



**NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C. 20594**

Office of Research and Engineering
Safety Studies and Statistical Analysis Division

May 29, 2008

Data Report

Large Bus Accidents and Injuries in Rural and Urban Areas, 2000-2006

A. ACCIDENT INFORMATION

Date and Time: January 6, 2008, 8:02 p.m. MST
Location: Southbound US Rt. 163, near MP29
Mexican Hat, San Juan County, Utah
Vehicle: 2007 MCI Model J4500, 56-Passenger Motorcoach
Motor Carrier: Busco, Inc., dba Arrow Stage Lines
Fatalities: 9
Injuries: 44
NTSB#: HWY-08-MH-012

B. SAFETY STUDIES AND STATISTICAL ANALYSIS DIVISION

Bruce G. Coury, Ph.D.
Transportation Research Analyst
Office of Research and Engineering
Safety Studies and Statistical Analysis Division, RE-10
Washington, DC 20594

C. ACCIDENT SUMMARY

On January 6, 2008 about 3:30 p.m. MST a 2007 MCI 56-passenger motorcoach with 253 passengers on-board departed Telluride, CO enroute to Phoenix, AZ, as part of a 17-motorcoach charter. The motorcoach was returning from a three-day weekend ski trip. The motorcoaches were diverted to an alternate route that included US Route 191 and 163 in Utah, due to the closure of Colorado State Route 145 because of snow. Colorado State Route 145 is the normal route used from Telluride to Phoenix.

At about 8:02 p.m. MST the motorcoach was traveling southbound descending a 6 percent grade leading to a curve to the left, 1,800 feet north of milepost 29, at a driver reported speed of 65 mph. After entering the curve the motorcoach departed the roadway at a shallow angle striking the guardrail with the right rear wheel about 61 feet before the end of the guardrail.

The motorcoach began rotating in a counter clockwise direction as it descended an embankment. The motorcoach began to overturn and struck several rocks in a creek bed at the bottom of the embankment. The motorcoach came to rest on its wheels after overturning 360 degrees. During the rollover sequence the entire roof of the motorcoach separated from the body, and 51 of the 53 occupants were ejected. As a result, nine passengers were fatally injured, 43 passengers and the driver received various degrees of injuries from minor to critical.

The weather was cloudy and the roadway was dry at the time of the accident.

D. DETAILS OF THE DATA REPORT

Travel on rural roads has been recognized as especially hazardous. According to a recent NHTSA report that compared rural and urban accidents in 1994 – 2003, rural roads accounted for almost 60% of the fatal crashes and 60% of the fatalities, but only 39% of the total vehicle miles traveled.¹ During that period there were 218,539 fatal rural road accidents resulting in 249,986 fatalities. The report highlighted the differences between rural and urban roads, emphasizing the relatively greater number of fatal accidents and fatalities, and the higher rural road fatal accident and fatality rates.

This Data Report focuses on charter/tour bus travel on rural roads. The report uses fatal accident data from the National Highway Traffic Safety Administration's (NHTSA) Fatality Analysis Reporting System (FARS) to determine the scope of charter/tour bus accidents in rural areas. The report places the scope of the problem in the context of fatal accidents involving large buses engaged in charter and tour operations, scheduled service, commuter service, and shuttle bus service for the period 2000 – 2006. The report begins with an overview of the large bus fatal accident data, then uses these data to show:

- Differences between rural and urban charter/tour bus accidents
- The extent of fatal accidents involving charter/tour buses in rural areas
- Fatalities and injuries for both bus occupants and occupants of other vehicles

¹ U.S. Department of Transportation, National Highway Traffic Safety Administration, *Contrasting Rural and Urban Fatal Crashes, 1994 – 2003*, DOT HS 809 896 (Washington, DC: NHTSA, 2005).

- Number of injured transported to hospitals

D.1 Fatality Analysis Reporting System (FARS)

This report begins with accident data drawn from NHTSA's FARS database. FARS provides a census of all fatal crashes within the United States, including the District of Columbia and Puerto Rico. A fatal crash is included in FARS if it involved "a motor vehicle traveling on a traffic way customarily open to the public, and must result in the death of a person (occupant of a vehicle or a nonmotorist) within 30 days of the crash."² FARS has documented fatal highway crashes since 1975, and provides data for each crash in terms of accident event characteristics, the people and vehicles involved, and the extent and type of injuries suffered by vehicle occupants and nonmotorists. Data in FARS are based on State police accident reports, and FARS analysts will verify the data and find as much of the missing data as possible. Because FARS is a census of all fatal accidents, and its accuracy is verified by a FARS analyst, researchers treat FARS data with confidence that it can be used to accurately characterize fatal highway accidents. The latest data is from calendar year 2006, and is available, with documentation, from the FARS website at <http://www-fars.nhtsa.dot.gov/Main/index.aspx>.

Although FARS is a census of all fatal highway accidents in any given year back to 1975, it represents only a very small subset of all accidents in a year. For example, in 2005, there were 39,252 fatal accidents, representing less than 1% of all the accidents that occurred in that year.³ As a result, large bus accidents involving injuries, but no fatalities, are not included in this analysis.

D.2 Selecting Fatal Accidents Involving Large Buses from FARS

Fatal accidents involving large buses were selected from FARS for the period 2000 – 2006. The specific criteria for the set of accidents are described in detail in Appendix A. Briefly, a large bus is defined in this report as a bus used in tours, in scheduled service, in commuter service, or as a shuttle bus, has a Gross Vehicle Weight Rating (GVWR) greater than 10,000 lb, and is configured to carry more than 15 passengers. This analysis specifically uses FARS criteria related to Bus Use, Bus Body Type, Gross Vehicle Weight Rating (GVWR), and Vehicle Configuration.⁴ No school buses, either in type or use, are included in this analysis.

The period 2000 – 2006 was chosen for a specific reason. Prior to 2000, Bus Use was not accurately recorded, and any analysis of bus activity relied on existing FARS criteria related to the Bus Body Type, GVWR, and Vehicle Configuration. As a result, prior to 2000, accurately determining how a bus was being used was difficult. Given the requirement to accurately identify accidents involving charter/tour buses in this analysis, no data prior to 2000 was used.

The data is subdivided into three bus types: motorcoaches, transit/city buses, and buses with a GVWR between 10,000lb and 26,000 lb. There is no definitive definition of a

² U.S. Department of Transportation, National Highway Traffic Safety Administration, National Center for Statistics and Analysis, *FARS Analytic Reference Guide 1975 – 2006* (Washington, DC: DOT), p. F-i.

³ U.S. Department of Transportation, Bureau of Transportation Statistics, Table 2-17: *Motor Vehicle Safety Data*. See www.bts.gov/publications/national_transportation_statistics/

⁴ See *FARS Analytic Reference Guide 1975 – 2006* for more details.

“motorcoach” in FARS or in NHTSA regulations. In previous analyses of “motorcoach”⁵ accidents this type of bus was typically treated as a cross-country/intercity bus, implying that the bus was capable of carrying upwards of 55 passengers or more over long distances at highway speeds. Consequently, the bus could be of type “motorcoach,” or being used in a motorcoach way.

However, FARS and police accident reports allow other types of bus body-type codes, even when the bus was operating as if it was a motorcoach. Consequently, use of only one of the bus criteria in FARS to identify motorcoaches can result in an underestimation of the total number of fatal accidents involving a large bus that can be used to carry upwards of 55 passengers or more over long distances. Such a bus must have a GVWR greater than 26,000 lb, be configured to carry more than 15 passengers, and be used as a charter/tour bus, in scheduled or commuter service, or as a shuttle bus. These criteria defined a “motorcoach” in this analysis, and emphasized both the type of bus and the way in which it was being used. More specific details about the motorcoach selection criteria is presented in Appendix A. Large buses with a GVWR between 10,000 lb and 26,000 lb are typically comprised of a medium or heavy duty truck cab-chassis with a passenger-carrying body added to it.

Finally, injury data were compiled for all of the fatal accidents used in this report. One purpose of this report was to show the extent of injuries in fatal accidents involving large buses as a way to illustrate the need for accident notification and emergency medical services. Consequently, fatal and nonfatal injury data, and data indicating transport to a hospital, are shown for both bus occupants and occupants of the other vehicles involved in the accident.

E. RESULTS

There were a total of 954 fatal accidents involving large buses in 2000-2006 (Table 1), resulting in 1,151 fatalities and 2,873 nonfatal injuries (Table 3). Fatal accidents involving charter/tour buses accounted for 202 of the accidents (representing 21% of the total), resulting in 298 fatalities and 1,402 nonfatal injuries. The following sections discuss fatal accidents and injuries in more detail, with specific focus on comparisons between rural and urban accidents.

Table 1: Fatal Accidents Involving Large Buses, 2000-2006

Bus Use	2000	2001	2002	2003	2004	2005	2006	Total
Charter/Tour	27	33	30	20	37	36	19	202
Scheduled Service	110	80	73	82	65	57	80	547
Commuter	21	28	21	22	14	22	30	158
Shuttle	6	5	9	7	8	10	2	47
Total	164	146	133	131	124	125	131	954

⁵ For example, see U.S. Department of Transportation, National Highway Traffic Safety Administration, National Center for Statistics and Analysis, *NHTSA’s Approach to Motorcoach Safety* (Washington, DC: DOT, 2007).

E.1 Fatal Accidents Involving Large Buses

The 954 fatal accidents involving large buses occurred primarily in urban areas (Table 2). There were 741 urban fatal accidents, resulting in 843 fatalities and 1,556 nonfatal injuries, accounting for 78% of the fatal accidents, 73% of the fatalities, and 54% of the nonfatal injuries (Table 3). Accidents involving buses in scheduled service accounted for the majority (65%) of the urban accidents, followed by buses in commuter service (18%), charter/tour buses (13%), and shuttle buses (4%). Almost all of the scheduled service bus accidents (88%) occurred in urban areas, and almost all of these types of urban accidents (88%) involved transit buses. The large number of urban accidents involving buses in scheduled and in commuter service reflect the high level of public transport provided by buses in populated areas.

Table 2: Fatal Bus Accidents by Rural or Urban Location and Type of Bus, 2000-2006

	Rural	Urban
Charter/Tour		
Motorcoach	88	89
Transit/City Bus	3	7
GVWR 10-26K	5	3
Scheduled Service		
Motorcoach	14	54
Transit/City Bus	33	426
GVWR 10-26K	1	3
Commuter Service		
Motorcoach	3	10
Transit/City Bus	16	117
GVWR 10-26K	2	5
Shuttle Service		
Motorcoach	8	11
Transit/City Bus	1	6
GVWR 10-26K	8	10
Total	182	741

In rural areas, charter/tour buses, rather than scheduled service buses, accounted for greatest proportion of accidents. Charter/tour buses were involved in more than half (53%) of the fatal rural accidents, with the remaining accidents divided among scheduled service (26%), commuter service (12%), and shuttle bus service (9%). Motorcoaches were involved in more than 60% of all these rural accidents, and almost all of the rural accidents involved charter/tour buses.

These data show that rural fatal accidents involving large buses are primarily comprised of motorcoaches being used in a tour or as a charter. This result is in contrast to urban accidents that are dominated by transit/city buses in scheduled service.

E.2 Fatalities and Injuries

E2.1. All Fatalities and Injuries. Fatalities and injuries resulting from the fatal accidents involving large buses is shown in shown in Table 3. As might be expected, the large number of urban accidents produced the greatest number of fatalities and nonfatal injuries. However, nonfatal injuries were more evenly distributed between urban and rural accidents.

In urban areas, there were 843 fatalities and 1,556 nonfatal injuries in fatal accidents involving large buses. Accidents involving buses in scheduled service accounted for most of the urban fatalities (61%) and nonfatal injuries (52%).

In rural areas, there were 298 fatalities and 1,294 nonfatal injuries. Rural fatal accidents involving charter/tour buses accounted for 57% of the rural fatalities and 71% of the rural nonfatal injuries. It is interesting to note that rural charter/tour bus fatal accidents resulted in more fatalities and nonfatal injuries than urban charter/tour bus accidents, a pattern that is exactly the reverse for accidents involving buses in any other type of service or use. In fact, rural accidents involving charter/tour buses resulted in almost twice the number of nonfatal injuries as the same type of urban accidents.

E2.2. Bus Occupants. Overall, bus occupants accounted for a small percentage (15%) of the total number of fatalities in fatal accidents involving large buses (Table 4). However, a greater number of bus occupants were fatally injured in rural accidents than in urban accidents, with these fatalities accounting for almost a third of the total number of people killed in rural accidents. In contrast, bus occupants accounted for only 8% of the fatalities in urban accidents. The proportion of charter/tour bus occupants fatally injured in rural accidents (25%) represented a greater proportion of the total number of rural fatalities than did the urban charter/tour bus occupants fatally injured in urban accidents (2%).

Furthermore, bus occupants were more likely to be nonfatally than fatally injured in these accidents involving large buses (Table 4). Bus occupants accounted for 88% of the nonfatal injuries in rural accidents, and 76% of the nonfatal injuries in urban accidents.

Rural accidents involving charter/tour buses accounted for the largest proportion of all rural nonfatal injuries (71%). In fact, almost all (90%) of the nonfatal injuries in these rural charter/tour bus accidents occurred on the bus. Furthermore, rural fatal accidents involving

charter/tour buses accounted for only 10% of the total number of fatal accidents involving large buses, but resulted in 15% of the total fatalities and 32% of the total nonfatal injuries. In addition, passengers of buses involved in rural fatal accidents were less likely to escape injury than their urban counterparts; only 8% of bus occupants in rural accidents were reported uninjured, whereas 33% of bus occupants in urban areas were uninjured.

Table 3: Fatalities and Nonfatal Injuries in Fatal Accidents Involving Large Buses, 2000-2006

	Total	Rural	Urban
Fatalities			
Charter/Tour	298	169	127
Scheduled Service	582	58	517
Commuter	184	40	143
Shuttle	87	31	56
Total	1151	298	843
Nonfatal Injuries			
Charter/Tour	1402	920	470
Scheduled Service	1041	227	804
Commuter	199	66	132
Shuttle	231	81	150
Total	2873	1294	1556
Total Fatalities & Injuries	4024	1592	2399
Uninjured			
Charter/Tour	260	108	149
Scheduled Service	508	41	460
Commuter	156	21	131
Shuttle	46	18	28
Total Uninjured	970	188	768

Table 4: Bus Occupant Fatalities and Nonfatal Injuries
in Fatal Accidents Involving Large Buses, 2000-2006

	Total	Rural	Urban
Fatalities			
Charter/Tour	93	73	20
Scheduled Service	14	6	8
Commuter	9	7	2
Shuttle	52	8	34
Total	168	94	64
Nonfatal Injuries			
Charter/Tour	1230	832	389
Scheduled Service	763	187	571
Commuter	149	55	94
Shuttle	198	68	130
Total	2340	1142	1184
Total Fatalities & Injuries	2508	1236	1248
Uninjured			
Charter/Tour	156	53	101
Scheduled Service	417	29	382
Commuter	129	16	112
Shuttle	32	10	22
Total Uninjured	734	108	617

E.3 Injured Transported to Hospitals

The demands placed on emergency response and emergency medical services can be estimated by the number injured in the accident who were transported to a hospital. FARS provides hospital transport data for all injured, and indicates whether the injured person was an occupant of the bus. Almost 75% of all the people injured in fatal accidents involving large buses were transported to a hospital (Table 5). This was the case for both rural and urban areas.

Table 5: Injured Transported to Hospital, 2000-2006

	Total	Rural	Urban
Fatalities Transported			
Charter/Tour	98	44	53
Scheduled Service	363	18	340
Commuter	93	7	85
Shuttle	25	7	18
Total	579	76	496
Nonfatal Injuries Transported			
Charter/Tour	1204	799	399
Scheduled Service	802	164	632
Commuter	173	58	114
Shuttle	190	73	117
Total	2369	1094	1262
Total Transported	2948	1170	1758

As might be expected, a greater proportion of the nonfatally injured were transported to a hospital (82%) than the fatally injured (50%). In rural areas, a much smaller proportion of the fatally injured (26%) were transported, perhaps reflecting the much greater severity of rural accidents and the greater emergency medical response times in rural areas.

For all accidents, a large proportion of the injured who were transported to a hospital (66%) were bus occupants (Table 6). In rural fatal accidents involving large buses, most of the transported injured were bus occupants (84%). In urban accidents, a much smaller proportion of the transported injured were bus occupants (54%).

When only rural accidents involving charter/tour buses were considered, bus occupants accounted for almost all (88%) of the accident victims transported to a hospital. Almost all (98%) of these bus occupant transports had suffered nonfatal injuries.

Table 6: Injured Bus Occupants Transported to Hospital, 2000-2006

	Total	Rural	Urban
Fatalities Transported			
Charter/Tour	15	11	4
Scheduled Service	8	2	6
Commuter	2	0	2
Shuttle	8	4	4
Total	33	17	16
Nonfatal Injuries Transported			
Charter/Tour	1065	729	333
Scheduled Service	550	124	425
Commuter	125	47	78
Shuttle	159	62	97
Total	1899	962	933
Total Transported	1932	979	949

F. SUMMARY

Rural fatal accidents involving large buses are primarily comprised of motorcoaches being used as a charter or in a tour. Overall, rural fatal accidents involving charter/tour buses accounted for only 10% of the total number of fatal accidents involving large buses, but resulted in 15% of the total fatalities and 32% of the total nonfatal injuries. Charter/tour buses were involved in more than half (53%) of the fatal rural accidents, with the remaining bus accidents divided among scheduled service (26%), commuter service (12%), and shuttle bus service (9%). This result is in contrast to urban accidents that are dominated by transit/city buses in scheduled service.

Rural fatal accidents involving charter/tour buses accounted for more than half of the rural fatalities and almost three quarters of the rural nonfatal injuries, with almost all of the nonfatal injuries suffered by the occupants of the bus. The number of charter/tour bus occupants fatally injured in rural accidents was also proportionally higher (25% of rural large bus accident

fatalities) than the charter/tour bus occupants fatally injured in urban accidents (2% of urban large bus accident fatalities). It is also interesting to note that passengers of buses involved in rural fatal accidents were less likely to escape injury than their urban counterparts.

The number of persons transported to hospitals was used as an estimate of the demands placed on rural emergency response. The data showed that in rural accidents involving large buses, most of the people transported to hospitals were bus occupants. When only those accidents involving charter/tour buses were considered, almost all of the transported accident victims were bus occupants.

G. DATA LIMITATIONS AND CONSTRAINTS

G.1 Accidents in FARS

As previously discussed in Section D.1, FARS includes only those accidents where at least one fatality has occurred. FARS is a census of all fatal crashes within the United States, District of Columbia, and Puerto Rico, and a candidate crash is included in FARS if it involved a motor vehicle traveling on a public roadway and the death of a vehicle occupant or nonmotorist occurred within 30 days of the accident. Consequently, crashes that result only in nonfatal injuries or property damage are not included in FARS data.

This characteristic of FARS is an important limitation in this Data Report because the full extent of the risk of injury during rural travel cannot be determined using only FARS data. In fact, fatal accidents account for a very small proportion of the total number of highway accidents in any given year. For example, fatal accidents accounted for less than 1% of the total number of accidents in 2005. Although fatal accidents can be viewed as the worst case scenario where the severity of the crash is sufficient to produce fatal injuries, they may not adequately characterize the kinds of accidents where nonfatal, but severe, injuries can occur. An accurate estimate of these types of accidents would be needed to adequately assess many of the risks of rural road travel (for example, the demands placed on emergency medical response and services).

In addition, fatal rural accidents involving large buses represent a small proportion of all fatal rural accidents. Given the fact that almost 60% of all fatal accidents occur on rural roads, the magnitude of rural road travel risk may be substantially higher than shown in this report.

G.2 Charter/Tour Bus Activity in Rural Areas

The calculation of accident rates to characterize accident risk is dependent upon accurate measures of activity. Measures of activity, such as vehicle miles traveled or passenger populations, are used as the basis for exposure measures to risk. These measures of exposure are used by Federal and State highway agencies in safety programs to calculate accident rates, and to evaluate accident risk and help pinpoint areas of high risk on highways.

Accident rates are missing from this Data Report because accurate estimates of large bus activity are not readily available or reported. This is especially true for charter/tour bus operations in rural areas where travel patterns, travel characteristics, driver and passenger demographics, and

seasonal variations are unknown. For example, the charter/tour bus involved in this accident was one of 17 buses traveling between a population center to a recreational area. Whether this was a rare, single trip or a regularly occurring trip is unknown, and the frequency with which the route is taken by such buses cannot be easily determined.

There are industry estimates of the number of passengers carried by buses, but these estimates are typically aggregated and contain insufficient detail to support the kinds of analyses found in this report. Furthermore, the source estimates and the validity of the methods used to obtain the data underlying the estimates cannot be adequately determined. This is especially problematic for assessing the risks of rural road travel, because there does not appear to be any data collected on large bus travel in rural areas, especially in those areas where accident notification and emergency response might be an issue.

Submitted By:

Bruce G. Coury, Ph.D.
Transportation Research Analyst

APPENDIX A FARS CODES, DEFINITIONS, AND SELECTION CRITERIA

As previously discussed, FARS provides a census of all fatal crashes within the United States, including the District of Columbia and Puerto Rico. FARS has documented fatal highway crashes since 1975, and provides data for each crash in terms of accident event characteristics, the people and vehicles involved, and the extent and type of injuries suffered by vehicle occupants and nonmotorists. Data in FARS are drawn from State police accident reports, and verified by a FARS analysts.

The FARS database is organized into three principle files: Accident, Vehicle, and Person. Each of these files contains variables that code the characteristics of a fatal crash (called a *case*). In this analysis all three files were used. The variables from each of these files that were used in this Data Report and their respective codes and definitions are shown in Table A.1.

Note that only those accidents meeting the specific criteria shown in Table A.1 were included. Almost all the variables in the table have an “unknown” code; consequently in any analysis where an unknown was possible in a critical variable, the case was excluded from the analysis. For example, in 31 of the 954 fatal accidents involving large buses, the variable roadway function class was coded unknown. As a result, these 31 accident cases were excluded from any analysis that compared rural and urban accidents.

The basic steps used to select specific accidents, types of buses, and bus occupants, and rural or urban accidents are described below.

Step 1: Select the period of time for the accidents. As previously discussed, calendar years 2000 – 2006 were chosen for this analysis because one of the important variables, Bus Use, was not universally coded before 2000. Before 2000, finding accidents involving buses that were being used in a tour or charter would have been difficult.

Step 2: Select fatal accidents involving large buses. In this step of the analysis, accidents involving large buses being used in scheduled service, commuter service, or as a charter/tour or shuttle bus were selected. Consequently, the selected accidents had to meet the following criteria:

- a. A vehicle with a bus body type had to be involved in the accident. Accidents with a FARS Body Type code of 51, 52, 58, or 59 were selected. These codes excluded school bus body types.
- b. The bus was being used in scheduled or commuter service, or as a charter/tour or shuttle bus. The set of accidents involving buses was further limited to those that met FARS BUS_USE code equal to 4, 5, 6 or 7. These codes excluded any type of bus being used as a school bus.

Table A.1: FARS Variables, Codes, and Code Definitions Used in the Data Report

Variable	FARS Variable Name	FARS Codes Used In Analysis & Definitions
Accident File		
Year	YEAR	2000-2006
Fatalities	FATAL	Count of total fatalities in an accident
Roadway Function Class (using FHWA classification guidelines)	ROAD_FNC	01 - Rural Principal Arterial - Interstate 02 - Rural Principal Arterial - Other 03 - Rural Minor Arterial 04 - Rural Major Collector 05 - Rural Minor Collector 06 - Rural Local Road or Street 09 - Rural Unknown 11 - Urban Principal Arterial - Interstate 12 - Urban Principal Arterial - Other Freeways or Expressways 13 - Urban Principal Arterial 14 - Urban Minor Arterial 15 - Urban Collector 16 - Urban Local Road or Street 19 - Urban Unknown
Vehicle File		
Way in Which Bus Is Being Used in Transport	BUS_USE	4 - Used as a Scheduled Service Bus 5 - Used as a Tour Bus 6 - Used as a Commuter Bus 7 - Used as a Shuttle Bus
Type of Bus Body	BODY_TYP	51 - Cross-Country/Intercity Bus (i.e., Greyhound) 52 - Transit Bus (city Bus) 58 - Other Bus Type 59 - Unknown Bus Type
Gross Vehicle Weight Rating (GVWR) is the maximum allowable total weight of the bus, including the weight of the vehicle plus fuel, passengers, and cargo	GVWR	2 - 10,000 lbs-26,000 lbs 3 - 26,000 lbs or more
Configuration of the Vehicle	V_CONFIG	21 - Bus (seats for more than 15 people, including driver)

Variable	FARS Variable Name	FARS Codes Used In Analysis & Definitions
Person File		
Body Type of the Vehicle Occupied by Injured and Uninjured Persons		Following codes used to determine if person was a bus occupant: 51 - Cross-Country/Intercity Bus (i.e., Greyhound) 52 - Transit Bus (city Bus) 58 - Other Bus Type 59 - Unknown Bus Type
Severity of Injuries	INJ_SEV	0 - No Injury (O) 1 - Possible Injury (C) 2 - Nonincapacitating Evident Injury (B) 3 - Incapacity Injury (A) 4 - Fatal Injury (K) 5 - Injured, Severity Unknown
Person's Type in Accident	PER_TYP	01 - Driver 02 - Passenger of a Motor Vehicle in Transport 03 - Occupant of a Motor Vehicle Not in Transport 04 - Occupant of a Non-Motor Vehicle Transport Device 05 - Pedestrian 06 - Bicyclist 07 - Other Cyclist 08 - Other Pedestrian (includes Persons on Personal Conveyances) 09 - Unknown Occupant Type in a Motor Vehicle in Transport 19 - Unknown Type of Nonmotorist
Transported to Hospital	HOSPITAL	For years 2001-2006: 0 - No 1 - Yes For year 2000: 0 - No 1 - Yes 7 - Died at the Scene 8 - Died En Route

- c. All buses had a Gross Vehicle Weight Rating (GVWR) greater than 10,000 lb. The set of accidents involving large buses being used in scheduled or commuter service, or as a charter/tour or shuttle bus was further restricted to those with a FARS GVWR code of 2 or 3.
- d. Finally, all the buses were required to be configured to hold more than 15 passengers. This required that all the fatal accidents in the final set be equal to FARS V_CONFIG code 21.

These criteria excluded all school buses, any type of bus being used as a school bus, and small passengers vans configured to carry 15 passengers or less.

Step 3: Identify different types of buses. In the analysis, buses were characterized as motorcoaches, transit/city buses, and large buses with a GVWR between 10,000 lb and 26,000 lb. These distinctions allowed comparisons among buses of different types that may be used in a similar way. For example, there are motorcoaches and smaller truck cab-chassis based buses that are being used for tours and charters. This is also the case for buses used in shuttle service. In addition, transit/city buses are specifically designed for use in urban areas requiring slow speeds, frequent stops, and accommodating both seated and standing passengers.

- a. Transit/City buses that were in the final set of fatal accidents derived from Steps 1 and 2 were identified by the FARS BODY_TYP code 52 (Transit/City Bus).
- b. Large buses with a GVWR between 10,000 lb and 26,000 lb were identified by the FARS GVWR code 2.

Motorcoaches required multiple criteria. As previously discussed, there is no FARS definition of a motorcoach, or a motorcoach definition in NHTSA regulations. In practice, a number of definitions have been used. In this Data Report, a motorcoach was defined in this analysis as any large bus with a GVWR greater than 26,000 lb and configured to carry more than 15 passengers that was being used as a charter/tour bus, in scheduled service, in commuter service, or as a shuttle bus. This definition would include the cross/country intercity bus type used in previous NHTSA and industry analyses, and any other types of buses that were being used in a motorcoach way. Given that all large buses in the set of fatal accidents met the FARS V_CONFIG code equal to 21 (seats for more than 15 people, including driver), the following criteria were used in this report to characterize motorcoaches.

- a. All buses that met FARS BODY_TYP code 51 (Cross-Country/Intercity Bus).
- b. All buses with a FARS BODY_TYP code of 58 or 59 that met FARS BUS_USE code 4, 5, 6 or 7, and FARS GVWR code 3.

Step 4: Identify bus occupants. The analysis required evaluating bus occupant injuries and transport to hospital of bus occupants. Injured transported to a hospital were identified by using FARS INJ_SEV codes 1, 2, 3, 4 or 5 and FARS HOSPITAL code 1 (1, 7 or 8 for year 2000).

Bus occupants can be identified by using the FARS BODY_TYP variable in the Person File to determine the type of vehicle in which the person was an occupant. Bus occupants were identified by using the Person File FARS Body_TYP codes of 51, 52, 58 or 59.

Step 5: Identify rural or urban accident. Many of the analyses in this report compared rural and urban accidents. Selecting rural and urban accidents involving large buses was based on FHWA's Roadway Function Classification system, a method typically used in the analysis of highway accident data to characterize rural or urban accidents. In this report, rural and urban accidents involving large buses were identified using FARS ROAD_FNC codes 1 through 9 for rural accidents, and codes 11 through 19 for urban accidents.