition, 1998

Road Surface Condition	Fatal: FARS	Non-Fatal	
		MCMIS	GES
Dry	79.8%	67.7%	79.2%
Wet	16.4%	17.4%	17.6%
Ice	2.2%	2.9%	1.9%
Snow or Slush	1.4%	2.2%	1.2%
Sand, Mud, Dirt, or Oil	0.0%	0.2%	0.0%
Other	0.1%	0.2%	0.1%
Unknown	0.1%	3.4%	--
Missing	--	5.9%	--
Total Number	**4,935**	**93,308**	**407,000**

Sources: FARS, MCMIS Crash File, and GES, 1998.

Light Conditions, Time of Day, and Day of Week

The following three tables provide data on light conditions when large truck crashes occurred, the time of day, and the day of the week. A large majority of fatal truck crashes take place during the day (Table 19), whereas almost half of passenger vehicle fatal crashes occur at night. Passenger vehicle fatal crashes are also more likely to occur on weekend days than are fatal truck crashes.

Table 19. Large Trucks in Crashes by Light Condition, 1998

Light Condition	Fatal: FARS	Non-Fatal	
		MCMIS	GES
Daylight	66.0%	67.0%	79.5%
Dark - not lighted	22.5%	12.8%	7.9%
Dark - lighted	6.9%	6.4%	8.8%
Dawn	3.0%	2.8%	1.6%
Dusk	1.5%	2.1%	2.2%
Unknown/Missing	0.4%	3.3%	--
Total Number	**4,935**	**93,308**	**407,000**

Sources: FARS, MCMIS Crash File, and GES, 1998.

For 66 percent of the large trucks involved in fatal crashes in 1998, the crash took place during daylight conditions. For trucks in non-fatal crashes, 67 percent of the crashes in the MCMIS file and 80 percent of those in GES took place in daylight (Table 20). For 69 percent of the trucks involved in fatal crashes the crash occurred between 6:00 a.m. and 6:00 p.m—daytime business hours plus commuting time. NHTSA defines daytime as beginning at 6:00 a.m. and ending at 5:59 p.m. Night begins at 6:00 p.m. and extends until 5:59 a.m. The daytime (6:00 a.m. to 5:59 p.m.) figures for trucks in non-fatal crashes are higher than for those in fatal crashes: 75 percent in the MCMIS Crash File and 80 percent in the GES file.

Table 20. Large Trucks in Crashes by Time of Day, 1998

Time	Fatal: FARS	Non-Fatal	
		MCMIS	GES
12:00 - 2:59 am	6.7%	4.8%	3.6%
3:00 - 5:59 am	8.6%	6.4%	3.7%
6:00 - 8:59 am	15.0%	16.7%	15.3%
9:00 - 11:59 am	18.0%	19.8%	21.6%
12:00 - 2:59 pm	19.0%	20.4%	23.4%
3:00 - 5:59 pm	16.6%	17.9%	19.8%
6:00 - 8:59 pm	9.2%	8.0%	8.4%
9:00 - 11:59 pm	6.9%	5.8%	4.2%
Unknown	0.1%	0.2%	--
Total Number	**4,935**	**93,308**	**407,000**

Sources: FARS, MCMIS Crash File, and GES, 1998.

For 31 percent of trucks involved in fatal crashes the crash took place during the night, but for passenger vehicles in fatal crashes 45 percent of the crashes occurred at night. The difference is smaller for non-fatal crashes: night-time crashes were recorded in the GES file for 20 percent of the large trucks and for 27 percent of the passenger cars in non-fatal crashes.

For large trucks involved in both fatal and non-fatal crashes, most of the crashes occurred during the five working days of the week; only 15 percent of the fatal crashes and 10 to 20 percent of the non-fatal crashes took place on weekends (Table 21). In contrast, the corresponding percentages of weekend crashes for passenger vehicles were 33 percent for those involved in fatal crashes and 22 percent for those in non-fatal crashes.

Table 21. Large Trucks in Crashes by Day of Week, 1998

Day	Fatal: FARS	Non-Fatal	
		MCMIS	GES
Sunday	5.7%	4.7%	3.6%
Monday	16.8%	17.6%	17.7%
Tuesday	17.4%	18.3%	17.9%
Wednesday	17.8%	18.0%	18.8%
Thursday	16.0%	17.5%	17.2%
Friday	17.4%	17.0%	18.2%
Saturday	8.9%	7.1%	6.6%
Total Number	**4,935**	**93,308**	**407,000**

Sources: FARS, MCMIS Crash File, and GES, 1998.

Roadway Types

The FARS database contains information on the types of roadways and trafficways on which fatal crashes occur. The MCMIS Crash File contains data only on the type of trafficway. The two tables below present data on the two variables. According to the Federal Highway Administration's *Highway Statistics 1998*, 41 percent of all large truck miles traveled and 50 percent of combination truck miles traveled in 1997 were on Interstate highways. In contrast, for large trucks involved in fatal crashes in 1998, only 26 percent of the crashes occurred on Interstate highways (Table 22). Interstates are the safest roadways in the Nation, both for trucks and for other vehicles.

Table 22. Large Trucks in Fatal Crashes by Type of Roadway, 1998

Roadway Type	Percent of Total
Interstate Highway	25.6%
Other Principal Arterial	36.7%
Minor Arterial	17.1%
Collector	13.1%
Local Road/Street	6.2%
Unknown/Missing	1.3%
Total Number	**4,871**

Source: FARS, 1998.

Other principal arterial highways accounted for more than one-third (37 percent) of trucks in fatal crashes in 1998. Many of these highways are high-quality divided highways, but many others are not divided and do not have controlled access, both conditions that make them more dangerous than Interstate highways.

For more than one-half (56 percent) of all trucks involved in fatal crashes in 1998 the crashes took place on highways that were not physically divided (Table 23). When divided highways without barriers are included, 87 percent of the trucks involved in fatal crashes were operating on highways where the opposing lanes were not separated by barriers. In contrast, the MCMIS Crash File data show that for only 35 percent of all trucks involved in non-fatal crashes the crash occurred on highways that were not physically divided, and 23 percent occurred on divided highways that did not have a barrier—a total of 58 percent (however, for 22 percent of the trucks in the MCMIS file the type of trafficway was not recorded). The GES figure for undivided highways was 45 percent of trucks involved in non-fatal crashes.

Table 23. Large Trucks in Crashes by Type of Trafficway, 1998

Trafficway Type	Fatal: FARS	Non-Fatal	
		MCMIS	GES
Not Physically Divided	55.8%	34.9%	45.2%
Divided Highway Without Barrier	31.2%	23.0%	36.2%
Divided Highway With Barrier	11.7%	17.1%	
One-Way Trafficway	0.6%	3.5%	3.4%
Missing/Unknown	0.6%	21.5%	15.2%
Total Number	**4,935**	**93,308**	**407,000**

Sources: FARS, MCMIS Crash File, and GES, 1998.

Crashes

Most fatal truck crashes in 1998 took place in rural areas. The first crash event, as well as the first harmful event, in the majority of fatal and non-fatal truck crashes was a collision with another vehicle in transport. The impact area in most fatal crashes was the front of the truck. The impact area in non-fatal crashes was more evenly distributed to all sides of the truck. This section covers crash location in terms of population density, the events that happened during the crashes, and the point of impact on the trucks.

Geographic Location

For 67 percent of the trucks involved in fatal crashes in 1998, the crashes took place in rural areas. In a large majority of States, however, the individual counties with the highest number of fatal and non-fatal crashes were predominantly urban in character. This is possible because rural counties outnumber urban counties in nearly all States. For example, the counties in Texas with the most fatal crashes were urban counties that include the major cities of Houston, Dallas, Forth Worth, San Antonio, Austin, and El Paso; however, most fatal crashes occurred in the State's 200 rural counties.

Crash Events

The first harmful and most harmful events are coded in the FARS and GES databases for each crash. The MCMIS Crash File records the first and up to three subsequent events (not necessarily harmful) that happened to the truck involved in the crash. The first and most harmful events in FARS and GES are, therefore, defined differently from the first and subsequent events in MCMIS. To decide on first and most harmful events, the reporting officer or FARS analyst must make a judgment as to which crash events were significant and which were not. Asking the reporting officer to record the first, second, third, and fourth events that happened to a truck involved in a crash usually does not require the officer to make a judgment call. The officer only has to record the events that happened to the truck in the sequence they happened. Even so, there are strong similarities in the results from the two approaches (Table 24).

For almost four-fifths (79 percent) of large trucks involved in fatal crashes and almost three-fourths (74 percent) of large trucks involved in non-fatal crashes, the first harmful event was a collision between the truck and another vehicle in transit, according to the FARS and GES databases, respectively (Table 24). According to the MCMIS Crash File, for 58 percent of the trucks involved in a non-fatal crash, the first crash event was a collision between the truck and another vehicle in traffic, usually a passenger vehicle.

The main reason that the MCMIS percentage for collision with a vehicle in transport is much lower than the FARS and GES numbers is that the first event codes in MCMIS include "ran off road" and "cargo loss or shift," neither of which is counted as a harmful event in FARS and GES. However, these events may be the first in a chain that leads to a crash. Together these two first events—plus jackknife, which is not counted as a harmful event in FARS—accounted for 15 percent of the trucks involved in non-fatal crashes in the MCMIS Crash File. Ran off the road alone accounted for 12 percent of the MCMIS cases,

second behind collision with a vehicle in transport and much more common than the third-place event, collision with a fixed object (3 percent of the trucks involved in non-fatal crashes).

Table 24. Large Trucks in Crashes by First Harmful Event or First Crash Event, 1998

First Event	Fatal: FARS	Non-Fatal	
		MCMIS	GES
Collision With Vehicle in Transport	78.8%	55.3%	73.6%
Collision With Fixed Object	7.3%	3.2%	9.6%
Collision With Pedestrian	6.2%	0.5%	0.2%
Overturn (Rollover)	4.2%	3.3%	2.6%
Collision With Pedalcycle	1.1%	0.1%	0.1%
Collision With Parked Motor Vehicle	0.7%	1.5%	7.1%
Collision With Train	0.5%	0.2%	0.1%
Collision With Other Object	0.6%	1.0%	0.5%
Collision With Animal	0.2%	0.7%	0.8%
Ran Off Road	*	11.5%	*
Jackknife	*	2.4%	0.6%
Cargo Loss or Shift	*	1.3%	*
Explosion/Fire	0.0%	0.4%	0.1%
Other	0.5%	8.9%	4.6%
Missing	--	9.8%	--
Total Number	**4,935**	**93,308**	**407,000**

*These crash events are not coded in FARS or GES.
Sources: FARS, MCMIS Crash File, and GES, 1998.

For trucks involved in fatal crashes, the second-ranked first harmful event was a collision with a fixed object (7 percent). The third most common event was collision with a pedestrian (6 percent), according to FARS. When a truck collides with a pedestrian, there is a fairly large chance that the result will be a fatality or serious injury. In such crashes the pedestrian killed is usually walking in the road, improperly crossing the trafficway, or darting into the road.

For GES non-fatal crashes, collision with a fixed object ranked second (10 percent) behind collision with a vehicle in transport, and collision with a parked vehicle was third (7 percent). Collision with a pedestrian was the first harmful event for only 0.2 percent of the large trucks in GES non-fatal crashes and for 0.5 percent in MCMIS non-fatal crashes.

Type of Crash

The point of impact on vehicles involved in crashes can shed important light on the crashes. Unlike most of the tables in this profile, where fatal and non-fatal crash data are similar, there is a marked contrast between the two columns in Table 25. The front of the truck was the initial impact area for 62 percent of trucks involved in fatal crashes but for only 30 percent of the trucks involved in non-fatal crashes. Side impact crashes are much more prevalent in non-fatal truck crashes, accounting for nearly one-half (46 percent) of all the trucks involved. Rear impact crashes are about the same for fatal and non-fatal crashes, and non-collision crashes, such as rollovers, are more common in non-fatal crashes.

Table 25. Large Trucks in Crashes by Initial Impact Area, 1998

Impact Area	Fatal	Non-Fatal
Front	62.0%	29.6%
Rear	14.4%	15.7%
Left Side	9.8%	20.4%
Right Side	6.4%	25.4%
Non-collision	2.8%	7.5%
Other/Unknown	4.5%	1.5%
Total Number	**4,935**	**407,000**

Sources: FARS and GES, 1998.

When large trucks collided with passenger vehicles in fatal crashes in 1998, the front was the initial impact area for more than 60 percent of both vehicles. Thus, in a majority of the crashes, for both large trucks and passenger vehicles, the crash took place in the forward vision of the drivers. There is a large difference, however, in the back of the vehicle as an initial impact point. For large trucks the rear was the initial point of impact in 14 percent of the fatal crashes and 16 percent of the non-fatal crashes. For passenger vehicles the rear was the initial crash impact area for only 6 percent of those in fatal crashes but for 21 percent of those in non-fatal crashes. Thus, it is more than twice as likely in fatal crashes between large trucks and passenger vehicles that the truck is struck in the rear than that the passenger vehicle is struck in the rear. In non-fatal crashes the passenger vehicle is more likely to be struck in the rear than is the truck.

Motor Carriers

The MCMIS Crash File collects data on whether the motor carrier operating each vehicle involved in a crash was an interstate or intrastate carrier. For 1998 a total of 79 percent of the trucks involved in crashes were operated by interstate motor carriers. From 1994 through 1997 the percentage of trucks in the MCMIS Crash File operated by interstate carriers varied from 72 percent to 78 percent.

The only national crash database that identifies truck and bus motor carriers by name is the MCMIS Crash File. As of January 4, 2000, the MCMIS database contained information on 105,718 trucks and buses involved in crashes that occurred in 1998 as reported by the States. The file also contains data on 108,000 vehicles involved in crashes in 1997, more than 103,000 for 1996, more than 90,000 for 1995, more than 80,000 for 1994, and fewer for 1993 and 1992. A large majority of all vehicles are identified by the operating motor carrier at the time of the crash.

Crash data play a vital role in measuring motor carrier safety. FMCSA has developed a data-based motor carrier safety status analysis method, SafeStat, to guide motor carrier selection for safety compliance reviews conducted at carrier facilities. All interstate motor carriers for which FMCSA has a sufficient amount of safety data receive a SafeStat score. Safety data are collected on carrier crashes, roadside vehicle and driver safety inspections, previous carrier safety compliance reviews, safety enforcement case history, and other indicators. Thirty-six percent of the carrier score is based on crashes in the MCMIS Crash File. FMCSA field staff conduct compliance reviews on the motor carriers with the worst SafeStat scores.

To guide roadside vehicle and driver inspections, an Inspection Selection System (ISS) has been developed. The ISS has been revised to match the SafeStat system which, as noted above, relies heavily on MCMIS Crash File data. The only difference is the addition of a factor for any carrier that has never had a roadside inspection, or has not had one in a long time. When trucks and buses pull into roadside inspection stations, State personnel are able to enter the carrier identification number into a computer and receive an ISS score for the carrier. The vehicles and drivers of those carriers with high ISS scores, indicating a bad safety record, are selected more often for roadside safety inspections than are the vehicles of carriers with low scores.

MCMIS Crash File Progress

As noted in the introduction to this profile, FMCSA received crash reports on an estimated 66 percent of the large trucks involved in crashes in 1998 that met the NGA criteria for a reportable crash. One way to estimate how well each State is doing in reporting crashes to FMCSA is to compare the FARS numbers for large trucks involved in fatal crashes with the MCMIS Crash File numbers. FARS is considered a reliable data source for all fatal crashes, including fatal truck crashes. If the number of trucks involved in fatal crashes in the MCMIS Crash File is close to the FARS number for a State, that State is reporting almost all fatal truck crashes to FMCSA.

The FARS and MCMIS numbers need not match exactly. The two databases use slightly different definitions for a truck. For FARS a vehicle is a large truck if it has a GVWR over 10,000 pounds. For the MCMIS Crash File a truck must be designed, used, or maintained primarily for carrying property and must have at least two axles and six tires. Even with this difference in definitions, the FARS and MCMIS Crash File numbers should be very close.

Table 26 provides a State-by-State comparison of the MCMIS Crash File numbers for large trucks involved in fatal crashes with FARS numbers for large trucks involved in fatal crashes. The table includes the 50 States and the District of Columbia but excludes the five United States territories—Puerto Rico, the Virgin Islands, Guam, the Northern Marianas, and American Samoa.

Table 26 shows that, in total, the States reported 77 percent of the truck numbers recorded in FARS. Only 21 States reported numbers that were within 10 percent of the FARS numbers. These included big States, such as Pennsylvania and Texas, and small States such as Delaware and Wyoming. On the other hand, 10 States reported less than 50 percent of the FARS numbers. These States also included large ones, such as California and Ohio, and small ones, such as Nevada and New Mexico. Louisiana failed to report a single fatal truck crash to MCMIS, whereas FARS recorded 140 large trucks in the State as being involved in fatal crashes.

Table 26. Large Trucks in 1998 Fatal Crashes by State: FARS vs. MCMIS

State	FARS	MCMIS	State	FARS	MCMIS
Alabama	149	150	Montana	18	16
Alaska	1	0	Nebraska	41	43
Arizona	98	44	Nevada	34	10
Arkansas	105	112	New Hampshire	10	10
California	365	151	New Jersey	64	17
Colorado	52	47	New Mexico	44	8
Connecticut	29	18	New York	134	140
Delaware	18	19	North Carolina	228	192
District of Columbia	1	1	North Dakota	8	7
Florida	317	209	Ohio	189	80
Georgia	195	154	Oklahoma	106	61
Hawaii	4	3	Oregon	68	65
Idaho	23	26	Pennsylvania	178	161
Illinois	185	155	Rhode Island	3	2
Indiana	179	128	South Carolina	118	134
Iowa	83	80	South Dakota	14	14
Kansas	79	74	Tennessee	136	82
Kentucky	97	94	Texas	422	391
Louisiana	140	0	Utah	44	56
Maine	21	12	Vermont	10	9
Maryland	65	70	Virginia	109	66
Massachusetts	37	32	Washington	69	46
Michigan	147	140	West Virginia	41	25
Minnesota	78	96	Wisconsin	90	92
Mississippi	104	69	Wyoming	30	29
Missouri	155	154	**Total**	**4,935**	**3,794**

Sources: FARS and MCMIS Crash File, 1998.

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