

**FACTBOOK ON COMBINATION VEHICLES
IN FATAL ACCIDENTS,
1975-1981**

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16. Abstract <p>This factbook presents statistical data about combination vehicles in fatal accidents on American roads. It is based on data available from the Fatal Accident Reporting System (FARS) of the U.S. National Highway Traffic Safety Administration (NHTSA).</p> <p>It contains five sections. The first section considers the frequency of combination-vehicle fatal accident involvements compared with involvements of other types of vehicles over the period 1975-1981. The second section looks at combination vehicle accident characteristics in relation to the type of accident. The third section provides data on combination vehicle driver characteristics in relation to the type of accident. The fourth section looks at accident characteristics in relation to combination vehicle occupant deaths. The fifth section contains miscellaneous tables interrelating various accident characteristics. The last four sections contain data for 1976-1980 only.</p>					
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EXECUTIVE SUMMARY

This "Factbook" is an updating and improvement of the information presented in the earlier Combination Vehicles: Five-Year Accident Experience. It is based on data from the National Highway Traffic Safety Administration's Fatal Accident Reporting System (FARS). To more accurately portray the extent of each type of vehicle's participation in the nation's motor vehicle accident and fatality scene, the data are generally reported in numbers and percentages of vehicle "involvement," rather than numbers and percentages of accidents per se.

The five sections of this fatal accident reference book are concerned with (1) combination vehicle and other motor vehicle fatal accident involvement trends, (2) combination vehicle fatal accident characteristics, (3) combination vehicle fatal accident driver characteristics, (4) combination vehicle fatal accident occupant injuries and accident characteristics, and (5) miscellaneous accident and occupant injury data.

The "Factbook" reports that the combination truck fatal accident involvement rate rose from 5.2 percent in 1975 to 7.0 percent in 1979. This declined to 6.1 percent in 1980 and increased just slightly to 6.3 percent in 1981. Over the 1975 through 1981 period almost 340,000 people were killed in the United States in motor vehicle accidents, 30,000 of whom (8.9 percent) were in 25,000 accidents involving combination vehicles. Over 6,000 of those fatalities were occupants of combination vehicles.

Seventy-seven percent of combination truck fatal accident involvements are in two-or-more-vehicle accidents, compared to 57 percent for both passenger cars and all other trucks. As would be expected because of the great weight differential, multi-vehicle accidents involving a combination truck and a smaller vehicle are much more likely to be fatal to the occupants of the smaller vehicle. Seven percent of the fatal combination vehicle involvements are collisions with a pedestrian or other nonmotorist, one percent are collisions with a train, and 15 percent involve the combination vehicle alone (collision with a fixed object, overturning, etc.).

Seventy-two percent of combination truck fatal accident involvements are on rural highways. About one-quarter of the fatal involvements take place on limited access highways, while 17 percent take place on U.S. and state multi-lane highways, and 45 percent take place on U.S. and state two-lane highways. Seventy-three percent take place on "high speed" (55 mph speed limit) roadways. About 45 percent of the fatal involvements take place during the 6 p.m. to 6 a.m. "night" period.

Only five percent of the combination vehicles involved in fatal accidents were reported as having mechanical defects. Those few defects were almost exclusively tire, wheel, and brake system related. Likewise, according to the available FARS data, combination vehicle

drivers in fatal accidents were involved with alcohol less than five percent of the time, compared to about 28 percent alcohol involvement for all motor vehicle drivers in fatal accidents.¹

Rollovers were involved in 56 percent of the total combination truck occupant fatalities. One-third of the fatally-injured combination-truck occupants were totally or partially ejected (57 percent of them in conjunction with a vehicle rollover). Among the occupants of combination vehicles involved in fatal accidents, the survivors were reported to be wearing seat belts three times as often as the fatalities. There was a fire or explosion in the combination vehicle in five percent of the fatal accident involvements. Combination vehicle occupants who were ejected in the fatal crashes were much more likely to be killed than the occupants who were not ejected.

¹Because of the underreporting of alcohol involvement in some states both of these percentages are probably smaller than the true national values. See NHTSA Alcohol Involvement in Traffic Accidents: Recent Estimates From the National Center for Statistics and Analysis, NHTSA Technical Report DOT-HS-806-209, May 1982.

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1975-1981

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INTRODUCTION

In July 1980 the Highway Safety Research Institute published Combination Vehicles: Five-Year Accident Experience with the financial support of the Motor Vehicle Manufacturers Association. This volume is a substantially revised update of that report to include complete 1979, 1980, and some 1981 fatal accident data. Its publication is also supported by the Motor Vehicle Manufacturers Association.

In addition to the time period covered there are four basic changes in the data presented in this book:

1. Except for the national estimates of vehicle miles traveled by vehicle type and state estimates of diesel fuel consumption, all data presented here come from the Fatal Accident Reporting System (FARS). This accident reporting system was established in 1975 to provide a comprehensive national databank on the human, vehicle, and environmental characteristics of motor vehicle accidents in which at least one participant died within 30 days of the accident. There have been some changes in data variables and coding conventions during the seven years of FARS data collection, but most variables are consistent for the whole period. Where appropriate, tables have been footnoted to indicate such changes. As would be expected with a new data collection system, the data are somewhat less complete and reliable in 1975 than in subsequent years.

2. Almost all of the data presented here relate to frequencies and percentages of vehicle involvements in fatal accidents, not to frequencies of accidents per se. Since about two-fifths of fatal accidents involve more than one vehicle, it seems misleading to discuss the number of accidents which involve one or more vehicles of a certain type. For example, suppose one had the following distribution of vehicle types in fatal accidents:

	Accidents	Cars	Trucks
Single Car	40	40	0
Two Cars	10	20	0
Single Truck	10	0	10
Two Trucks	10	0	20
One Car, One Truck	30	30	30
Total	100	90	60

In this distribution 50 percent of the accidents involved one or more trucks, but at the same time 80 percent of the accidents involved one or more cars. It seems more appropriate to use percentages which sum to 100, that is, in this example, to report that 40 percent of the vehicles involved in fatal accidents were trucks and 60 percent were cars. Except for Tables 1.1 and 1.5, all accident data in this report show frequencies of vehicle involvements or of vehicle occupants, not frequencies of accidents.

3. Only a few tables present year-by-year comparisons for the accident characteristics of interest, since there is rarely much variation from year to year in the distributions presented. Instead the accident data have been aggregated over the 1976-1980 years, and most tables present the distributions on the variables of interest within five basic accident type categories: Single Vehicle with a Pedestrian/Bicyclist, Single Vehicle with a Train, Other Single Vehicle, Two Vehicles, and Three or More Vehicles. In addition a number of two-way tabulations of accident characteristic variables are presented in Section Five. It is hoped that these presentations will be of greater utility than the year-by-year data presented in the earlier report.

4. The earlier factbook was based on individual year FARS data sets for 1975 to 1979, and Puerto Rico was included in the data base. The 1979 data set was only about 85 percent complete at the time of analysis. The current report is based on a FARS summary data set for 1975-1979 (Version of February 6, 1981), an individual 1980 data set (Version of July 29, 1981), and an individual 1981 data set (Version of July 12, 1982). Puerto Rico data are not included in any of these data sets as currently constituted at The University of Michigan Transportation Research Institute.

It should be noted that the National Highway Traffic Safety Administration (NHTSA) has provided a new summary FARS data set for 1975-1980. The July 12, 1982, version of this summary file has the same number of total accidents for 1975-1979 as the earlier 1975-1979 summary, but there are now four accidents with missing data on the year variable (three apparently from 1975 and one apparently from 1977). This 1975-1980 summary data set also contains 13 additional accidents for 1980. These accidents involved 18 additional vehicles and 14 additional fatalities, including three additional two-unit combination vehicles. There is also one more two-unit combination vehicle for 1979 than in the earlier 1975-1979 summary data set, although the total number of 1979 vehicles did not change. This new 1975-1980 summary file has been used only for the state data in Appendix A.

Accuracy of FARS Combination Vehicle Classifications

The data presented in this report are of necessity based on the vehicle classification provided in each annual FARS data set which is collated by the National Highway Traffic Safety Administration from the fatal accident reports provided by the individual states. However, there appear to be serious problems of completeness and accuracy in the vehicle classifications provided for some of the states for some of the

seven years of FARS data. As might be expected, these problems appear most serious in 1975, the first year of FARS data collection.

The 1975 FARS vehicle type code had ten automobile types (including "unknown"), three motorcycle types (including "unknown"), five bus types (including "unknown"), ten truck types (including "unknown"), and seven special vehicle types (e.g., snowmobile). In addition there was a final "unknown" category for use when even the general body type was not known. A fire truck category was added to the special vehicles group in 1976, and moped and truck-tractor-without-trailer (bobtail) categories were added to the classification system in 1977 when the passenger vehicle types were reduced to seven.

In 1975 1.7 percent of the vehicles involved in fatal accidents were classified as unknown vehicle types and a further 1.1 percent were classified as unknown truck types. By 1980 these percentages had decreased to 0.7 percent and 0.1 percent, respectively, but in 1981 they increased again to 1.2 percent and 0.4 percent, respectively. Thus it is apparent that each year there was a substantial amount of missing data on vehicle types, and some of these "unknown" types could have been combination vehicles.

In addition to the problem of unknown data, There are some uncertainties about the accuracy of truck type classification in the seven years of FARS data on which this report is based. In 14 states there are unexpectedly large year-to-year variations in the reported numbers of combination vehicles involved in fatal accidents. Most of the possible discrepancies are in the 1975 data when 10 states appear to have undercounts of combination vehicle involvements. These are Alabama, Connecticut, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Mississippi, Missouri, and South Carolina. The data appear much more reasonable in 1976, but still the numbers appear low in Connecticut, Maryland, and South Carolina. In 1977 and 1978 the numbers appear low in Delaware, Rhode Island, and West Virginia. In 1979 they appear low in Maryland, Rhode Island, and West Virginia. In 1980 they appear low in Rhode Island and West Virginia. In 1980 and again in 1981 no combination vehicle involvements in fatal accidents were reported from West Virginia, although 41 such involvements were reported in 1976.

On the other side, the data from Pennsylvania on the involvement of bobtail tractors in fatal accidents seem in error for 1978 through 1981. While there were no Pennsylvania bobtail trucks reported in the 1977 FARS data, the numbers for 1978 through 1981 were 66, 68, 64, and 27, respectively, accounting for close to half of all bobtail trucks in the 1978 to 1981 FARS data. In those same years no fatal involvements by large single-unit trucks were reported for Pennsylvania.

Thus there are substantial problems of missing data, incomplete data, and inaccurate data in the FARS vehicle classifications used for the tables in this report, particularly for the 1975 year. The reader is cautioned to remember these problems when looking at year-to-year trends of combination vehicle involvements, since the data presented make use of the vehicle classification data as furnished by NHTSA and no attempt has been made to "correct" for these problems. Further details

are provided in Appendix A which shows 1975-1981 state variations in all eleven truck classifications plus unknown vehicle type. Also Appendix B provides data on the 1980 FARS independent classification of the same vehicles which was carried out by UMTRI using BMCS, police accident report, and telephone/mail survey data. truck classifications plus unknown vehicle type.

Combination Vehicle Definition

For this report three truck categories in the FARS vehicle type code have been included in the combination vehicle definition. These are: (1) Two-unit truck-tractor with semi-trailer, or single-unit truck with one cargo trailer. (2) Multi-unit: truck-tractor or single-unit truck with two or more trailers. (3) Truck-tractor pulling no trailers (bobtail).

It should be noted that the third category, bobtail truck-tractors, was not coded separately until 1977. How this combination vehicle type had been classified previously is not clear. The vast majority of combination vehicles are of the "truck-tractor with semi-trailer" types.

Time Period of Data Analysis

Most of the tables in this report are based on reported combination vehicle involvements in fatal accidents for the years 1976 through 1980. The 1981 FARS data only became available as this report was almost finished. These data were then added to the tables showing national and state trends since 1975, but it did not seem worthwhile to rerun all of the other tables to include the 1981 data. It is unlikely that the inclusion of these data would make any significant differences in the accident characteristic patterns found in the 1976-1980 aggregated data.

The reason for excluding 1975 data from these tables is not related to the underreporting of combination vehicle involvements in 1975 which was discussed above. It seems safe to assume that the combination vehicle involvements which were reported in 1975 were generally valid. The problem with the 1975 data is simply that it lacks a variable, which was added in 1976 and subsequent data sets, on the number of vehicles in the accident. Thus it would have been much more difficult analytically to create the basic accident type variable which is used for most analysis tables. It seemed unlikely that the addition of the 1975 data to the accident characteristics tables would make enough difference to be worth this extra trouble.

Organization of the Report

The tables of this report are organized in five sections. Section 1 presents national and state-by-state trend data on combination vehicle involvements in fatal accidents for 1975-1981. It also includes some miscellaneous tables on exposure trends, on monthly trends, and showing comparisons with other vehicle types.

Section 2 presents national data for 1976-1980 on the accident characteristics (time, road class, etc.) of combination vehicle involvements in fatal accidents in relation to the five basic accident types. Section 3 presents national data on combination vehicle driver characteristics in fatal accidents (both for all drivers and killed drivers), again in relation to the five basic accident types. Section 4 presents injury data on all combination vehicle occupants in relation to accident type and some other accident characteristics. Finally Section 5 presents some other tables showing the interrelationship of various accident characteristics in combination vehicle involvements in fatal accidents.

It is quite possible in a large set of tables such as this that errors have been made in data analysis or transcription. The reader is urged to bring any such errors discovered to the attention of the authors.

SECTION 1.
TRENDS AND VEHICLE TYPE COMPARISONS,
1975-1981

TABLE 1.1
Total and Combination Vehicle Fatal Accidents, Vehicle
Involvements, and Fatalities by Year, 1975-1981*

		1975	1976	1977	1978	1979	1980	1981	Total
Fatal Accidents									
Total	N	39161	39747	42211	44433	45223	45271	43980	300026
Comb.Vehicle**	N	2706	3226	3574	4005	4253	3676	3778	25218
Comb.Vehicle	%	6.9%	8.1%	8.5%	9.0%	9.4%	8.1%	8.6%	8.4%
Vehicles									
Involved									
All Vehicles	N	55534	56084	60516	64144	64762	63467	62666	427173
Comb.Vehicles	N	2878	3402	3785	4239	4516	3897	3979	26696
Comb.Vehicle	%	5.2%	6.1%	6.3%	6.6%	7.0%	6.1%	6.3%	6.2%
Total									
Fatalities									
All Accidents	N	44525	45523	47878	50331	51093	51077	49268	339695
Comb.Vehicle									
Accidents	N	3311	3909	4260	4759	5090	4409	4496	30234
Comb.Vehicle									
Accidents	%	7.4%	8.6%	8.9%	9.5%	10.0%	8.6%	9.1%	8.9%
Comb.Vehicle									
Accident									
Fatalities									
Total	N	3311	3909	4260	4759	5090	4409	4496	30234
Comb.Vehicle									
Occupants	N	675	828	920	975	1027	887	839	6151
Comb.Vehicle									
Occupants	%	20.4%	21.2%	21.6%	20.5%	20.2%	20.1%	18.7%	20.3%

*A combination vehicle fatal accident is one in which one or more combination vehicles were involved.

**As indicated in the Preface, there is some question about the accuracy and completeness of combination vehicle identification in FARS fatal accidents, especially in 1975.

The FARS data show combination vehicle accidents, involvements, and fatalities increasing each year from 1975 to 1979. However, these declined substantially in 1980, and they increased again only slightly in 1981.

TABLE 1.2
Involvements in Fatal Accidents by Vehicle Type by Year, 1975-1981*

Vehicle Type		Year							Total
		1975	1976	1977	1978	1979	1980	1981	
Two-Unit Trucks	N	2,751	3,205	3,573	3,970	4,191	3,591	3,721	25,002
	%	5.0	5.7	5.9	6.2	6.5	5.7	5.9	5.9
Multi-Unit Trucks	N	127	197	149	152	186	154	154	1,119
	%	0.2	0.4	0.2	0.2	0.3	0.2	0.2	0.3
Bobtail Tractors**	N	-	-	63	117	139	152	104	575
	%	-	-	0.1	0.2	0.2	0.2	0.2	0.1
Total Truck Combinations**	N	2,878	3,402	3,785	4,239	4,516	3,897	3,979	26,696
	%	5.2	6.1	6.3	6.6	7.0	6.1	6.3	6.2
All Other Trucks	N	9,331	9,852	11,068	12,678	13,293	13,081	12,402	81,705
	%	16.8	17.6	18.3	19.8	20.5	20.6	19.8	19.1
Passenger Cars	N	37,987	37,206	39,038	40,544	39,987	39,039	38,725	272,436
	%	68.2	66.3	64.5	63.2	61.7	61.5	61.8	63.8
Misc./Unknown Vehicle Types	N	5,428	5,624	6,625	6,683	6,966	7,450	7,560	46,336
	%	9.8	10.0	10.9	10.4	10.8	11.7	12.1	10.8
Total	N	55,534	56,084	60,516	64,144	64,762	63,467	62,666	427,173
	%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

*As explained in more detail in the Preface, the FARS data for 1975, 1976, and 1981 seem to underrepresent combination vehicles in some states.

**When feasible, bobtail tractors are included in the combination trucks total. However, these vehicles were not distinguished in 1975 and 1976 FARS data, they were probably undercounted in 1977, and they were definitely overcounted in 1978 through 1981 due to a coding convention in Pennsylvania data (see Preface).

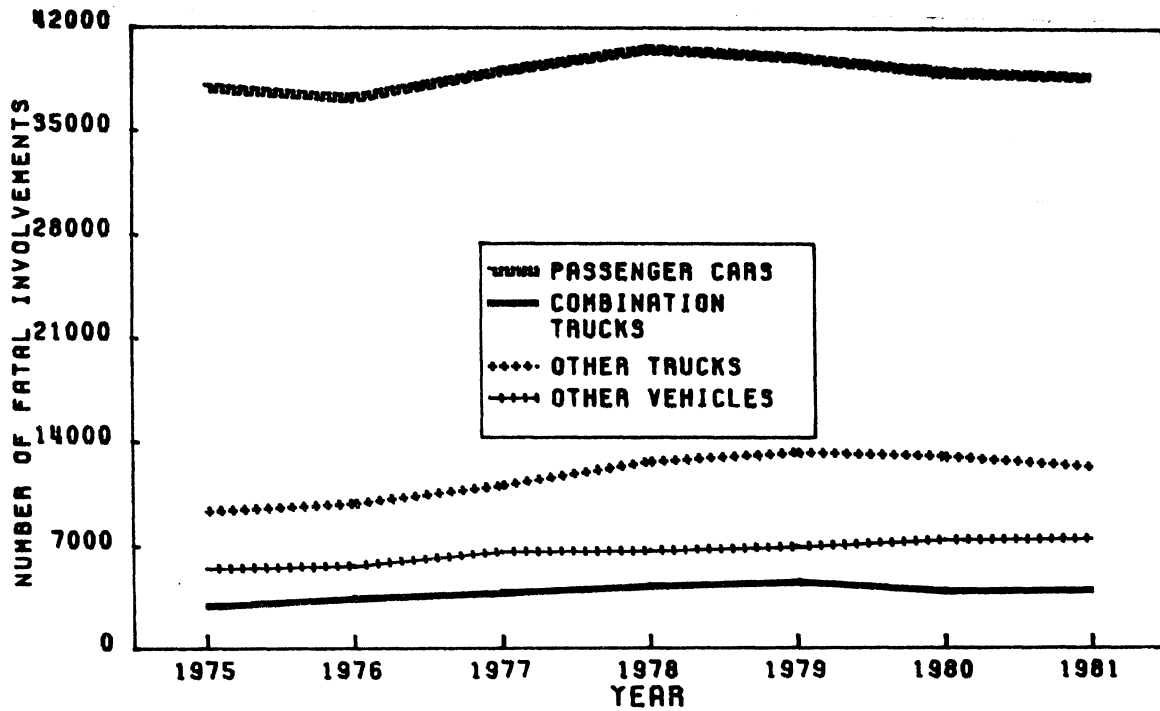


FIGURE 1.1
Involvements in Fatal Accidents for Four Vehicle Types by Year, 1975-1981

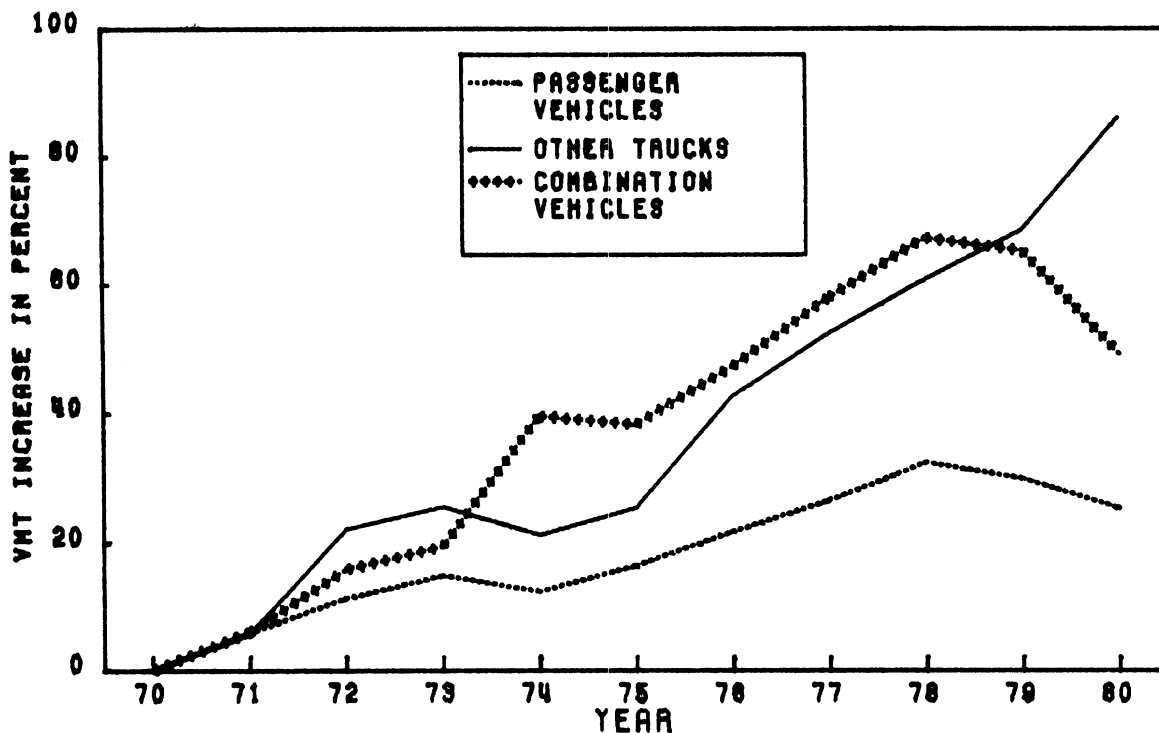
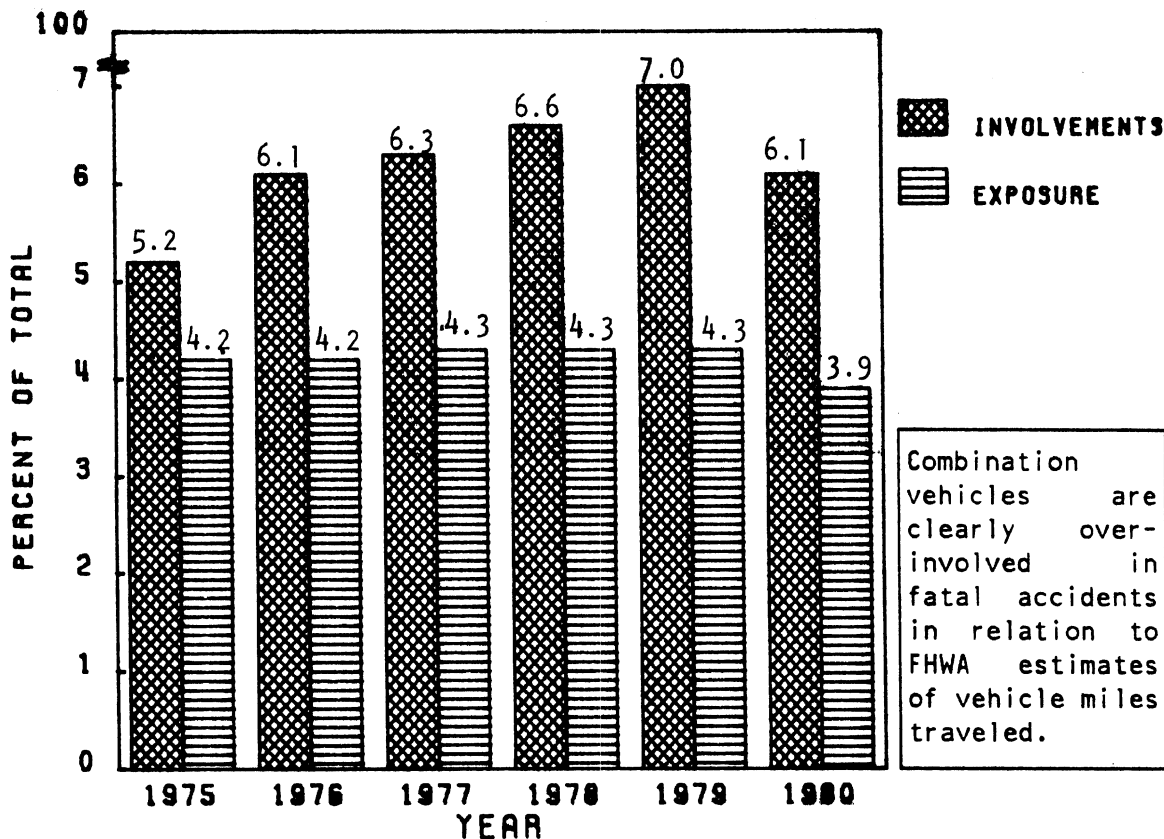


FIGURE 1.2
FHWA Estimates of Percentage Increases Since 1970 in Vehicle Miles Traveled for Three Vehicle Types by Year, 1970-1980



NOTE: The percentages shown are the combination vehicle proportions of all vehicles involved in fatal accidents and of all miles traveled in the U.S. for each year.

FIGURE 1.3
Comparison of Combination Vehicle Fatal Accident Involvements and Estimated Vehicle Miles Traveled by Year, 1975-1980

TABLE 1.3
Estimated Billions of Vehicle Miles Traveled (VMT), 1970-1980, and
Percentage Increase Since 1970 for Selected Vehicle Types

	1970	1971	1972	1973	1974	1975
<u>All Passenger Vehicles</u>						
VMT (billions)	906.0	959.3	1008.6	1041.1	1018.1	1055.6
% Increase since 1970	-	5.9%	11.3%	14.9%	12.4%	16.5%
<u>Trucks (Excluding Combination Vehicles)*</u>						
VMT (billions)	174.4	184.4	213.1	219.1	211.5	218.9
% Increase since 1970	-	5.7%	22.2%	25.6%	21.3%	25.5%
<u>Combination Vehicles</u>						
VMT (billions)	40.2	42.6	46.6	48.0	56.1	55.6
% Increase since 1970	-	6.0%	15.9%	19.4%	39.6%	38.3%
<u>All Vehicles</u>						
VMT (billions)	1120.7	1186.3	1268.3	1308.6	1285.6	1330.1
% Increase since 1970	-	5.9%	13.2%	16.8%	14.7%	18.7%
<u>Combination Vehicles VMT as a % of all VMT</u>	3.59%	3.59%	3.67%	3.67%	4.36%	4.18%

*Includes pickup trucks and small vans.

TABLE 1.3 (Continued)

	1976	1977	1978	1979	1980
<u>All Passenger Vehicles</u>					
VMT (billions)	1103.9	1147.1	1200.3	1168.6	1136.3
% Increase since 1970	21.8%	26.6%	32.5%	30.0%	25.4%
<u>Trucks (Excluding Combination Vehicles)*</u>					
VMT (billions)	248.8	266.0	280.6	294.0	324.6
% Increase since 1970	42.7%	52.5%	60.9%	68.6%	86.1%
<u>Combination Vehicles</u>					
VMT (billions)	59.2	63.5	67.3	66.5	60.0
% Increase since 1970	47.3%	58.0%	67.4%	65.4%	49.3%
<u>All Vehicles</u>					
VMT (billions)	1411.9	1476.6	1548.2	1529.1	1520.9
% Increase since 1970	26.0%	31.8%	38.1%	36.4%	35.7%
<u>Combination Vehicles VMT as a % of all VMT</u>	4.19%	4.30%	4.35%	4.35%	3.95%

*Includes pickup trucks and small vans.

SOURCE: Federal Highway Administration estimates published in Table VM-1 of the annual Highway Statistics series.

According to FHWA estimates, both combination vehicle and other truck mileage increased faster than passenger car mileage throughout the 1970s. However, estimated combination vehicle mileage decreased in 1979 and 1980, while other truck mileage (primarily pickups and vans) continued to increase substantially.

TABLE 1.4
Involvements in Fatal Accidents by Vehicle Type
and General Accident Type, 1976-80

Vehicle Type	Accident Type					Total	
	Single Vehicle With Ped/Bic	Single Vehicle With Train	Other Single Vehicle	Two Vehicles	Three or More Vehicles		
Two-Unit Trucks	N Row % Col %	1,326 7.2 3.7	182 1.0 5.3	2,666 14.4 3.0	12,143 65.5 8.0	2,213 11.9 7.5	18,530 100.0 6.0
Multi-Unit Trucks	N Row % Col %	84 10.0 0.2	6 0.7 0.2	135 16.1 0.2	493 58.8 0.3	120 14.3 0.4	838 100.0 0.3
Bobtail Tractors**	N Row % Col %	54 11.5 0.1	4 0.8 0.1	91 19.3 0.1	263 55.8 0.2	59 12.5 0.2	471 100.0 0.2
Combination Truck Subtotal*	N Row % Col %	1,464 7.4 4.0	192 1.0 5.6	2,892 14.6 3.3	12,899 65.0 8.5	2,392 12.1 8.1	19,839 100.0 6.4
All Other Trucks	N Row % Col %	7,816 13.0 21.6	847 1.4 24.8	16,877 28.1 19.1	29,148 48.6 19.3	5,283 8.8 17.8	59,971 100.0 19.4
Passenger Cars	N Row % Col %	25,068 12.8 69.1	2,166 1.1 63.4	56,014 28.6 63.4	92,771 47.4 61.3	19,787 10.1 66.8	195,806 100.0 63.4
Misc./Unknown Vehicle Types	N Row % Col %	1,921 5.8 5.3	210 0.6 6.1	12,570 37.7 14.2	16,508 49.5 10.9	2,138 6.4 7.2	33,347 100.0 10.8
Total	N Row % Col %	36,269 11.7 100.0	3,415 1.1 100.0	88,353 28.6 100.0	151,326 49.0 100.0	29,600 9.6 100.0	308,963 100.0 100.0

*This is the subtotal of the three combination vehicle types above.

**As explained in the Preface, the bobtail category in FARS appears to include all large single-unit trucks involved in fatal accidents in Pennsylvania for 1978-1981.

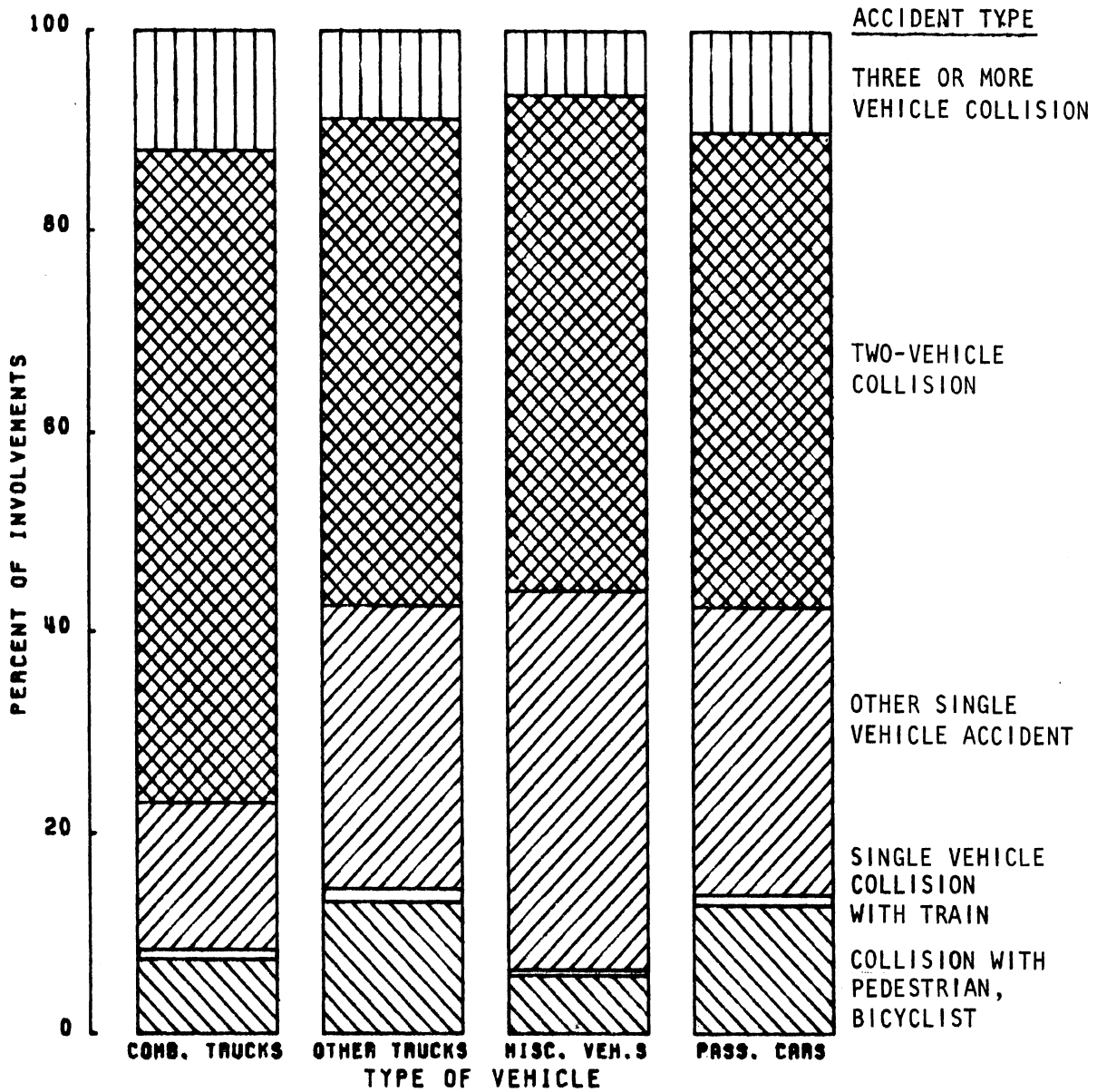


FIGURE 1.4
 Type of Fatal Accident Involvement for Four
 Vehicle Types, 1976-1980

Combination vehicles are much less involved in single-vehicle and pedestrian/bicyclist accidents than are passenger cars and other types of trucks.

TABLE 1.5
Interaction of Vehicle Types in Two-Vehicle Fatal Accidents, 1980*
N=15,266

Vehicle Type		Two-Unit Trucks	Multi-Unit Trucks	Bob-tail Trucks	Total Comb. Trucks	All Other Trucks	Passenger Cars	Misc./Unknown Vehicle Types
Two-Unit Trucks	N	110	5	4	119	518	1427	190
	Tot %	0.7	0.0	0.0	0.8	3.4	9.3	1.2
Multi-Unit Trucks	N	5	2	0	2	15	53	11
	Tot %	0.0	0.0	-	0.0	0.1	0.3	0.1
Bobtail Tractors**	N	4	0	0	0	18	54	13
	Tot %	0.0	-	-	-	0.1	0.4	0.1
Total Comb. Trucks†	N	119	2	0	121	551	1534	214
	Tot %	0.8	0.0	-	0.8	3.6	10.0	1.4
All Other Trucks	N	518	15	18	551	611	3586	906
	Tot %	3.4	0.1	0.1	3.6	4.0	23.5	5.9
Passenger Cars	N	1427	53	54	1534	3586	5503	2049
	Tot %	9.3	0.3	0.4	10.0	23.5	36.0	13.4
Misc./Unk. Vehicle Types	N	190	11	13	214	906	2049	191
	Tot %	1.2	0.1	0.1	1.4	5.9	13.4	1.3

*The total % indicates the proportion of all two-vehicle fatal crashes accounted for by this combination. The bottom right section of the table shows the interaction of the combination vehicle subtotal with the other three main vehicle types.

**As explained in the Preface, the bobtail category in FARS appears to include all large single-unit trucks involved in fatal accidents in Pennsylvania for 1978-1981.

†This is the subtotal of the three combination vehicle types above.

Over one-third of all two-vehicle fatal accidents involve two passenger vehicles, while one-tenth involve a passenger vehicle and a combination vehicle, and almost a quarter involve a passenger car and another truck type (primarily pickups and vans).

TABLE 1.6
Combination Vehicle Fatal Accident Involvement in Relation to Expected
Involvement Based on Exposure, Two-Vehicle Accidents, 1980

Collision Type	Proportion Predicted From Exposure*	Actual Proportion of Fatal Accidents	Actual/Predicted Ratio	Actual/Predicted Normalized Ratio
Other-Other	0.9227	0.8415	0.91	1.00
Comb.-Other	0.0758	0.1506	1.99	2.18
Comb.-Comb.	0.0016	0.0079	4.94	5.41

*The proportions of two-vehicle accidents predicted from exposure are based on the 1980 FHWA estimates of vehicle miles traveled for the two vehicle types. If the proportion of combination vehicle exposure is p and the proportion of other vehicle exposure is q , then the proportion of combination vehicle-combination vehicle accidents should be p^2 , the proportion of other vehicle-other vehicle accidents should be q^2 , and the proportion of combination vehicle-other vehicle accidents should be $1-(p^2 + q^2)$ or $2pq$. Of course these exposure estimates do not take into account differences in type of road, time of day, etc. for the miles traveled by the two vehicle types.

The data suggest that combination vehicles are disproportionately involved in fatal accidents compared to other vehicles, especially in fatal accidents involving another combination vehicle. However, it is not known whether combination vehicles are disproportionately involved in accidents of all degrees of severity. It seems more likely that the explanation for these data lies in the great weight of these combination vehicles which leads to a greater likelihood of a fatality occurring when they are involved in an accident.

TABLE 1.7
 Fatality Ratios for Combination Vehicle Occupants in
 Fatal Accidents by Accident Type, 1976-80

	Accident Type					
	Single Vehicle With Ped./Bic.	Single Vehicle With Train	Other Single Vehicle	Two Vehicles	Three or More Vehicles	Total
Fatalities in Combination Vehicle	2	193	2948	1224	270	4637
Fatalities in Accident	1490	206	3141	15,100	2490	22,427
Combination Vehicle % of Total Fatalities	0.1	93.7	93.9	8.1	10.8	19.4
Fatalities in Combination Vehicle*	2	193	2941	1221	270	4627
Occupants in Combination Vehicle*	1602	231	3877	14,686	2742	23,138
Fatality % of Combination Vehicle Occupants*	0.1	83.5	75.9	8.3	9.8	20.0

*In these rows the data are restricted to cases in which the total number of occupants of the combination vehicle is known (about 98 percent).

Not surprisingly, in two-vehicle and multi-vehicle fatal accidents, combination vehicle occupants are much less likely to be killed than are occupants of the other involved vehicles.

TABLE 1.8
 Combination Vehicle Involvements in Fatal Accidents by State and
 Year, 1975-1981* (Percent shown is the fraction of all vehicles
 involved in fatal crashes in the state for that year.)

State		1975	1976	1977	1978	1979	1980	1981	Total
Alabama	N	59	101	147	131	137	83	91	749
	%	5.2	8.4	10.6	9.1	10.5	6.9	7.9	8.5
Alaska	N	13	7	4	4	4	4	5	41
	%	8.5	4.6	2.2	2.5	3.6	3.8	4.1	4.2
Arizona	N	46	55	53	64	89	63	64	434
	%	5.3	6.2	5.0	4.9	7.1	5.4	5.4	5.7
Arkansas	N	63	47	63	83	89	58	92	495
	%	9.2	7.3	9.0	11.5	12.9	8.8	13.4	10.3
California	N	231	219	264	282	325	317	293	1931
	%	4.4	4.0	4.2	4.1	4.5	4.5	4.4	4.3
Colorado	N	40	48	61	58	69	52	51	379
	%	5.8	6.7	7.3	5.4	6.6	7.8	6.1	6.8
Connecticut	N	9	18	30	22	24	18	35	156
	%	1.8	3.5	5.0	3.8	3.3	2.4	5.0	3.6
Delaware	N	8	17	0	4	12	22	12	75
	%	5.3	11.3	0.	2.6	7.5	10.8	7.9	6.6
Dist of Columbia	N	0	0	0	0	1	1	0	2
	%	0.	0.	0.	0.	1.7	1.9	0	0.4
Florida	N	135	128	162	199	203	204	203	1234
	%	5.3	5.3	6.3	6.9	6.2	5.8	5.0	5.8
Georgia	N	83	111	98	125	154	150	125	846
	%	5.0	6.9	5.7	6.8	8.0	7.8	7.0	6.7
Hawaii	N	3	4	4	8	1	2	2	24
	%	1.8	2.1	2.1	3.3	.4	.9	1.1	1.6
Idaho	N	28	21	17	24	42	21	41	194
	%	8.7	6.7	4.8	6.3	10.9	5.0	11.2	7.6
Illinois	N	151	152	200	182	180	139	156	1160
	%	5.8	5.9	7.1	6.4	6.7	5.4	6.5	6.2
Indiana	N	138	168	156	178	197	123	122	1082
	%	9.5	10.7	9.7	10.8	11.6	8.4	8.3	9.9

TABLE 1.8 (Continued)

State		1975	1976	1977	1978	1979	1980	1981	Total
Iowa	N	58	79	59	79	70	70	84	499
	%	6.6	8.3	7.4	9.4	8.1	8.7	10.6	8.4
Kansas	N	40	41	60	69	54	63	49	376
	%	6.1	6.3	8.6	9.2	8.2	8.7	6.6	7.7
Kentucky	N	27	75	88	89	72	62	78	491
	%	2.5	7.1	7.6	7.8	6.3	6.0	7.6	6.2
Louisiana	N	20	72	81	83	93	120	129	598
	%	1.8	6.3	6.5	6.3	6.3	7.7	8.2	6.3
Maine	N	7	11	12	11	13	16	11	81
	%	2.7	4.1	4.7	4.1	4.8	5.2	4.3	4.3
Maryland	N	39	20	59	51	35	44	42	290
	%	4.5	2.6	7.3	5.8	4.2	4.8	4.4	4.8
Massachusetts	N	13	40	28	30	36	29	14	190
	%	1.3	4.3	3.1	2.9	3.1	2.7	1.5	2.7
Michigan	N	44	87	113	149	132	85	101	711
	%	1.9	3.4	4.3	5.5	5.4	3.7	4.8	4.2
Minnesota	N	56	62	72	71	82	59	40	442
	%	5.8	6.3	6.9	5.7	7.1	5.5	4.2	5.9
Mississippi	N	30	56	59	71	90	71	74	451
	%	4.5	8.0	6.9	7.1	10.1	8.1	8.2	7.7
Missouri	N	64	91	100	117	113	94	92	671
	%	4.8	6.2	7.0	6.7	7.7	7.8	6.6	6.7
Montana	N	29	32	34	34	37	37	40	243
	%	8.9	9.8	9.9	10.8	9.9	10.2	10.8	10.0
Nebraska	N	40	42	31	51	51	68	54	337
	%	8.5	8.7	7.0	11.8	11.8	13.7	11.4	10.5
Nevada	N	10	15	17	22	21	27	16	128
	%	4.1	6.0	6.0	5.8	5.0	6.5	4.6	5.4
New Hampshire	N	7	8	5	6	5	6	9	46
	%	3.9	4.3	2.6	2.7	2.3	2.6	5.0	3.3
New Jersey	N	60	65	96	92	96	85	81	575
	%	4.5	5.0	6.8	6.1	6.5	6.0	5.4	5.8

TABLE 1.8 (Continued)

State		1975	1976	1977	1978	1979	1980	1981	Total
Iowa	N	58	79	59	79	70	70	84	499
	%	6.6	8.3	7.4	9.4	8.1	8.7	10.6	8.4
Kansas	N	40	41	60	69	54	63	49	376
	%	6.1	6.3	8.6	9.2	8.2	8.7	6.6	7.7
Kentucky	N	27	75	88	89	72	62	78	491
	%	2.5	7.1	7.6	7.8	6.3	6.0	7.6	6.2
Louisiana	N	20	72	81	83	93	120	129	598
	%	1.8	6.3	6.5	6.3	6.3	7.7	8.2	6.3
Maine	N	7	11	12	11	13	16	11	81
	%	2.7	4.1	4.7	4.1	4.8	5.2	4.3	4.3
Maryland	N	39	20	59	51	35	44	42	290
	%	4.5	2.6	7.3	5.8	4.2	4.8	4.4	4.8
Massachusetts	N	13	40	28	30	36	29	14	190
	%	1.3	4.3	3.1	2.9	3.1	2.7	1.5	2.7
Michigan	N	44	87	113	149	132	85	101	711
	%	1.9	3.4	4.3	5.5	5.4	3.7	4.8	4.2
Minnesota	N	56	62	72	71	82	59	40	442
	%	5.8	6.3	6.9	5.7	7.1	5.5	4.2	5.9
Mississippi	N	30	56	59	71	90	71	74	451
	%	4.5	8.0	6.9	7.1	10.1	8.1	8.2	7.7
Missouri	N	64	91	100	117	113	94	92	671
	%	4.8	6.2	7.0	6.7	7.7	7.8	6.6	6.7
Montana	N	29	32	34	34	37	37	40	243
	%	8.9	9.8	9.9	10.8	9.9	10.2	10.8	10.0
Nebraska	N	40	42	31	51	51	68	54	337
	%	8.5	8.7	7.0	11.8	11.8	13.7	11.4	10.5
Nevada	N	10	15	17	22	21	27	16	128
	%	4.1	6.0	6.0	5.8	5.0	6.5	4.6	5.4
New Hampshire	N	7	8	5	6	5	6	9	46
	%	3.9	4.3	2.6	2.7	2.3	2.6	5.0	3.3
New Jersey	N	60	65	96	92	96	85	81	575
	%	4.5	5.0	6.8	6.1	6.5	6.0	5.4	5.8

TABLE 1.8 (Continued)

State		1975	1976	1977	1978	1979	1980	1981	Total
New Mexico	N	40	49	75	66	47	65	62	404
	%	6.6	8.0	9.8	8.3	6.5	9.3	10.3	8.4
New York	N	88	95	108	123	124	95	106	739
	%	3.1	3.4	3.7	4.0	4.0	3.0	3.4	3.5
North Carolina	N	117	150	127	160	134	127	126	941
	%	6.2	8.3	7.3	8.5	7.0	6.9	6.9	7.2
North Dakota	N	14	8	11	14	15	12	17	91
	%	6.9	3.7	5.0	6.7	9.0	6.7	8.0	6.5
Ohio	N	126	148	164	199	226	146	166	1175
	%	5.4	6.1	6.9	7.5	7.9	5.7	7.2	6.8
Oklahoma	N	67	86	103	107	104	102	107	676
	%	6.7	8.5	9.3	9.7	9.5	8.7	8.4	8.6
Oregon	N	40	41	47	40	55	56	60	339
	%	5.7	5.3	5.7	4.5	6.6	6.8	7.4	6.0
Pennsylvania	N	179	182	188	266	280	236	208	1539
	%	6.7	7.3	7.0	9.7	10.2	9.0	8.0	8.3
Rhode Island	N	2	7	0	1	0	1	6	17
	%	1.5	4.4	0.	.8	0.	.6	3.9	1.6
South Carolina	N	3	40	67	67	89	68	58	392
	%	.3	4.2	6.1	6.2	8.0	6.6	5.5	5.3
South Dakota	N	10	18	16	13	22	28	15	122
	%	4.4	6.8	6.3	5.4	8.6	10.4	7.1	7.1
Tennessee	N	87	77	118	112	79	81	81	635
	%	6.2	5.2	7.4	7.0	5.1	5.6	5.8	6.1
Texas	N	305	304	313	389	455	431	500	2697
	%	7.5	7.9	7.0	8.1	8.9	8.2	8.6	8.1
Utah	N	30	26	35	39	46	34	31	241
	%	9.0	8.4	8.5	8.2	11.7	8.4	7.0	8.7
Vermont	N	2	5	2	7	9	3	4	32
	%	1.3	3.7	1.4	5.0	5.1	1.9	3.2	3.1
Virginia	N	68	80	71	76	88	74	69	526
	%	5.7	6.7	5.1	5.5	6.9	5.8	5.5	5.8

TABLE 1.8 (Continued)

State		1975	1976	1977	1978	1979	1980	1981	Total
Washington	N	41	51	52	54	70	46	47	361
	%	4.4	5.2	4.5	4.3	5.5	3.8	4.2	4.5
West Virginia	N	30	41	11	10	10	0	0	102
	%	5.4	6.8	1.7	1.7	1.6	0.	0.0	2.5
Wisconsin	N	57	72	70	52	87	70	73	481
	%	4.9	6.1	6.1	4.2	6.7	5.8	6.4	5.7
Wyoming	N	21	30	34	55	49	29	37	255
	%	9.5	10.9	11.5	19.4	18.2	10.4	12.3	13.2
TOTAL	N	2878	3402	3785	4239	4516	3897	3979	26696
	%	5.2	6.1	6.3	6.6	7.0	6.1	6.3	6.2

*See Preface for a discussion of deficiencies in these data.

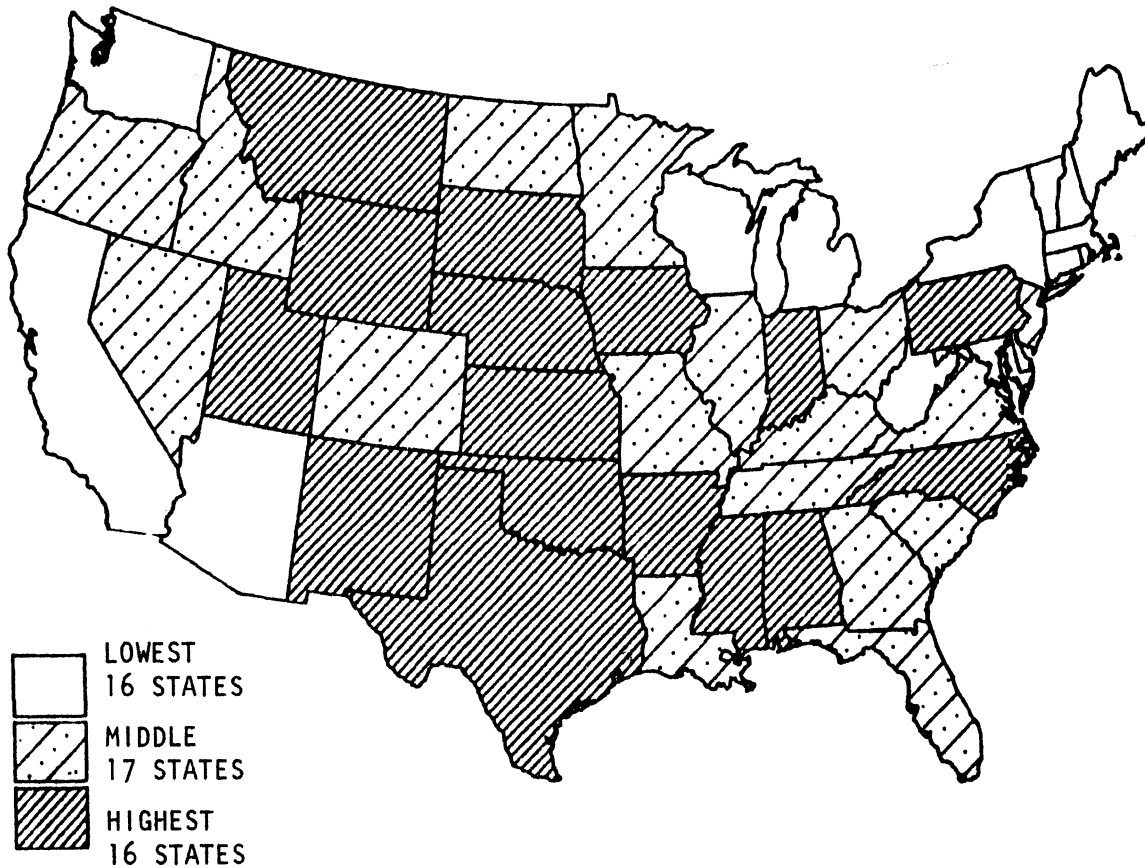


FIGURE 1.5
Relative Proportion of Combination Vehicles to All
Vehicles in Fatal Accidents, 1980

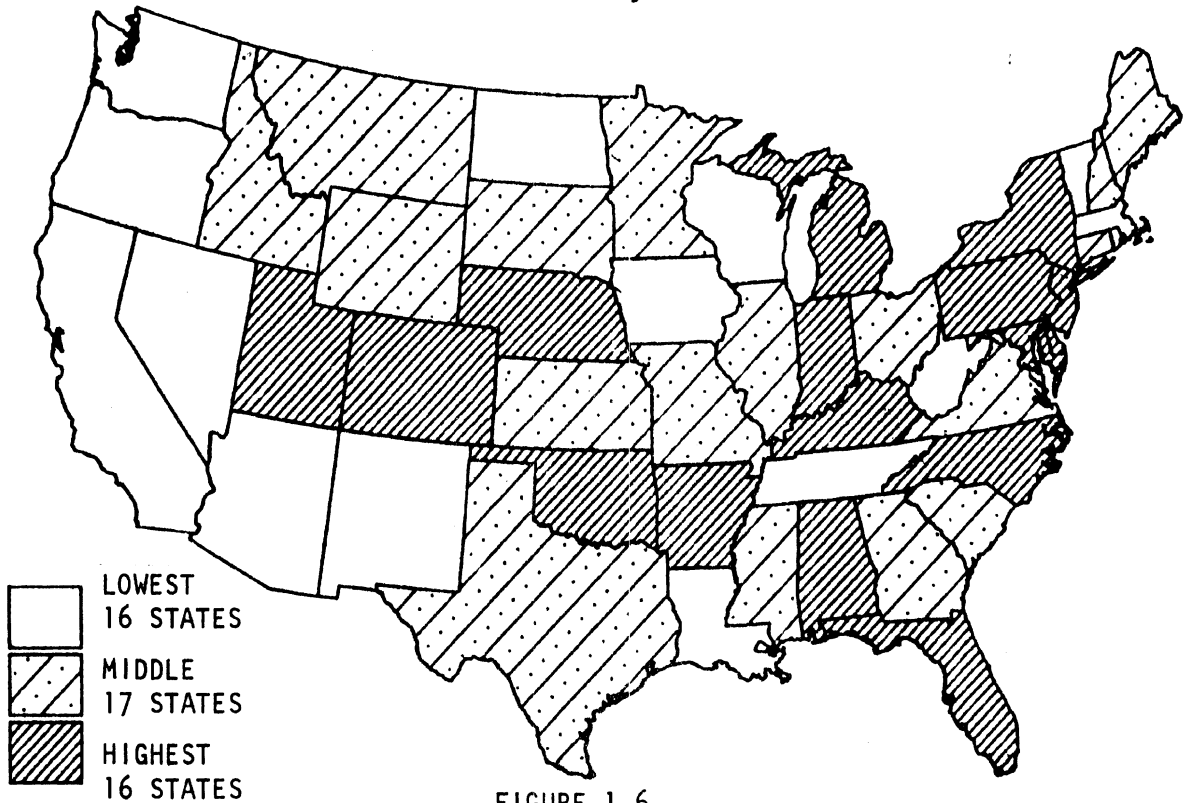


FIGURE 1.6

Relative Proportion of Diesel Fuel Purchases
to All Motor Vehicle Fuel Purchases, 1980*

*Since estimates of combination vehicle miles traveled are not available by state, data on proportion of diesel fuel consumption in each state are presented as a possible indicator of combination vehicle exposure.

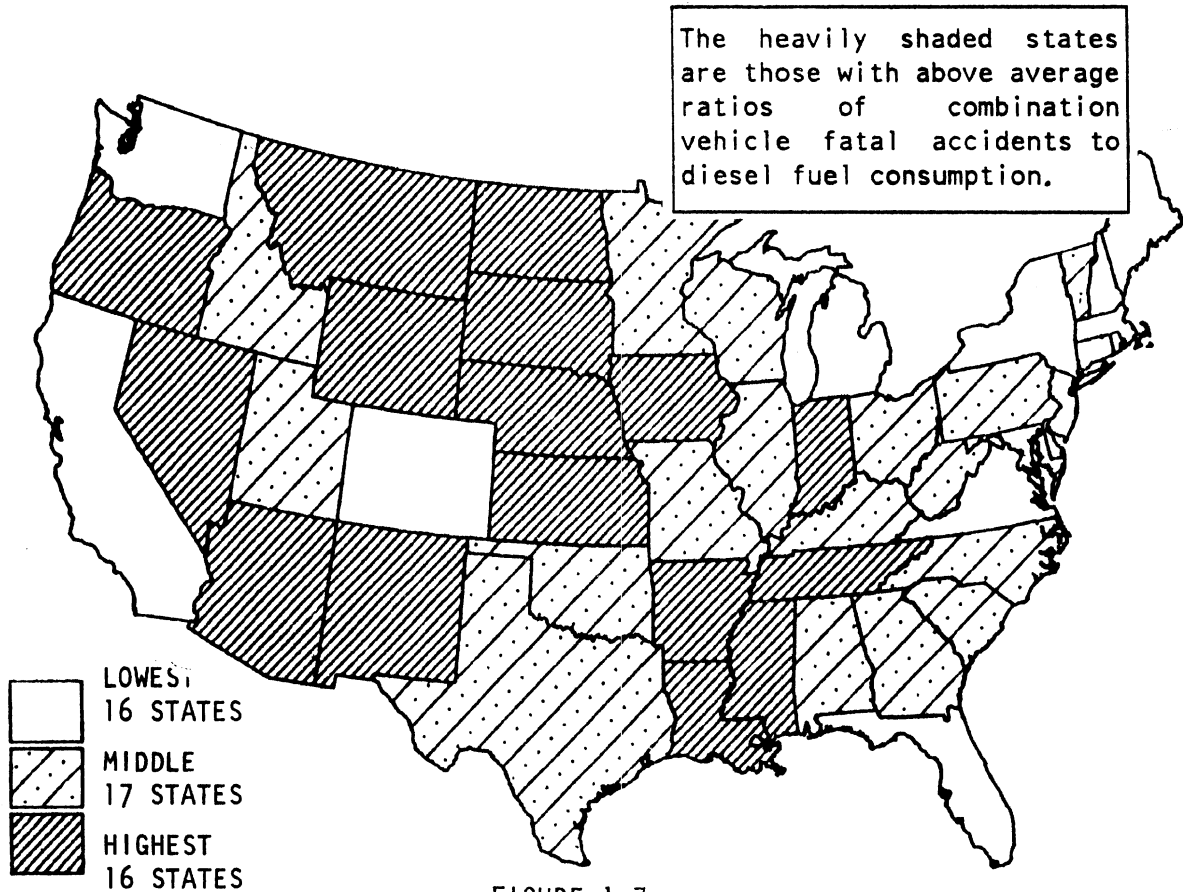


FIGURE 1.7

Relative Ratio of Combination Vehicle Involvement in
Fatal Accidents to Diesel Fuel Consumption, 1980

TABLE 1.9
Combination Vehicle Involvements in Fatal
Accidents by Month and Year, 1975-1980*

Month		1975	1976	1977	1978	1979	1980	Total
January	N	200	290	274	299	309	318	1690
	Col %	6.9	8.5	7.2	7.1	6.8	8.2	7.4
	Tot %	5.3	7.8	7.7	8.4	7.5	7.3	7.3
February	N	192	226	251	259	377	297	1602
	Col %	6.7	6.6	6.6	6.1	8.3	7.6	7.1
	Tot %	5.5	6.1	6.8	7.5	9.1	7.2	7.1
March	N	198	242	311	348	389	294	1782
	Col %	6.9	7.1	8.2	8.2	8.6	7.5	7.8
	Tot %	4.9	6.2	7.1	7.7	7.5	6.5	7.9
April	N	206	271	252	283	339	291	1642
	Col %	7.2	8.0	6.7	6.7	7.5	7.5	7.2
	Tot %	5.0	6.3	5.4	5.7	6.5	6.2	5.9
May	N	226	290	277	363	377	315	1848
	Col %	7.9	8.5	7.3	8.6	8.3	8.1	8.1
	Tot %	4.6	5.7	5.5	6.5	6.9	5.6	5.8
June	N	233	296	337	377	341	302	1886
	Col %	8.1	8.7	8.9	8.9	7.6	7.7	8.3
	Tot %	4.6	6.1	6.2	6.3	6.1	5.0	5.7
July	N	265	323	304	369	398	294	1953
	Col %	9.2	9.5	8.0	8.7	8.8	7.5	8.6
	Tot %	5.0	5.7	4.9	5.9	6.7	4.9	5.5
August	N	278	317	360	398	424	368	2145
	Col %	9.7	9.3	9.5	9.4	9.4	9.4	9.4
	Tot %	5.2	5.9	6.1	6.3	7.1	5.6	6.1
September	N	255	299	342	386	372	344	1998
	Col %	8.9	8.8	9.0	9.1	8.2	8.8	8.8
	Tot %	5.2	6.0	6.4	6.3	6.4	6.2	6.1
October	N	305	288	373	406	425	381	2178
	Col %	10.6	8.5	9.9	9.6	9.4	9.8	9.6
	Tot %	6.1	5.4	6.5	6.7	7.2	7.0	6.5
November	N	262	269	332	410	411	356	2040
	Col %	9.1	7.9	8.8	9.7	9.1	9.1	9.0
	Tot %	5.4	6.2	6.3	7.3	7.4	6.7	6.6

TABLE 1.9 (Continued)

Month		1975	1976	1977	1978	1979	1980	Total
December	N	258	291	372	341	354	337	1953
	Col %	9.0	8.6	9.8	8.0	7.8	8.6	8.6
	Tot %	5.5	6.0	7.0	6.0	6.0	6.3	6.1
Total	N	2878	3402	3785	4239	4516	3897	22,717
	Col %	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Tot %	5.2	6.1	6.3	6.6	7.0	6.1	6.2

*The Col % is the month's percentage of all combination vehicle fatal accident involvements for the year. The Tot % is the combination vehicle percentage of all vehicles in fatal accidents for the month.

August and October are regularly the highest months for combination vehicle fatal involvements, although the winter months are when combination vehicle involvements make up the greatest proportions of all fatal involvements.

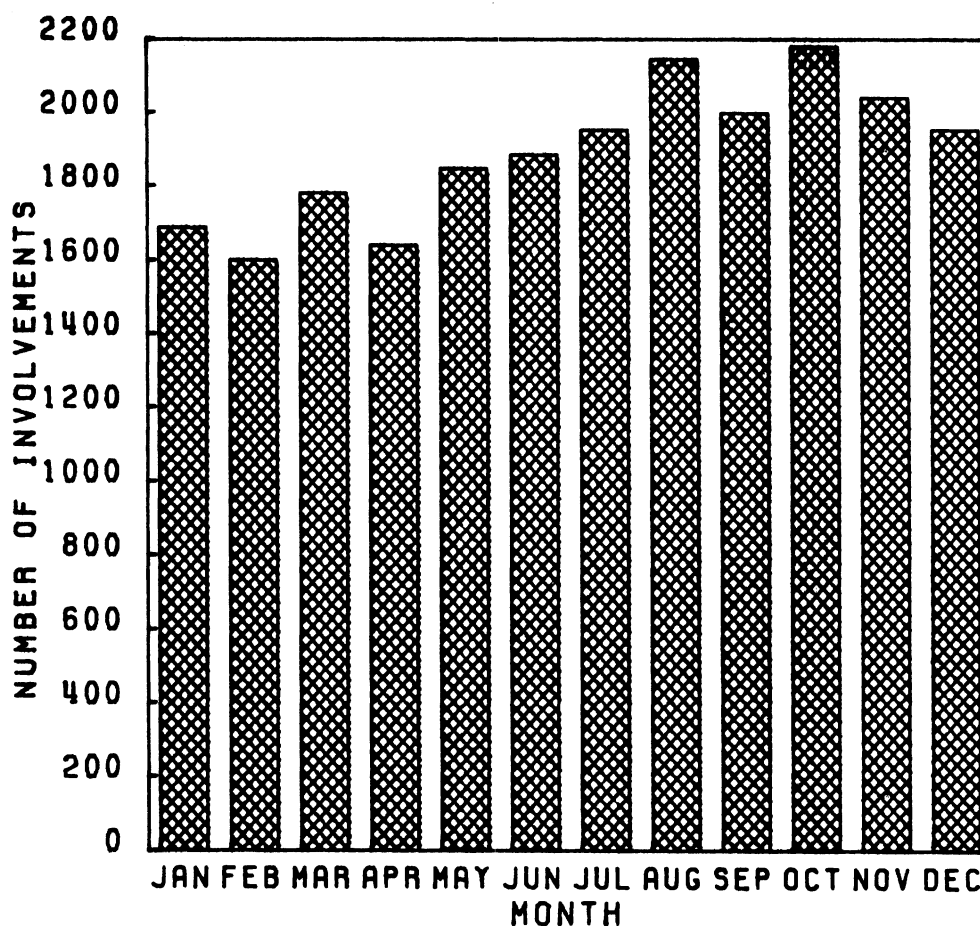


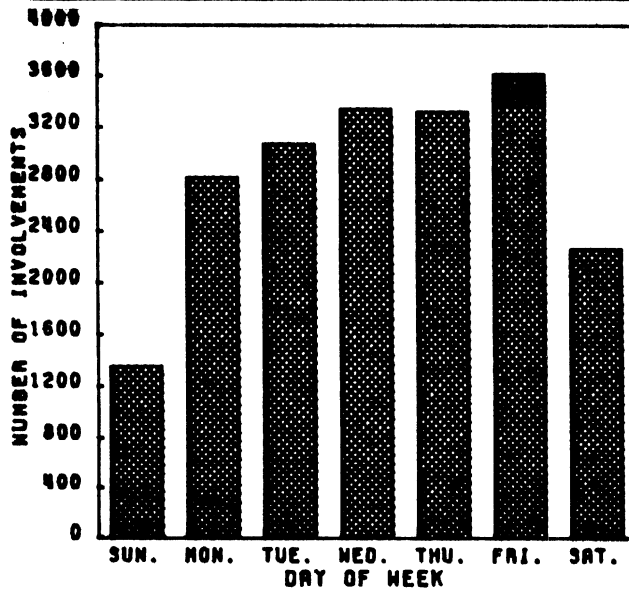
FIGURE 1.8
Combination Vehicle Fatal Accident Involvements by
Month, 1976-1980 Aggregate Data

SECTION 2.

COMBINATION VEHICLE ACCIDENT CHARACTERISTICS
IN RELATION TO FIVE ACCIDENT TYPES
1976-1980

TABLE 2.1
Combination Vehicle Fatal Accident Involvements by Day of Week and Type of Accident, 1976-1980

Day of Week	Accident Type					Total
	Single Vehicle With Ped./Bic.	Single Vehicle With Train	Other Single Vehicle	Two Vehicles	Three or More Vehicles	
Sunday	N 84 Col % 5.7	4 2.1	204 7.1	926 7.2	143 6.0	1361 6.9
Monday	N 206 Col % 14.1	31 16.1	429 14.8	1826 14.2	329 13.8	2821 14.2
Tuesday	N 218 Col % 14.9	30 15.6	469 16.2	1944 15.1	418 17.5	3079 15.5
Wednesday	N 294 Col % 20.1	39 20.3	500 17.3	2115 16.4	404 16.9	3352 16.9
Thursday	N 267 Col % 18.2	37 19.3	505 17.5	2145 16.6	377 15.8	3331 16.8
Friday	N 259 Col % 17.7	37 19.3	467 16.1	2395 18.6	465 19.4	3623 18.3
Saturday	N 136 Col % 9.3	14 7.3	318 11.0	1548 12.0	256 10.7	2272 11.5
Total	N 1464 Col % 100.0	192 100.0	2892 100.0	12899 100.0	2392 100.0	19839 100.0



As with all fatal accidents, weekday combination vehicle involvements peak on Fridays. However, combination vehicle fatal involvements decline considerably on weekends, in sharp contrast to the weekend increases found for all fatal accidents.

FIGURE 2.1
Combination Vehicle Fatal Accident Involvements by Day of Week, 1976-1980

TABLE 2.2
 Combination Vehicle Fatal Accident
 Involvements by Time of Day and Accident Type
 1976-1980

Time of Day	Accident Type					Total	
	Single Vehicle With Ped./Bic.	Single Vehicle With Train	Other Single Vehicle	Two Vehicles	Three or More Vehicles		
12:00-12:59 a.m.	N %	51 3.5	3 1.6	115 4.0	499 3.9	52 2.2	720 3.6
1:00-1:59 a.m.	N %	43 2.9	3 1.6	133 4.6	582 4.5	57 2.4	818 4.1
2:00-2:59 a.m.	N %	72 4.9	2 1.0	142 4.9	648 5.0	54 2.3	918 4.6
3:00-3:59 a.m.	N %	52 3.6	3 1.6	136 4.7	419 3.3	51 2.1	661 3.3
4:00-4:59 a.m.	N %	60 4.1	3 1.6	169 5.9	382 3.0	42 1.8	656 3.3
5:00-5:59 a.m.	N %	38 2.6	5 2.6	204 7.1	436 3.4	96 4.0	779 3.9
6:00-6:59 a.m.	N %	28 1.9	6 3.1	151 5.2	469 3.6	104 4.3	758 3.8
7:00-7:59 a.m.	N %	25 1.7	11 5.7	101 3.5	515 4.0	125 5.2	777 3.9
8:00-8:59 a.m.	N %	50 3.4	13 6.8	113 3.9	515 4.0	110 4.6	801 4.0
9:00-9:59 a.m.	N %	54 3.7	14 7.3	123 4.3	484 3.8	133 5.6	808 4.1
10:00-10:59 a.m.	N %	87 5.9	18 9.4	124 4.3	539 4.2	105 4.4	873 4.4
11:00-11:59 a.m.	N %	79 5.4	13 6.8	115 4.0	602 4.7	129 5.4	938 4.7
12:00-12:59 p.m.	N %	80 5.5	12 6.3	124 4.3	545 4.2	136 5.7	897 4.5

TABLE 2.2 (Continued)

Time of Day		Accident Type					Total
		Single Vehicle With Ped./Bic.	Single Vehicle With Train	Other Single Vehicle	Two Vehicles	Three or More Vehicles	
1:00-1:59 p.m.	N	84	16	117	595	147	959
	%	5.7	8.3	4.1	4.6	6.1	4.8
2:00-2:59 p.m.	N	92	16	134	727	195	1164
	%	6.3	8.3	4.6	5.6	8.2	5.9
3:00-3:59 p.m.	N	93	16	116	662	160	1047
	%	6.4	8.3	4.0	5.1	6.7	5.3
4:00-4:59 p.m.	N	75	10	113	652	139	989
	%	5.1	5.2	3.9	5.1	5.8	5.0
5:00-5:59 p.m.	N	66	13	96	539	128	842
	%	4.5	6.8	3.3	4.2	5.4	4.2
6:00-6:59 p.m.	N	53	4	85	550	82	774
	%	3.6	2.1	2.9	4.3	3.4	3.9
7:00-7:59 p.m.	N	56	5	101	499	78	739
	%	3.8	2.6	3.5	3.9	3.3	3.7
8:00-8:59 p.m.	N	55	1	74	444	66	640
	%	3.8	.5	2.6	3.4	2.8	3.2
9:00-9:59 p.m.	N	62	2	99	464	59	686
	%	4.2	1.0	3.4	3.6	2.5	3.5
10:00-10:59 p.m.	N	53	2	96	521	59	731
	%	3.6	1.0	3.3	4.0	2.5	3.7
11:00-11:59 p.m.	N	56	1	104	601	85	847
	%	3.8	.5	3.6	4.7	3.6	4.3
Total	N	1464	192	2885	12889	2392	19822
	%	100.0	100.0	100.0	100.0	100.0	100.0
Missing Data	N	0	0	7	10	0	17

Combination vehicle fatal accident involvements are spread fairly uniformly throughout the day and night, but they are most frequent in the afternoon.

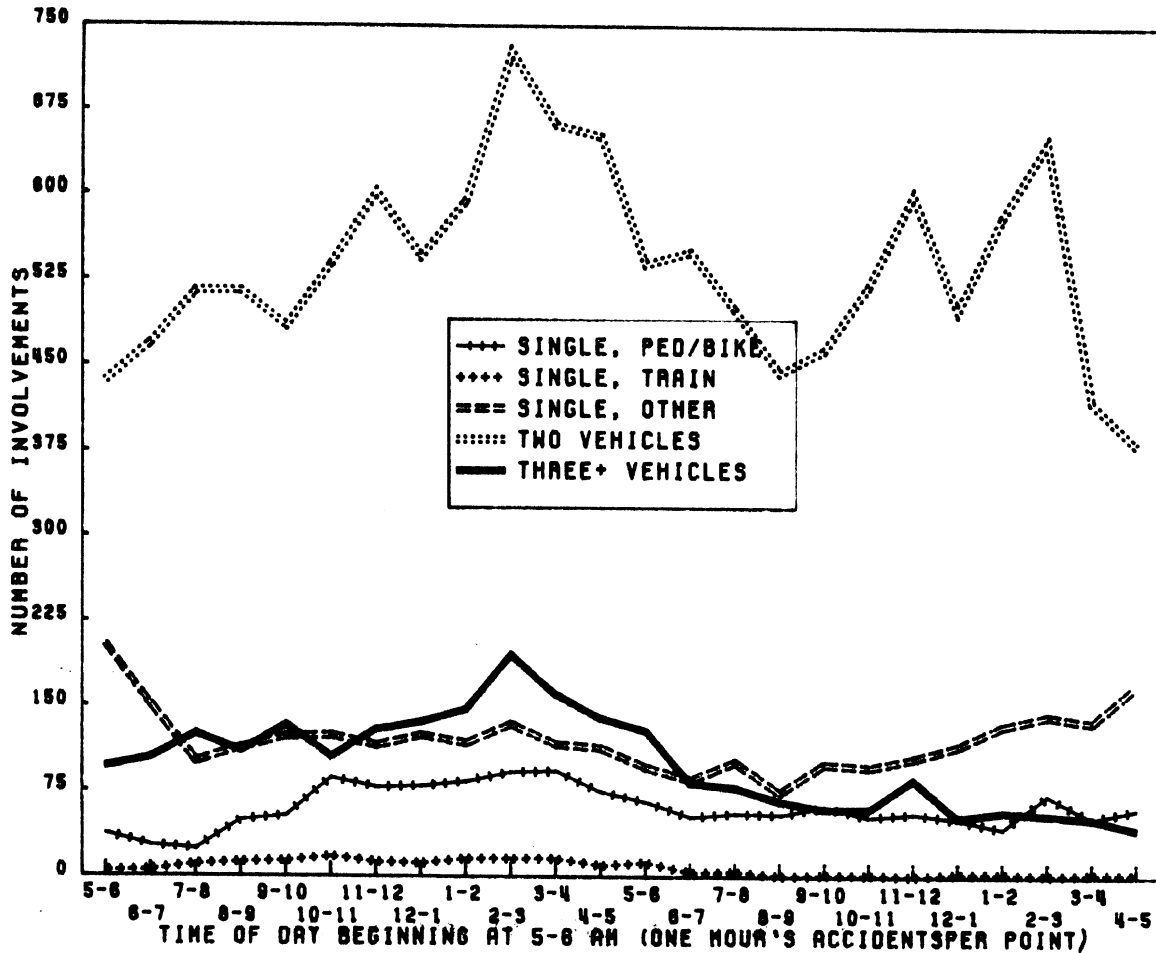


FIGURE 2.2
Combination Vehicle Fatal Accident Involvements
by Time of Day and Five Accident Types, 1976-1980

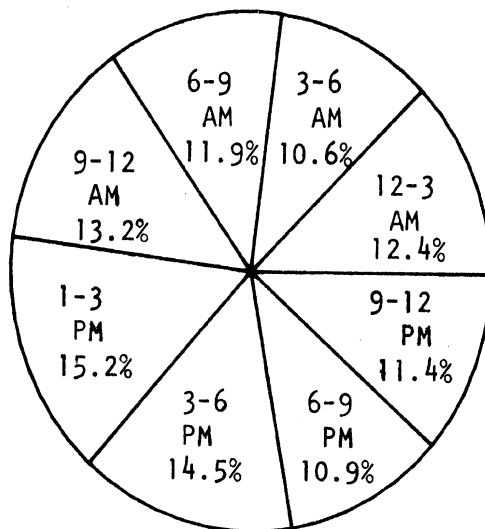


FIGURE 2.3
Combination Vehicle Fatal Accident
Involvements by Three-Hour Time Periods,
1976-1980

TABLE 2.3
Combination Vehicle Fatal Accident Involvements by Rural/Urban
Split and Road Class by Accident Type, 1976-1980

Rural/Urban Road Class		Accident Type					Total
		Single Vehicle With Ped./Bic.	Single Vehicle With Train	Other Single Vehicle	Two Vehicles	Three or More Vehicles	
Rural Limited Access	N %	218 15.2	1 .5	853 29.8	1742 13.6	498 21.0	3312 16.8
Rural U.S./State Multi-Lane	N %	112 7.8	5 2.6	202 7.1	1383 10.8	218 9.2	1920 9.8
Rural U.S./State Two-Lane	N %	284 19.8	57 29.8	1078 37.7	5639 44.0	864 36.4	7922 40.3
Rural Local Multi-lane	N %	7 .5	2 1.0	1 .0	56 .4	8 .3	74 .4
Rural Local Two-lane Major*	N %	22 1.5	11 5.8	64 2.2	267 2.1	18 .8	382 1.9
Rural Local Other/Misc.**	N %	54 3.8	59 30.9	117 4.1	382 3.0	18 .8	630 3.2
Urban Limited Access	N %	183 12.8	0 -	337 11.8	789 6.2	312 13.1	1621 8.2
Urban U.S./State Multi-lane	N %	138 9.6	2 1.0	64 2.2	1010 7.9	225 9.5	1439 7.3
Urban U.S./State Two-lane	N %	94 6.6	10 5.2	58 2.0	733 5.7	111 4.7	1006 5.1
Urban Local Multi-Lane	N %	127 8.9	4 2.1	26 .9	341 2.7	57 2.4	555 2.8
Urban Local Two-lane Major*	N %	50 3.5	14 7.3	13 .5	190 1.5	24 1.0	291 1.5
Urban Local Other/Misc.**	N %	144 10.0	26 13.6	46 1.6	288 2.2	20 .8	524 2.7
Total Limited Access	N %	401 27.4	1 .5	1191 41.2	2531 19.6	810 33.9	4934 24.9

TABLE 2.3 (Continued)

Rural/Urban Road Class		Accident Type					Total
		Single Vehicle With Ped./Bic.	Single Vehicle With Train	Other Single Vehicle	Two Vehicles	Three or More Vehicles	
Total U.S./State Multi-lane	N %	250 17.1	7 3.6	266 9.2	2394 18.6	443 18.5	3360 16.9
Total U.S./State Two-lane	N %	378 25.8	67 34.9	1136 39.3	6373 49.4	975 40.8	8929 45.0
Total Local Multi-lane	N %	135 9.2	6 3.1	28 1.0	403 3.1	68 2.8	640 3.2
Total Local Two-lane Major*	N %	72 4.9	25 13.0	77 2.7	457 3.5	42 1.8	673 3.4
Total Local Other/Misc.**	N %	228 15.6	86 44.8	194 6.7	741 5.7	54 2.3	1303 6.6
Total Rural	N %	697 48.6	135 70.7	2315 81.0	9469 73.9	1624 68.4	14240 72.4
Total Urban	N %	736 51.4	56 29.3	544 19.0	3351 26.1	749 31.6	5436 27.6
Grand Total	N %	1433 100.0	191 100.0	2859 100.0	12820 100.0	2373 100.0	19676 100.0
Missing Urban Data	N	31	1	33	79	19	163

*Local major roads are federal aid roads or other local roads considered to be arterials or collectors. This variable was not available in the 1976 and 1977 FARS data, and all local two-lane roads for those years are included in the Local Other/Misc. category.

**Includes unknown road type.

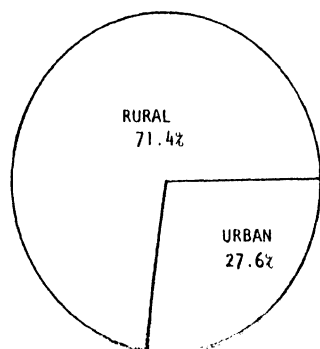


FIGURE 2.4

Combination Vehicle Fatal Accident Involvements by Rural/Urban Split, 1976-1980

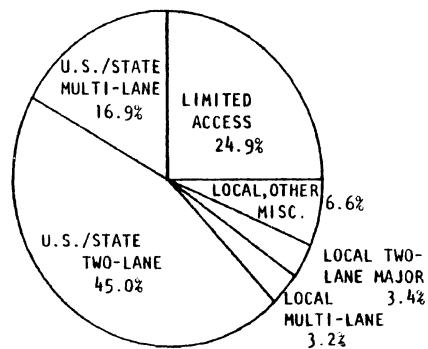


FIGURE 2.5

Combination Vehicle Fatal Accident Involvements by Road Class, 1976-1980

TABLE 2.4
Combination Vehicle Fatal Accident Involvements by
Relation to Junction and Accident Type, 1976-1980

Junction Type	Accident Type					Total
	Single Vehicle With Ped./Bic.	Single Vehicle With Train	Other Single Vehicle	Two Vehicles	Three or More Vehicles	
Non-junction* N %	1082 73.9	113 58.9	2610 90.3	7910 61.4	1774 74.2	13489 68.1
Intersection/ Interchange N %	332 22.7	9 4.7	259 9.0	4155 32.3	528 22.1	5283 26.7
Rail Crossing** N %	0 -	70 36.5	4 .1	11 .1	6 .3	91 .5
Driveway, Alley, etc. N %	50 3.4	0 -	18 .6	801 6.2	84 3.5	953 4.8
Total N %	1464 100.0	192 100.0	2891 100.0	12877 100.0	2392 100.0	19816 100.0
Missing Data N	0	0	1	22	0	23

*Non-junction refers to accidents which took place away from another traffic way.

**Rail crossing was only coded separately in 1979 and 1980.

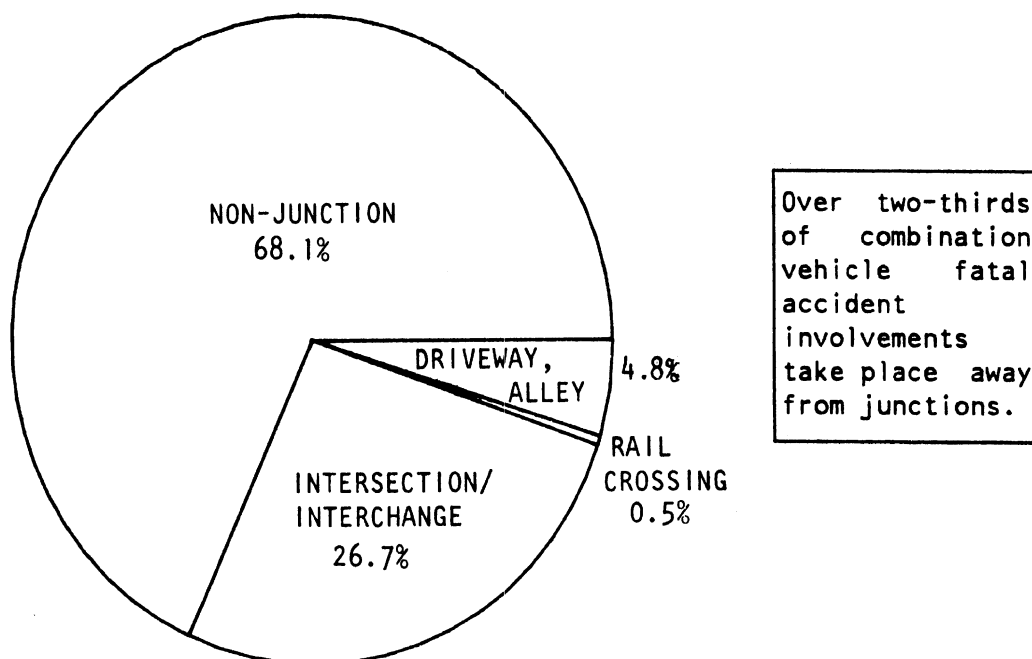


FIGURE 2.6
Combination Vehicle Fatal Accident Involvements
by Junction Type, 1976-1980

TABLE 2.5
Combination Vehicle Fatal Accident Involvements by
Speed Limit and Accident Type, 1976-1980

Speed Limit		Accident Type					Total
		Single Vehicle With Ped./Bic.	Single Vehicle With Train	Other Single Vehicle	Two Vehicles	Three or More Vehicles	
5-20 mph	N	19	3	18	24	7	71
	%	1.5	1.9	.7	.2	.3	.4
25	N	115	14	48	128	20	325
	%	9.1	8.8	1.8	1.1	.9	1.8
30	N	137	21	54	255	40	507
	%	10.8	13.1	2.0	2.2	1.8	2.8
35	N	144	15	86	595	68	908
	%	11.3	9.4	3.2	5.0	3.1	5.0
40	N	28	3	66	450	95	642
	%	2.2	1.9	2.5	3.8	4.3	3.5
45	N	71	15	121	947	156	1310
	%	5.6	9.4	4.5	8.0	7.0	7.2
50	N	62	12	148	783	151	1156
	%	4.9	7.5	5.5	6.6	6.8	6.4
55	N	693	77	2141	8671	1687	13269
	%	54.6	48.1	79.8	73.2	75.9	73.0
Total	N	1269	160	2682	11853	2224	18188
	%	100.0	100.0	100.0	100.0	100.0	100.0
Missing Data	N	195	32	210	1046	168	1651

The great majority of combination vehicle fatal accident involvements take place on roads with the maximum speed limit.

TABLE 2.6
Combination Vehicle Fatal Accident Involvements by
Light Condition and Accident Type, 1976-1980

Light Condition	Accident Type					Total
	Single Vehicle With Ped./Bic.	Single Vehicle With Train	Other Single Vehicle	Two Vehicles	Three or More Vehicles	
Daylight	N 802 % 54.8	153 79.7	1397 48.4	6706 52.0	1590 66.5	10648 53.7
Dawn or Dusk	N 39 % 2.7	11 5.7	151 5.2	519 4.0	74 3.1	794 4.0
Dark With Street Lights	N 122 % 8.3	5 2.6	137 4.7	1015 7.9	122 5.1	1401 7.1
Dark--Not Lighted	N 501 % 34.2	23 12.0	1203 41.7	4650 36.1	606 25.3	6983 35.2
Total	N 1464 Col % 100.0	192 100.0	2888 100.0	12890 100.0	2392 100.0	19826 100.0
Missing Data	N 0	0	4	9	0	13

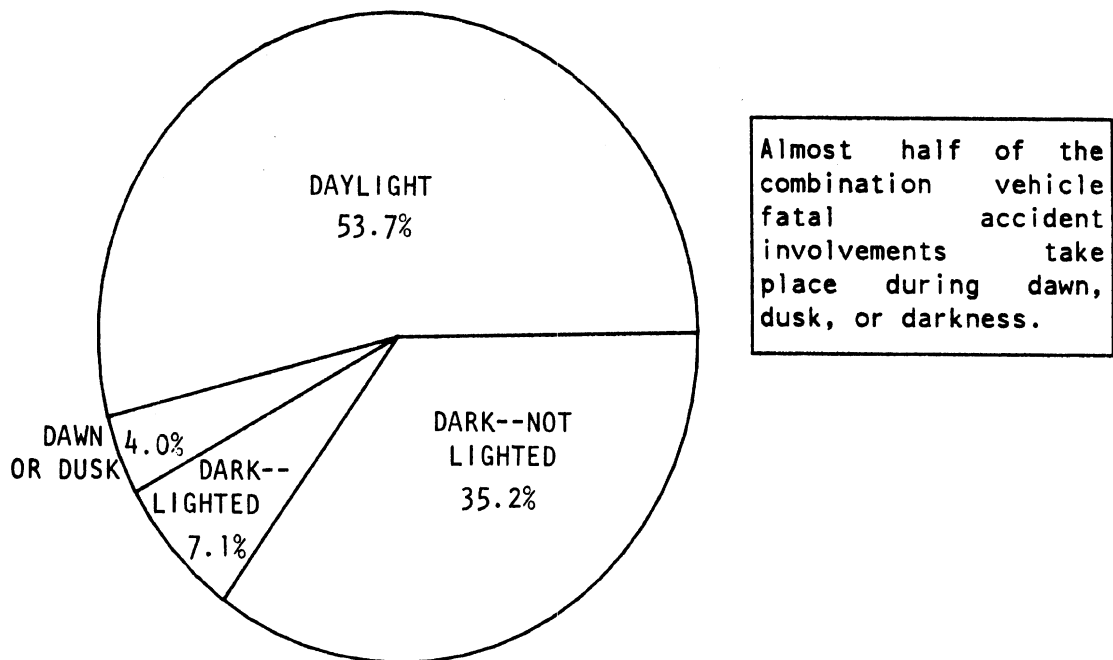
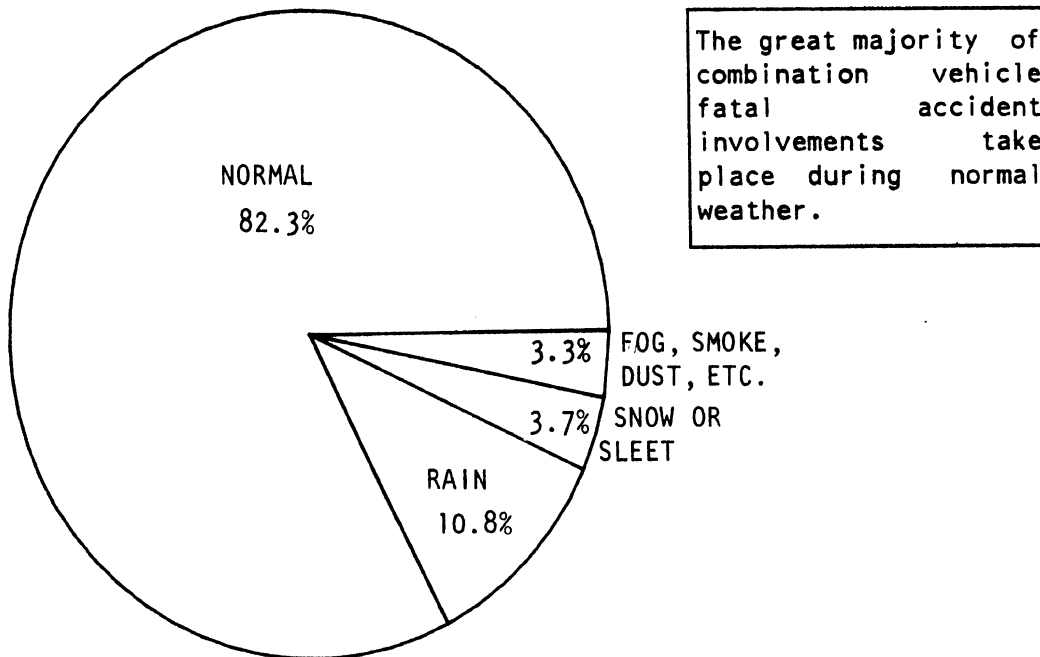


FIGURE 2.7
Combination Vehicle Fatal Accident Involvements
by Light Condition, 1976-1980

TABLE 2.7
 Combination Vehicle Fatal Accident Involvements by
 Weather Condition and Accident Type, 1976-1980

Weather Condition		Accident Type					Total
		Single Vehicle With Ped./Bic.	Single Vehicle With Train	Other Single Vehicle	Two Vehicles	Three or More Vehicles	
Normal	N	1325	177	2384	10627	1692	16205
	%	91.1	93.2	83.2	83.0	71.2	82.3
Rain	N	94	3	330	1376	317	2120
	%	6.5	1.6	11.5	10.7	13.3	10.8
Snow or Sleet	N	18	2	89	461	154	724
	%	1.2	1.1	3.1	3.6	6.5	3.7
Fog, Smoke, Dust, Etc.	N	18	8	64	342	215	647
	%	1.2	4.2	2.2	2.7	9.0	3.3
Total	N	1455	190	2867	12806	2378	19696
	%	100.0	100.0	100.0	100.0	100.0	100.0
Missing Data	N	9	2	25	93	14	143

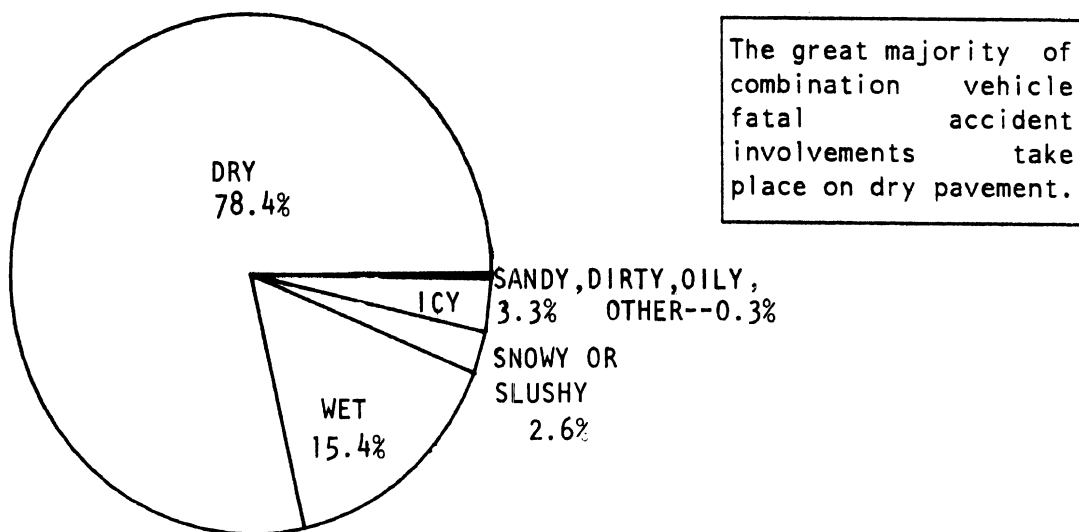


The great majority of combination vehicle fatal accident involvements take place during normal weather.

FIGURE 2.8
 Combination Vehicle Fatal Accident Involvements
 by Weather Condition, 1976-1980

TABLE 2.8
 Combination Vehicle Fatal Accident Involvements by Road
 Surface Moisture Condition and Accident Type, 1976-1980

Road Surface Moisture Condition	Accident Type					Total
	Single Vehicle With Ped./Bic.	Single Vehicle With Train	Other Single Vehicle	Two Vehicles	Three or More Vehicles	
Dry	N 1262 % 86.3	170 89.5	2321 80.4	10093 78.4	1675 70.1	15521 78.4
Wet	N 151 % 10.3	9 4.7	424 14.7	2002 15.6	458 19.2	3044 15.4
Snowy or Slushy	N 20 % 1.4	9 4.7	53 1.8	334 2.6	103 4.3	519 2.6
Icy	N 26 % 1.8	2 1.1	81 2.8	409 3.2	140 5.9	658 3.3
Sandy, Dirty Oily, etc.	N 3 % .2	0 -	3 .1	14 .1	5 .2	25 .1
Other	N 0 % -	0 -	5 .2	21 .2	9 .4	35 .2
Total	N 1462 % 100.0	190 100.0	2887 100.0	12873 100.0	2390 100.0	19802 100.0
Missing Data	N 2	2	5	26	2	37



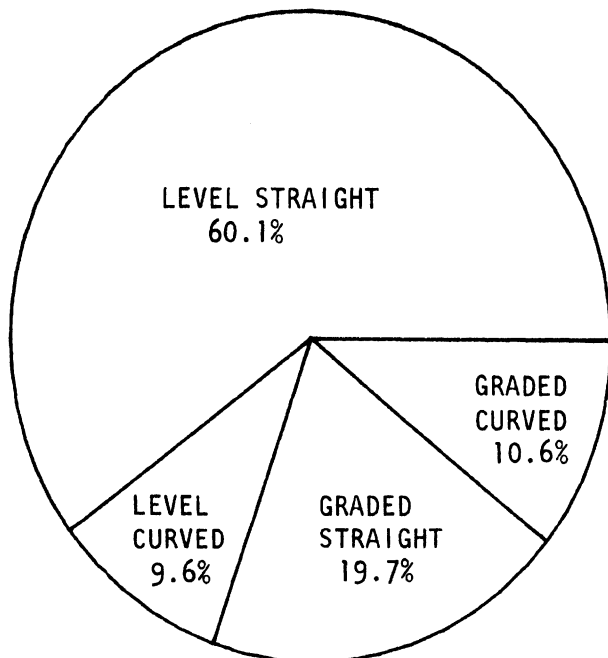
The great majority of combination vehicle fatal accident involvements take place on dry pavement.

FIGURE 2.9
 Combination Vehicle Fatal Accident Involvements by Road
 Surface Moisture Condition, 1976-1980

TABLE 2.9
Combination Vehicle Fatal Accident Involvements by Road
Alignment and Grade by Accident Type, 1976-1980

Road Alignment and Grade		Accident Type					Total
		Single Vehicle With Ped./Bic.	Single Vehicle With Train	Other Single Vehicle	Two Vehicles	Three or More Vehicles	
Level Straight	N %	1049 74.6	131 72.0	1108 39.6	7873 63.0	1368 59.6	11529 60.1
Level Curved	N %	62 4.4	6 3.3	457 16.3	1110 8.9	197 8.6	1832 9.6
Graded* Straight	N %	239 17.0	40 22.0	498 17.8	2500 20.0	497 21.6	3774 19.7
Graded* Curved	N %	57 4.1	5 2.7	738 26.3	1006 8.1	235 10.2	2041 10.6
Total	N %	1407 100.0	182 100.0	2801 100.0	12489 100.0	2297 100.0	19176 100.0
Missing Data	N	57	10	91	410	95	663

*The data do not indicate whether the vehicles were traveling uphill or downhill on the graded roadways.



The majority of combination vehicle fatal accident involvements take place on straight level roadways, but significant proportions take place on curved and/or hilly roadways.

FIGURE 2.10
Combination Vehicle Fatal Accident Involvements by
Road Alignment and Grade, 1976-1980

TABLE 2.10
Combination Vehicle Fatal Accident Involvements by Environmental Contributing Factor
and Accident Type, 1976-1980

Contributing Factor		Accident Type					Total
		Single Vehicle With Ped./Bic.	Single Vehicle With Train	Other Single Vehicle	Two Vehicles	Three or More Vehicles	
Vision Obscured: Rain, Snow, Fog, Etc.	N %	32 2.2	2 1.1	84 2.9	459 3.6	259 10.9	836 4.3
Vision Obscured: Sun, Headlights, Etc.	N %	15 1.0	3 1.6	2 .1	76 .6	12 .5	108 .6
Vision Obscured: Curve, Hill, Etc.	N %	9 -	0 .6	46 1.6	173 1.4	40 1.7	268 1.4
Vision Obscured: Buildings, Trees, Etc.	N %	2 .1	5 2.6	1 .0	69 .5	4 .2	81 .4
Vision Obscured: Other Vehicles, Etc.	N %	45 3.1	1 .5	7 .2	96 .8	24 1.0	173 .9
Swerve Due to Wind	N %	0 -	0 -	16 .6	19 .1	1 .0	36 .2
Swerve Due to Bumps, Slippery Surface, Etc.	N %	14 1.0	2 1.1	137 4.8	507 4.0	122 5.1	782 4.0
Swerve to Avoid People, Animals, Debris	N %	79 5.4	0 -	34 1.2	32 .3	11 .5	156 .8
Swerve to Avoid Other Vehicle	N %	9 .6	0 -	38 1.3	217 1.7	83 3.5	347 1.8
Poor Traffic Controls or Markings	N %	3 .2	5 2.6	6 .2	29 .2	3 .1	46 .2
Poor Shoulders/ Other Poor Design	N %	2 .1	2 1.1	18 .6	24 .2	8 .3	54 .3
Construction/ Maintenance Condition	N %	16 1.1	0 -	26 .9	90 .7	50 2.1	182 .9
Surface Under Water or Washed Out	N %	0 -	0 -	1 .0	1 .0	1 .0	3 .0
None	N %	1226 84.4	169 89.4	2433 85.4	10984 86.0	1751 73.9	16563 84.4
Total	N %	1452 100.0	189 100.0	2849 100.0	12776 100.0	2369 100.0	19635 100.0
Missing Data	N	12	3	43	123	23	204

TABLE 2.11
Combination Vehicle Fatal Accident Involvements by the Number of
Fatalities in the Accident and Accident Type, 1976-1980

Number of Fatalities	Accident Type					Total
	Single Vehicle With Ped./Bic.	Single Vehicle With Train	Other Single Vehicle	Two Vehicles	Three or More Vehicles	
One	N 1442 % 98.5	182 94.8	2678 92.6	10739 83.3	1797 75.1	16838 84.9
Two	N 19 % 1.3	6 3.1	187 6.5	1685 13.1	405 16.9	2302 11.6
Three	N 2 % .1	4 2.1	22 .8	317 2.5	110 4.6	455 2.3
Four	N 1 % .1	0 -	1 .0	111 .9	52 2.2	165 .8
Five or More	N 0 % -	0 -	3 .1	47 .4	28 1.2	78 .4
Total	N 1464 % 100.0	192 100.0	2891 100.0	12899 100.0	2392 100.0	19838 100.0
Missing Data	N 0	0	1	0	0	1

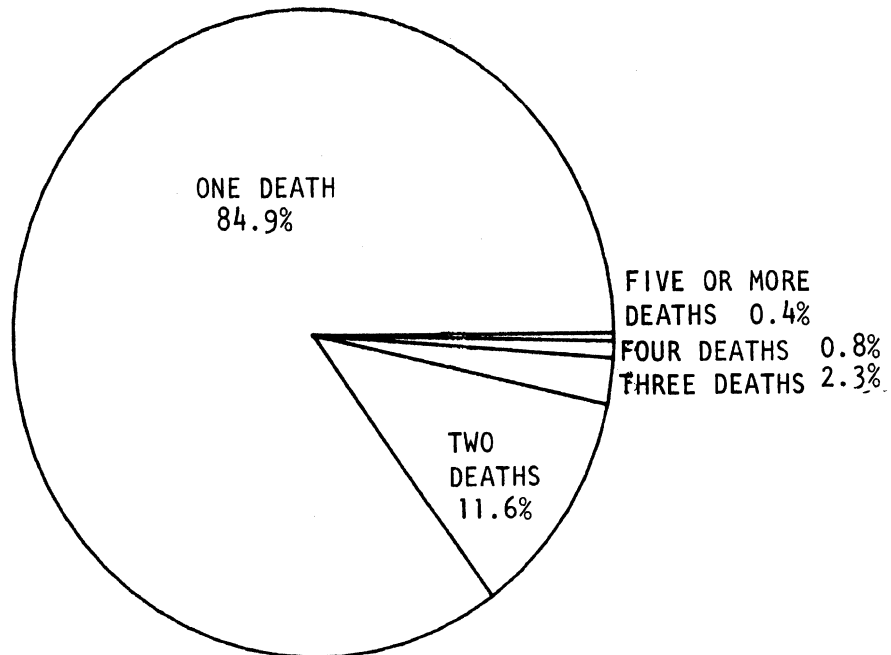


FIGURE 2.11
Combination Vehicle Fatal Accident Involvements
by Total Deaths in the Accident, 1976-1980

TABLE 2.12
Combination Vehicle Fatal Accident Involvements by
Manner of Accident and Accident Type, 1976-1980

Manner of Accident*		Accident Type					Total
		Single Vehicle With Ped./Bic	Single Vehicle With Train	Other Single Vehicle	Two Vehicles	Three or More Vehicles	
Overturn	N	0	0	1044	67	25	1136
	Col.%	-	-	36.2	.5	1.0	5.7
Comb.Vehicle	% of Total**	-	-	5.2	9.8	17.7	5.4
Other	N	0	0	140	21	8	169
Non-collision	Col.%	-	-	4.9	.2	.3	.9
Comb.Vehicle	% of Total	-	-	4.3	7.9	18.2	4.8
Collision with Pedestrian	N	1258	0	0	59	15	1332
	Col.%	85.9	-	-	.5	.6	6.7
Comb.Vehicle	% of Total	3.9	-	-	3.2	3.3	3.9
Collision with Other Non-motorist	N	206	0	0	6	0	212
	Col.%	14.1	-	-	.0	-	1.1
Comb.Vehicle	% of Total	4.7	-	-	6.3	-	4.8
Collision with Animal	N	0	0	55	6	0	61
	Col.%	-	-	1.9	.0	-	.3
Comb.Vehicle	% of Total	-	-	14.7	6.7	-	12.8
Collision with Train	N	0	192	0	2	1	195
	Col.%	-	100.0	-	.0	.0	1.0
Comb.Vehicle	% of Total	-	5.6	-	5.7	3.8	5.6
Collision with Parked Vehicle	N	0	0	189	50	12	251
	Col.%	-	-	6.5	.4	.5	1.3
Comb.Vehicle	% of Total	-	-	5.1	14.1	11.1	6.0
Collision with Non-fixed Object	N	0	0	33	18	6	57
	Col.%	-	-	1.1	.1	.3	.3
Comb.Vehicle	% of Total	-	-	5.9	16.4	20.0	8.2
Collision with Fixed Object	N	0	0	1421	220	88	1729
	Col.%	-	-	49.2	1.7	3.7	8.7
Comb.Vehicle	% of Total	-	-	2.4	8.7	9.0	2.7
Rear-end Vehicle Collision	N	0	0	3	2613	818	3434
	Col.%	-	-	.1	20.3	34.2	17.3
Comb.Vehicle	% of Total	-	-	3.4	16.6	11.7	15.0
Rear-to-rear Vehicle Collision	N	0	0	0	19	14	33
	Col.%	-	-	-	0.1	0.6	0.2
Comb.Vehicle	% of Total	-	-	-	15.0	16.5	15.6
Head-on Vehicle Collision	N	0	0	0	3456	433	3889
	Col.%	-	-	-	26.9	18.1	19.6
Comb.Vehicle	% of Total	-	-	-	6.4	6.1	6.3

TABLE 2.12 (Continued)

Manner of Accident*	Accident Type					Total	
	Single Vehicle With Ped./Bic.	Single Vehicle With Train	Other Single Vehicle	Two Vehicles	Three or More Vehicles		
Angle Vehicle Collision	N	0	0	0	5352	639	5991
Comb.Vehicle	Col.%	-	-	-	41.6	26.7	30.3
	% of Total	-	-	-	8.0	6.6	7.8
Sideswipe Vehicle Collision	N	0	0	1	982	332	1315
Comb.Vehicle	Col.%	-	-	.0	7.6	13.9	6.6
	% of Total	-	-	6.6	12.6	8.6	11.3
Total	N	1464	192	2886	12871	2391	19804
	Row %	7.4%	1.0%	14.6%	65.0%	12.1%	100.0%
	Col.%	100.0	100.0	100.0	100.0	100.0	100.0
Comb.Vehicle	% of Total	4.0	5.6	3.3	8.5	8.1	6.4
Missing Data							
Comb.Vehicles	N	0	0	6	28	1	35
Missing Data-All	N	0	0	186	269	69	524

*This variable is generally based on the first harmful event, so there are cases where the first event was not a two-vehicle collision but still two or more vehicles were involved in the accident. A parked vehicle is treated as a type of fixed object rather than as a second vehicle in the accident. Why the data show a few two-vehicle collisions among single-vehicle accidents is not known. The data do not indicate which was the striking vehicle in two-vehicle collisions.

**This is the percentage obtained from dividing the number of combination vehicle fatal involvements in a given category by all vehicle fatal involvements in that category.

Combination vehicles are much less likely than other vehicles to be involved in pedestrian/bicyclist and other single-vehicle fatal accidents. They are especially less likely to be involved in fatal collisions with a fixed object. More than three-fourths of combination vehicle fatal involvements are in collisions with one or more other vehicles. Combination vehicles are considerably more likely than other vehicles to be involved in fatal rear-end collisions; they are quite a bit more likely to be involved in fatal sideswipe collisions; and they are somewhat more likely to be involved in fatal angle collisions.

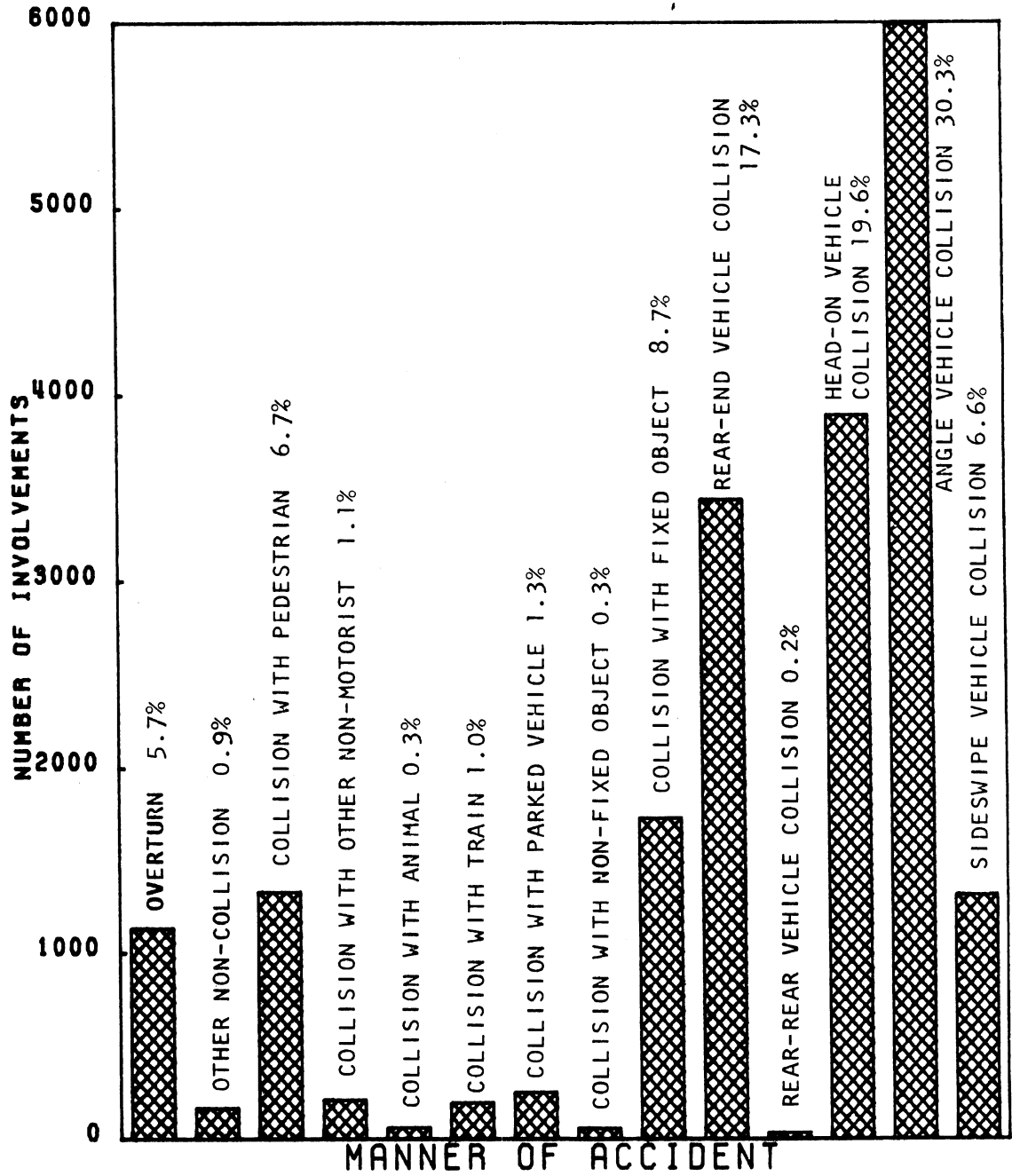


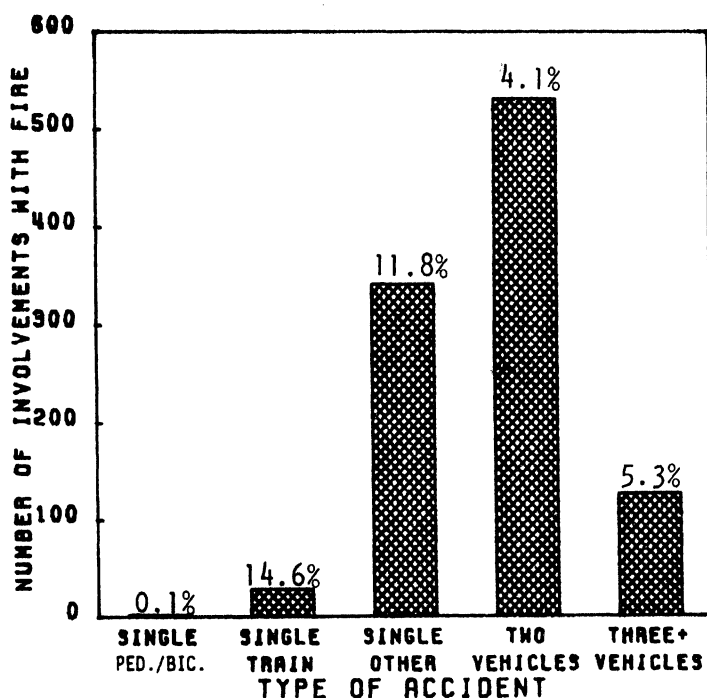
FIGURE 2.12
 Combination Vehicle Fatal Accident Involvements
 by Manner of Accident, 1976-1980

TABLE 2.13
Fire in Combination Vehicle by Combination Vehicle Type and
Accident Type, Fatal Accident Involvements, 1976-80*

Combination Vehicle Type	Accident Type					Total	
	Single Vehicle With Ped./Bic.	Single Vehicle With Train	Other Single Vehicle	Two Vehicles	Three or More Vehicles		
Two-unit	N %	2 0.2	27 14.8	315 11.8	488 4.0	120 5.4	952 5.1
Three or Four Unit	N %	0 -	1 16.7	23 17.0	34 6.9	6 5.0	64 7.6
Bobtail**	N %	0 -	0 -	4 4.4	9 3.4	1 1.7	14 3.0
Total	N %	2 0.1	28 14.6	342 11.8	531 4.1	127 5.3	1030 5.2
Comb.Vehicle % of Total		4.7	23.3	10.4	14.7	15.0	13.0

*The first percentages shown are the percentages of all combination vehicle involvements in a given category which involved a fire in the vehicle. The final percentages are the combination vehicle percentages of all vehicles with a fire.

**As explained in the Preface, the bobtail category in FARS appears to include all large single-unit trucks involved in fatal accidents in Pennsylvania for 1978-1981.



In fatal accidents combination vehicles are more likely to have a fire than are other types of vehicles. Fires are particularly likely in train and other single-vehicle accidents.

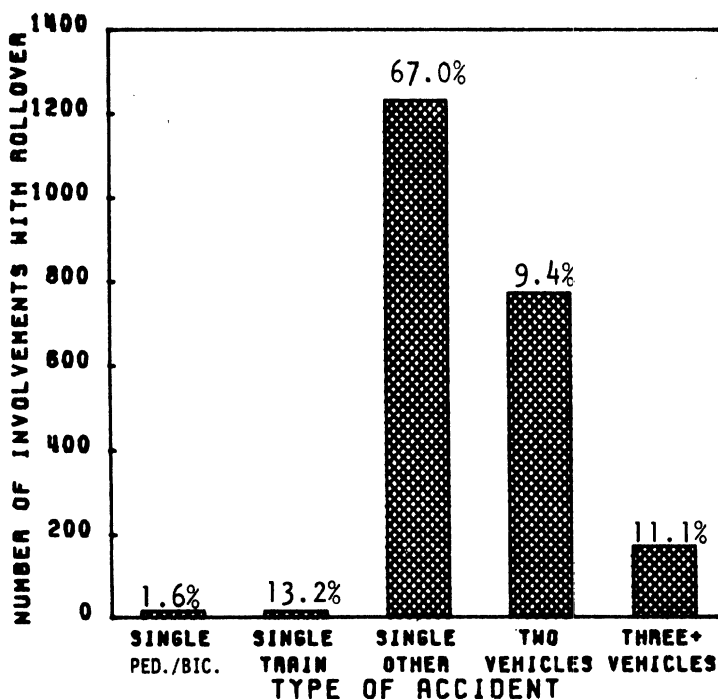
FIGURE 2.13
Incidence and Percent of Fire in the Combination Vehicle by Accident Type, 1976-1980

TABLE 2.14
 Combination Vehicle Rollover by Combination Vehicle Type and
 Accident Type, Fatal Accident Involvements, 1978-80*

Combination Vehicle Type	Accident Type					Total
	Single Vehicle With Ped./Bic.	Single Vehicle With Train	Other Single Vehicle	Two Vehicles	Three or More Vehicles	
Two-unit	N 14	12	1133	703	151	2013
	% 1.7	12.0	67.0	9.1	10.6	17.1
Three or Four Unit	N 1	2	56	43	14	116
	% 2.2	66.7	73.7	14.5	19.7	23.6
Bobtail**	N 0	0	42	27	6	75
	% -	-	59.2	11.5	11.5	18.4
Total	N 15	14	1231	773	171	2204
	% 1.6	13.2	67.0	9.4	11.1	17.4

*This variable was not included in the FARS data prior to 1978. The percentages shown are the percentages of all vehicle involvements in a given category which involved a rollover either as a first or subsequent event.

**As explained in the Preface, the bobtail category in FARS appears to include all large single-unit trucks involved in fatal accidents in Pennsylvania for 1978-1981.



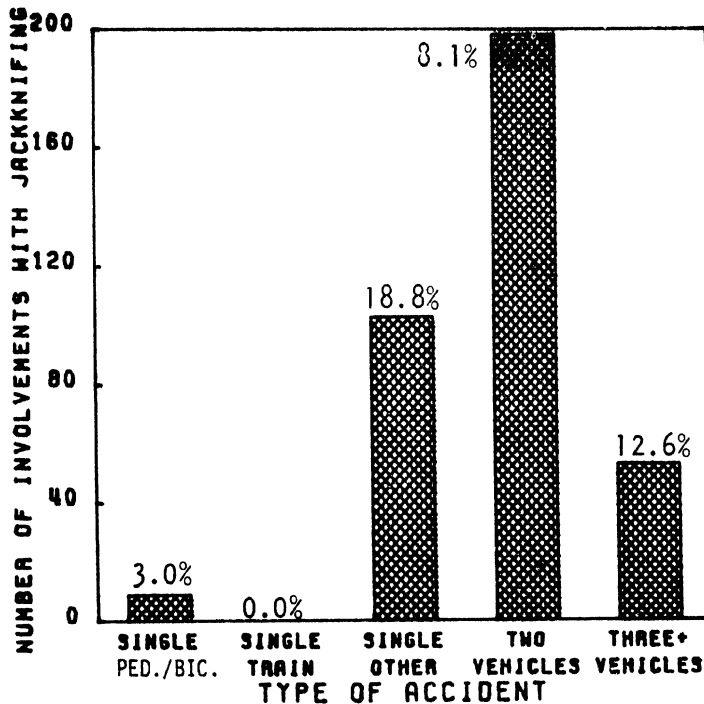
Combination vehicle rollover is much more likely in fixed-object and non-collision accidents than in other types of accidents.

FIGURE 2.14
 Incidence and Percent of Combination Vehicle Rollover by Accident Type, 1978-1980

TABLE 2.15
Combination Vehicle Jackknifing by Combination Vehicle Type and
Accident Type, Fatal Accident Involvements, 1980*

Combination Vehicle Type	Accident Type					Total
	Single Vehicle With Ped./Bic.	Single Vehicle With Train	Other Single Vehicle	Two Vehicles	Three or More Vehicles	
Two-Unit	N 8 % 2.9	0 -	95 18.2	189 8.0	50 12.5	342 9.5
Three or Four Unit	N 1 % 4.8	0 -	8 30.8	9 10.2	3 16.7	21 13.6
Total	N 9 % 3.0	0 -	103 18.8	198 8.1	53 12.6	363 9.7

*This variable was not included in the FARS data prior to 1980. The percentages shown are the percentages of all combination vehicle involvements in a given category which experienced jackknifing, excluding the 152 bobtail trucks from the base.



Combination vehicle jackknifing appears to be more common in fixed-object and non-collision accidents than in other types of accidents.

FIGURE 2.15
Incidence and Percent of Combination Vehicle Jackknifing by Accident Type, 1980

TABLE 2.16
Combination Vehicle Fatal Accident Involvements by Extent of
Combination Vehicle Damage and Accident Type, 1976-1980

Vehicle Damage	Accident Type					Total	
	Single Vehicle With Ped./Bic.	Single Vehicle With Train	Other Single Vehicle	Two Vehicles	Three or More Vehicles		
None	N	680	1	81	409	66	1237
	%	46.9	.5	2.8	3.2	2.8	6.3
Other (Minor)	N	571	0	58	2219	422	3270
	%	39.4	-	2.0	17.5	18.0	16.7
Functional (Moderate)	N	130	4	159	3229	526	4048
	%	9.0	2.1	5.5	25.5	22.4	20.7
Disabling (Severe)	N	68	187	2575	6813	1330	10973
	%	4.7	97.4	89.6	53.8	56.7	56.2
Total	N	1449	192	2873	12670	2344	19528
	%	100.0	100.0	100.0	100.0	100.0	100.0
Missing Data	N	15	0	19	229	48	311

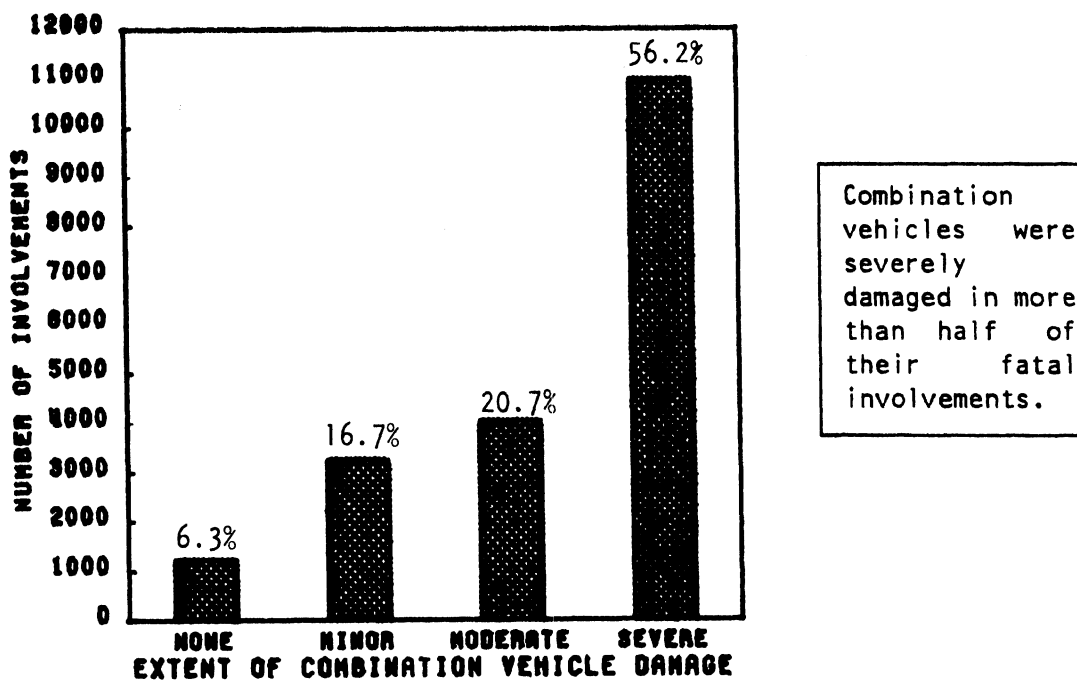


FIGURE 2.16
Combination Vehicle Fatal Accident Involvements
by Extent of Combination Vehicle Damage,
1976-1980

TABLE 2.17
 Combination Vehicle Fatal Accident Involvements by
 Reported Vehicle Defects and Accident Type, 1976-1980

Defective Parts		Accident Type					Total
		Single Vehicle With Ped./Bic.	Single Vehicle With Train	Other Single Vehicle	Two Vehicles	Three or More Vehicles	
None	N %	1390 96.7	164 96.5	2305 85.7	11940 96.3	2164 94.7	17963 94.6
Tires, Wheels	N %	18 1.3	0 -	195 7.2	138 1.1	30 1.3	381 2.0
Brake System	N %	23 1.6	6 3.5	140 5.2	177 1.4	70 3.1	416 2.2
Steering System	N %	0	0	16 .6	8 .1	4 .2	28 .1
Suspension	N %	0	0	4 .1	1 .0	3 .1	8 .0
Power Train	N %	1 .1	0	4 .1	33 .3	2 .1	40 .2
Headlights	N %	1 .1	0 -	1 .0	7 .1	0 .0	9 -
Signal Lights	N %	0 -	0 -	2 .1	13 .1	0 -	15 .1
Other Lights	N %	2 .1	0	2 .1	47 .4	3 .1	54 .3
Mirrors, Wipers	N %	0 -	0 -	2 -	2 .0	2 -	6 .0
Body, Doors Other	N %	1 .1	0	16 .6	11 .1	4 .2	32 .2
Trailer Hitch	N %	2 .1	0	4 .1	17 .1	4 .2	27 .1
Total	N %	1438 100.0	170 100.0	2691 100.0	12394 100.0	2286 100.0	18979 100.0
Missing Data	N	26	22	201	505	106	860

TABLE 2.18
 Model Year Distribution of Combination Vehicles
 Involved in Fatal Accidents by Year, 1976-1980

Year of Accident	Vehicle Model Year						Total
	Current and Next	Prior 1-2 Yrs	Prior 3-4 Yrs	Prior 5-6 Yrs	Prior 7-8 Yrs	Prior 9+ Yrs	
1976	N 204 % 6.0	930 27.5	952 28.2	526 15.6	367 10.9	400 11.8	3379 100.0
1977	N 413 % 11.0	778 20.8	1113 29.7	600 16.0	398 10.6	441 11.8	3743 100.0
1978	N 455 % 10.8	979 23.3	944 22.5	812 19.4	441 10.5	564 13.4	4195 100.0
1979	N 472 % 10.6	1281 28.6	687 15.4	889 19.9	471 10.5	673 15.0	4473 100.0
1980	N 262 % 6.8	1218 31.4	694 17.9	591 15.3	532 13.7	576 14.9	3873 100.0

NOTE: 176 combination vehicles with missing model year are excluded from this analysis.

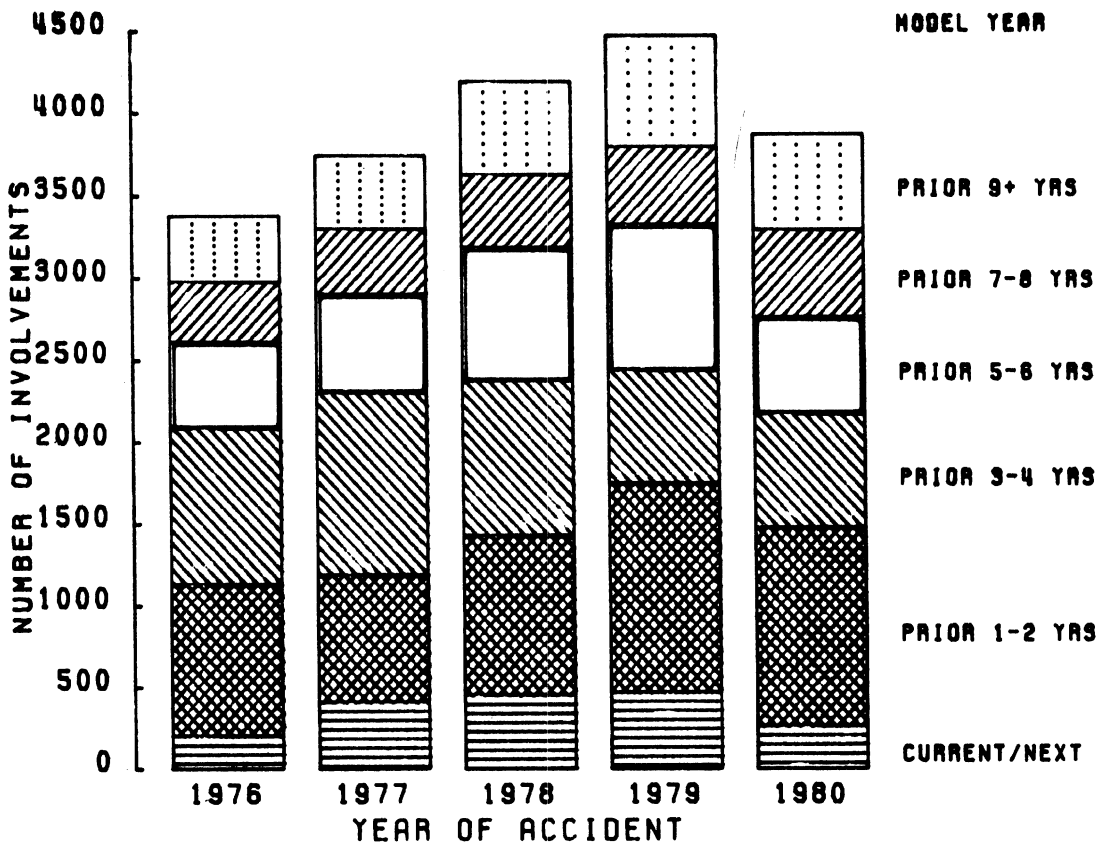


FIGURE 2.17
 Combination Vehicle Fatal Accident Involvements
 by Age of Vehicle and Year, 1976-1980

SECTION 3.

COMBINATION VEHICLE DRIVER CHARACTERISTICS (ALL AND
FATALLY INJURED) IN RELATION TO FIVE ACCIDENT TYPES
1976-1980

TABLE 3.1
Age of Combination Vehicle Drivers in Fatal
Accidents by Accident Type, 1976-1980

Age*	Accident Type					Total	
	Single Vehicle With Ped./Bic.	Single Vehicle With Train	Other Single Vehicle	Two Vehicles	Three or More Vehicles		
16-17	N %	2 .1	0 -	12 .4	29 .2	2 .1	45 .2
18-20	N %	24 1.7	8 4.2	88 3.1	328 2.6	63 2.7	511 2.6
21-24	N %	115 8.0	20 10.4	295 10.3	1368 10.7	268 11.3	2066 10.5
25-34	N %	480 33.4	66 34.4	995 34.6	4175 32.8	809 34.1	6525 33.3
35-44	N %	399 27.7	45 23.4	697 24.2	3353 26.3	606 25.5	5100 26.0
45-54	N %	293 20.4	39 20.3	497 17.3	2421 19.0	425 17.9	3675 18.7
55-64	N %	117 8.1	12 6.3	261 9.1	962 7.6	189 8.0	1541 7.9
65+	N %	9 .6	2 1.0	33 1.1	90 .7	12 .5	146 .7
Total	N %	1439 100.0	192 100.0	2878 100.0	12726 100.0	2374 100.0	19609 100.0
Missing Data	N	25	0	14	173	18	230

*Federal Motor Carrier Safety Regulations set a minimum age of 21 years for driving heavy vehicles in interstate commerce. Many carriers set a minimum age of 25 for their own operations.

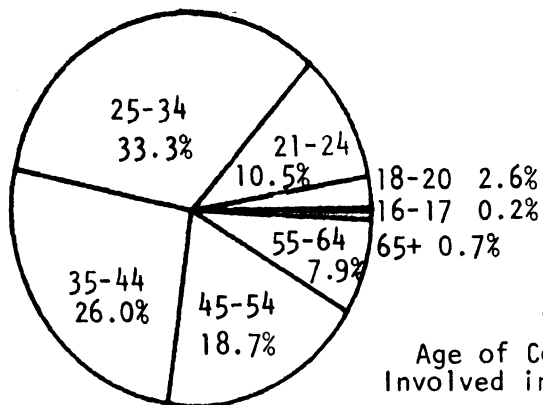
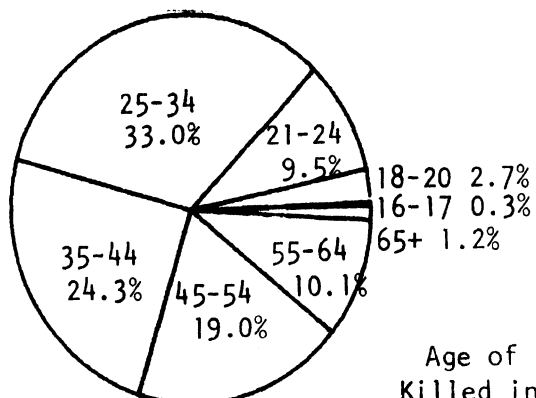


FIGURE 3.1
Age of Combination Vehicle Drivers
Involved in Fatal Accidents, 1976-1980

TABLE 3.2
Age of Fatally-Injured Combination Vehicle
Drivers by Accident Type, 1976-1980

Age		Accident Type					Total
		Single Vehicle With Ped./Bic.	Single Vehicle With Train	Other Single Vehicle	Two Vehicles	Three or More Vehicles	
16-17	N	0	0	9	1	0	10
	%	-	-	.4	.1	-	.3
18-20	N	0	6	68	25	6	105
	%	-	3.5	2.8	2.4	2.7	2.7
21-24	N	0	18	225	99	22	364
	%	-	10.5	9.4	9.5	9.8	9.5
25-34	N	1	59	814	317	76	1267
	%	100.0	34.5	33.9	30.3	33.9	33.0
35-44	N	0	38	591	261	45	935
	%	-	22.2	24.6	24.9	20.1	24.3
45-54	N	0	36	437	216	43	732
	%	-	21.1	18.2	20.6	19.2	19.0
55-64	N	0	12	230	115	30	387
	%	-	7.0	9.6	11.0	13.4	10.1
65+	N	0	2	28	13	2	45
	%	-	1.2	1.2	1.2	.9	1.2
Total	N	1	171	2402	1047	224	3845
	%	100.00	100.0	100.0	100.0	100.0	100.0
Missing Data	N	0	0	8	1	0	9



A comparison of Tables 3.1 and 3.2 shows that older drivers are slightly more likely to be killed when involved in fatal accidents.

FIGURE 3.2
Age of Combination Vehicle Drivers
Killed in Fatal Accidents, 1976-1980

TABLE 3.3
Sex of Combination Vehicle Drivers in Fatal
Accidents by Accident Type, 1976-1980

Sex	Accident Type					Total	
	Single Vehicle With Ped./Bic.	Single Vehicle With Train	Other Single Vehicle	Two Vehicles	Three or More Vehicles		
Male	N	1433	190	2838	12650	2358	19469
	%	99.3	99.0	98.3	99.3	99.2	99.1
Female	N	10	2	49	90	19	170
	%	.7	1.0	1.7	.7	.8	.9
Total	N	1443	192	2887	12740	2377	19639
	%	100.0	100.0	100.0	100.0	100.0	100.0
Missing Data	N	21	0	5	159	15	200

TABLE 3.4
Sex of Fatally-Injured Combination Vehicle
Drivers by Accident Type, 1976-1980

Sex	Accident Type					Total	
	Single Vehicle With Ped./Bic.	Single Vehicle With Train	Other Single Vehicle	Two Vehicles	Three or More Vehicles		
Male	N	1	169	2376	1038	219	3803
	%	100.0	98.8	98.6	99.0	97.8	98.7
Female	N	0	2	34	10	5	51
	%	-	1.2	1.4	1.0	2.2	1.3
Total	N	1	171	2410	1048	224	3854
	%	100.0	100.0	100.0	100.0	100.0	100.0

Very few female combination vehicle drivers are involved in fatal accidents.

TABLE 3.5
License Status of Combination Vehicle Drivers in
Fatal Accidents by Accident Type, 1976-1980

Driver License Status	Accident Type					Total
	Single Vehicle With Ped./Bic.	Single Vehicle With Train	Other Single Vehicle	Two Vehicles	Three or More Vehicles	
Valid for Vehicle Type	N 1344 95.7	N 172 94.0	N 2627 93.8	N 11971 96.0	N 2203 95.6	N 18317 95.6
Not Valid for Vehicle Type	N 19 1.4	N 2 1.1	N 41 1.5	N 189 1.5	N 35 1.5	N 286 1.5
Suspended, Revoked	N 22 1.6	N 5 2.7	N 69 2.5	N 165 1.3	N 43 1.9	N 304 1.6
Expired	N 12 .9	N 0 -	N 24 .9	N 80 .6	N 13 .6	N 129 .7
No License	N 8 .6	N 4 2.2	N 41 1.5	N 63 .5	N 10 .4	N 126 .7
Total	N 1405 100.0	N 183 100.0	N 2802 100.0	N 12468 100.0	N 2304 100.0	N 19162 100.0
Missing Data	N 59	N 9	N 90	N 431	N 88	N 677

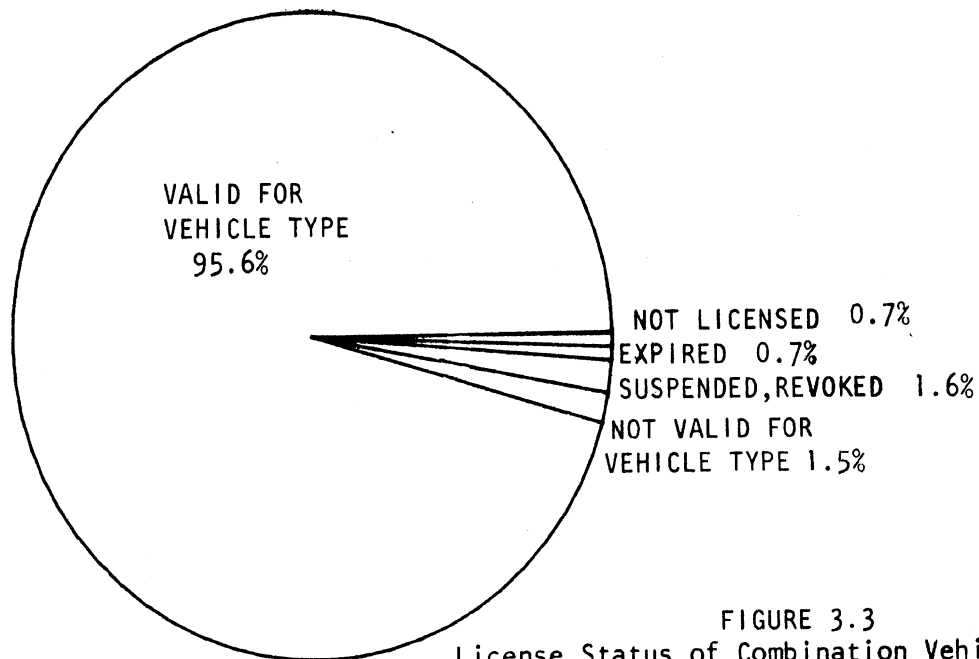


FIGURE 3.3
License Status of Combination Vehicle Drivers
Involved in Fatal Accidents, 1976-1980

TABLE 3.6
First Contributing Factor of Combination Vehicle Drivers
in Fatal Accidents by Accident Type, 1976-1980

Contributing Factor		Accident Type					Total
		Single Vehicle With Ped/Bic	Single Vehicle With Train	Other Single Vehicle	Two Vehicles	Three or More Vehicles	
None	N	1184	12	470	9034	1466	12166
	Col. %	81.6	6.3	16.8	70.7	61.8	62.1
Comb. Vehicle % of Total		4.9	6.5	6.0	12.8	8.1	10.0
Inattention	N	40	22	169	261	67	559
	Col. %	2.8	11.6	6.0	2.0	2.8	2.9
Comb. Vehicle % of Total		2.3	6.1	3.2	5.4	9.7	4.3
Drowsiness, Fatigue	N	3	1	357	96	11	468
	Col. %	.2	.5	12.7	.8	.5	2.4
Comb. Vehicle % of Total		2.9	12.5	8.5	9.5	12.8	8.6
Drug Effects	N	1	0	6	5	0	12
	Col. %	.1	-	.2	.0	-	.1
Comb. Vehicle % of Total		1.2	-	2.1	2.4	-	1.9
Other Physical/ Mental Condition	N	1	2	19	10	3	35
	Col. %	.1	1.1	.7	.1	.1	.2
Comb. Vehicle % of Total		.7	9.5	2.0	2.5	4.4	2.2
Driving Too Fast	N	42	11	895	744	348	2040
	Col. %	2.9	5.8	31.9	5.8	14.7	10.4
Comb. Vehicle % of Total		1.7	5.2	2.7	5.3	13.8	3.8
Failure to Keep in Lane	N	19	0	524	393	77	1013
	Col. %	1.3	-	18.7	3.1	3.2	5.2
Comb. Vehicle % of Total		2.5	-	2.5	3.2	5.1	2.8
Failure to Yield Right of Way	N	30	77	2	484	30	623
	Col. %	2.1	40.5	.1	3.8	1.3	3.2
Comb. Vehicle % of Total		1.5	5.5	2.3	3.4	2.9	3.3
Failure to Obey Traffic Controls	N	7	51	16	212	42	328
	Col. %	.5	26.8	.6	1.7	1.8	1.7
Comb. Vehicle % of Total		4.0	5.9	3.1	3.2	6.2	3.7
Driving on Wrong Side	N	1	0	18	312	41	372
	Col. %	.1	-	.6	2.4	1.7	1.9
Comb. Vehicle % of Total		.9	-	2.7	3.5	5.6	3.6
Driving the Wrong Way	N	0	0	0	6	2	8
	Col. %	-	-	-	.0	.1	.0
Comb. Vehicle % of Total		-	-	-	.7	1.3	.7
Improper Passing	N	7	1	11	198	24	241
	Col. %	.5	.5	.4	1.6	1.0	1.2
Comb. Vehicle % of Total		4.0	8.3	2.9	8.0	5.8	7.0

TABLE 3.6 (Continued)

Contributing Factor		Accident Type					Total
		Single Vehicle With Ped/Bic	Single Vehicle With Train	Other Single Vehicle	Two Vehicles	Three or More Vehicles	
Improper Turns	N	5	0	8	79	4	96
	Col. %	.3	-	.3	.6	.2	.5
Comb. Vehicle % of Total		6.9	-	2.4	5.0	3.1	4.5
Improper Entry, Starting, Backing	N	23	0	2	99	3	127
	Col. %	1.6	-	.1	.8	.1	.6
Comb. Vehicle % of Total		7.7	-	2.9	14.3	6.0	11.4
Improper Following	N	3	0	5	194	97	299
	Col. %	.2	-	.2	1.5	4.1	1.5
Comb. Vehicle % of Total		5.3	-	10.2	16.9	19.0	16.9
Erratic Driving Carelessness	N	49	12	224	307	105	697
	Col. %	3.4	6.3	8.0	2.4	4.4	3.6
Comb. Vehicle % of Total		1.7	5.5	2.4	4.4	9.7	3.4
Other Error	N	36	1	77	340	53	507
	Col. %	2.5	.5	2.7	2.7	2.2	2.6
Comb. Vehicle % of Total		7.4	2.7	6.1	12.1	8.5	9.7
Total	N	1451	190	2803	12774	2373	19591
	Col. %	100.0	100.0	100.0	100.0	100.0	100.0
Comb. Vehicle % of Total		4.1	5.7	3.3	8.5	8.1	6.4
Missing Data Comb. Vehicles	N	13	2	89	125	19	248
Missing Data-All*	N	645	70	2333	1832	267	5147

*There were also 10 non-combination vehicles missing on the type of accident.

For each type of accident except accidents involving three or more vehicles, combination vehicle drivers are less likely to have contributed to the accident than are drivers of other vehicles in those types of accidents. Speeding and lane changing are the most frequent contributing factors for combination vehicle drivers, as they are for other vehicle drivers in fatal accidents, but these factors are proportionately less important for combination vehicle drivers than for other vehicle drivers. Combination vehicle drivers are disproportionately involved in five contributing factors--drowsiness and fatigue; improper passing; improper entry/exiting, starting, or backing; improper following; and miscellaneous errors--but together these account for only one-twelfth of combination vehicle fatal involvements.

TABLE 3.7
Alcohol Involvement of Combination Vehicle Drivers in
Fatal Accidents by Accident Type, 1977-1980*

Alcohol Involvement		Accident Type					Total
		Single Vehicle With Ped./Bic.	Single Vehicle With Train	Other Single Vehicle	Two Vehicles	Three or More Vehicles	
Yes	N	19	12	365	272	60	728
	%	1.6	7.5	15.4	2.6	2.6	4.5
No, or Unknown	N	1162	149	2008	10297	1937	15553
	%	98.4	92.5	84.6	97.4	97.4	95.5
Total	N	1181	161	2373	10569	1997	16281
	%	100.0	100.0	100.0	100.0	100.0	100.0

*This variable was not coded in 1976.

TABLE 3.8
Alcohol Involvement of Fatally-Injured Combination
Vehicle Drivers by Accident Type, 1977-1980*

Alcohol Involvement		Accident Type					Total
		Single Vehicle With Ped./Bic.	Single Vehicle With Train	Other Single Vehicle	Two Vehicles	Three or More Vehicles	
Yes	N	0	12	324	80	23	439
	%	-	8.5	16.3	9.3	12.8	13.9
No, or Unknown	N	1	130	1661	781	156	2729
	%	100.0	91.5	83.7	90.7	87.2	86.1
Total	N	1	142	1985	861	179	3168
	%	100.0	100.0	100.0	100.0	100.0	100.0

*This variable was not coded in 1976.

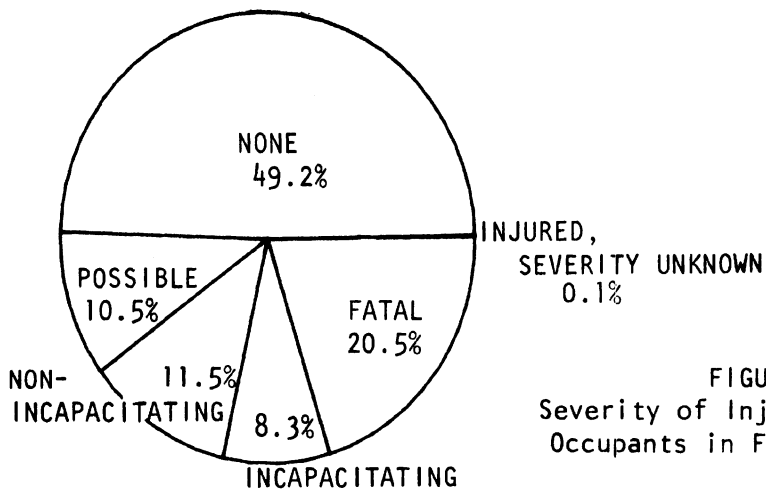
Prior alcohol consumption by combination vehicle drivers in fatal accidents is unusual, although it is much more frequent among drivers who are killed than among drivers who are not killed.

SECTION 4.

COMBINATION VEHICLE OCCUPANT INJURY SEVERITY AND FATALLY-
INJURED OCCUPANT DATA IN RELATION TO FIVE ACCIDENT TYPES
1976-1980

TABLE 4.1
Severity of Injury of Combination Vehicle Occupants in
Fatal Accidents by Accident Type, 1976-1980

Injury Severity		Accident Type					Total
		Single Vehicle With Ped./Bic.	Single Vehicle With Train	Other Single Vehicle	Two Vehicles	Three or More Vehicles	
None	N %	1465 94.3	1 .4	189 4.9	8009 56.0	1480 54.8	11144 49.2
Possible	N %	58 3.7	2 .9	90 2.3	1906 13.3	319 11.8	2375 10.5
Non-incapacitating	N %	16 1.0	9 3.9	236 6.1	1958 13.7	376 13.9	2595 11.5
Incapacitating	N %	11 .7	26 11.3	398 10.3	1200 8.4	253 9.4	1888 8.3
Fatal	N %	2 .1	193 83.5	2948 76.3	1224 8.6	270 10.0	4637 20.5
Injured, Severity unknown	N %	1 .1	0 -	1 .0	13 .1	2 .1	17 .1
Died Prior to Accident	N %	0 -	0 -	0 -	0 -	1 .0	1 .0
Total	N %	1553 100.0	231 100.0	3862 100.0	14310 100.0	2701 100.0	22657 100.0
Missing Data	N	1	0	0	16	0	17



Only about one-half of the combination vehicle occupants in fatal accidents are injured at all, and only one-fifth are killed.

FIGURE 4.1
Severity of Injury of Combination Vehicle Occupants in Fatal Accidents, 1976-1980

TABLE 4.2
Age of Fatally-Injured Combination Vehicle
Occupants by Accident Type, 1976-1980

Age		Accident Type					Total
		Single Vehicle With Ped./Bic.	Single Vehicle With Train	Other Single Vehicle	Two Vehicles	Three or More Vehicles	
16-17	N	0	1	27	8	1	37
	%	-	.5	.9	.7	.4	.8
18-20	N	0	7	122	43	9	181
	%	-	3.7	4.2	3.6	3.4	4.0
21-24	N	0	22	304	113	29	468
	%	-	11.7	10.6	9.4	11.0	10.3
25-34	N	2	67	957	358	88	1472
	%	100.0	35.6	33.3	29.7	33.3	32.5
35-44	N	0	40	681	296	53	1070
	%	-	21.3	23.7	24.6	20.1	23.6
45-54	N	0	36	485	241	48	810
	%	-	19.1	16.9	20.0	18.2	17.9
55-64	N	0	13	260	125	34	432
	%	-	6.9	9.0	10.4	12.9	9.5
65+	N	0	2	37	20	2	61
	%	-	1.1	1.3	1.7	.8	1.3
Total	N	2	188	2873	1204	264	4531
	%	100.0	100.0	100.0	100.0	100.0	100.0
Missing Data	N	0	5	75	20	6	106

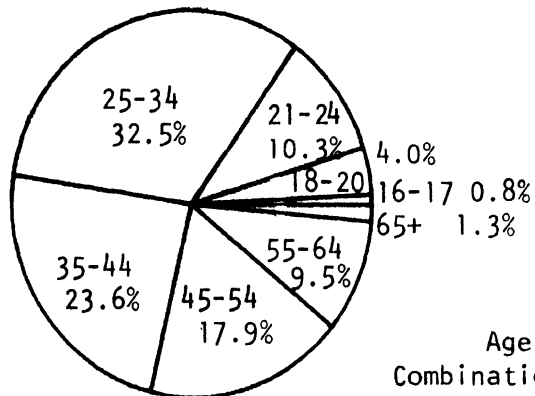


FIGURE 4.2
Age of Fatally-Injured
Combination Vehicle Occupants, 1976-1980

TABLE 4.3
 Fatally-Injured Combination Vehicle Occupants by
 Vehicle Rollover and Type of Accident, 1978-1980*

Rollover		Accident Type					Total
		Single Vehicle With Ped./Bic.	Single Vehicle With Train	Other Single Vehicle	Two Vehicles	Three or More Vehicles	
None	N	0	89	549	518	113	1269
	%	-	86.4	29.8	66.6	70.2	43.9
First Event	N	0	0	708	18	10	736
	%	-	-	38.4	2.3	6.2	25.5
Subsequent Event	N	2	14	588	242	38	884
	%	100.0	13.6	31.9	31.1	23.6	30.6
Total	N	2	103	1845	778	161	2889
	%	100.0	100.0	100.0	100.0	100.0	100.0

*The rollover variable was coded only for 1978-1980.

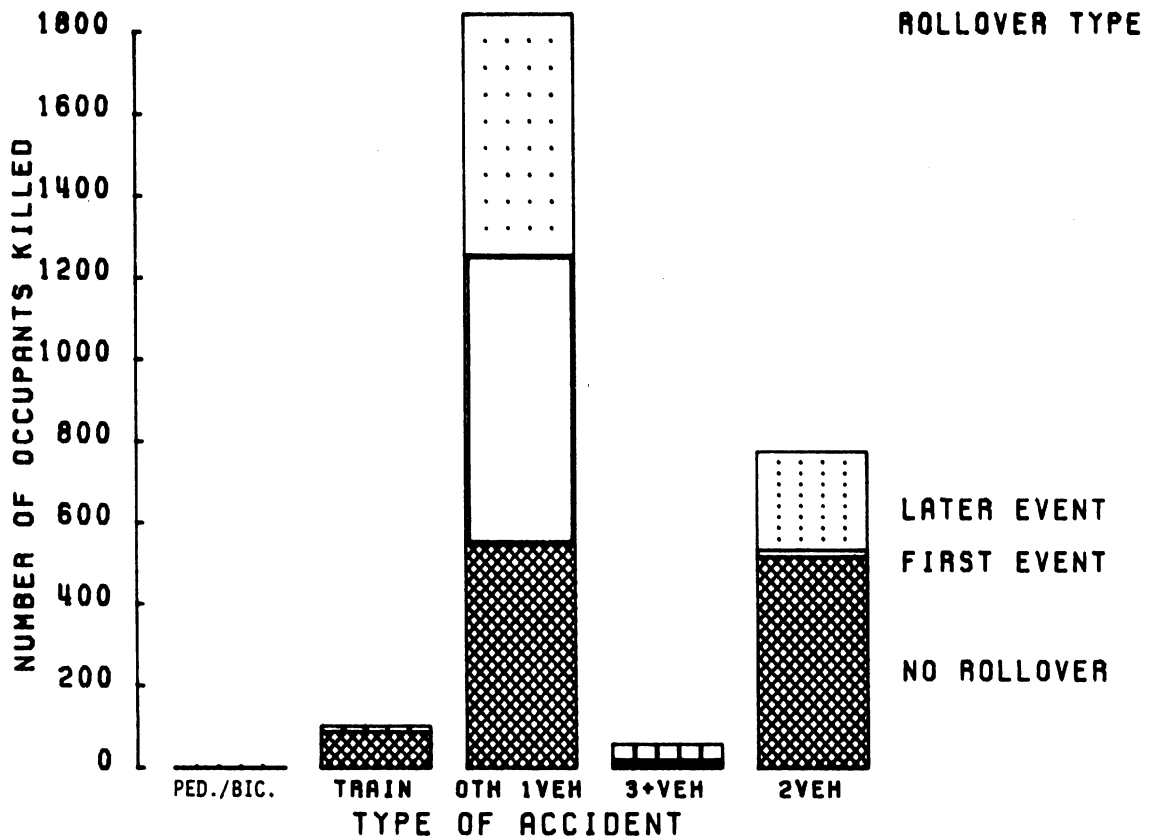


FIGURE 4.3
 Combination Vehicle Occupant Deaths by
 Vehicle Rollover and Type of Accident, 1978-1980

TABLE 4.4
 Fatally-Injured Combination Vehicle Occupants by Extent of
 Combination Vehicle Damage and Accident Type, 1976-1980

Vehicle Damage		Accident Type					Total
		Single Vehicle With Ped./Bic.	Single Vehicle With Train	Other Single Vehicle	Two Vehicles	Three or More Vehicles	
None	N	0	1	70	2	0	73
	%	-	.5	2.4	.2	-	1.6
Other (Minor)	N	0	0	29	16	3	48
	%	-	-	1.0	1.3	1.1	1.0
Functional (Moderate)	N	0	4	128	51	9	192
	%	-	2.1	4.4	4.2	3.3	4.2
Disabling (Severe)	N	2	188	2704	1146	258	4298
	%	100.0	97.4	92.3	94.3	95.6	93.2
Total	N	2	193	2931	1215	270	4611
	%	100.0	100.0	100.0	100.0	100.0	100.0
Missing Data	N	0	0	17	9	0	26

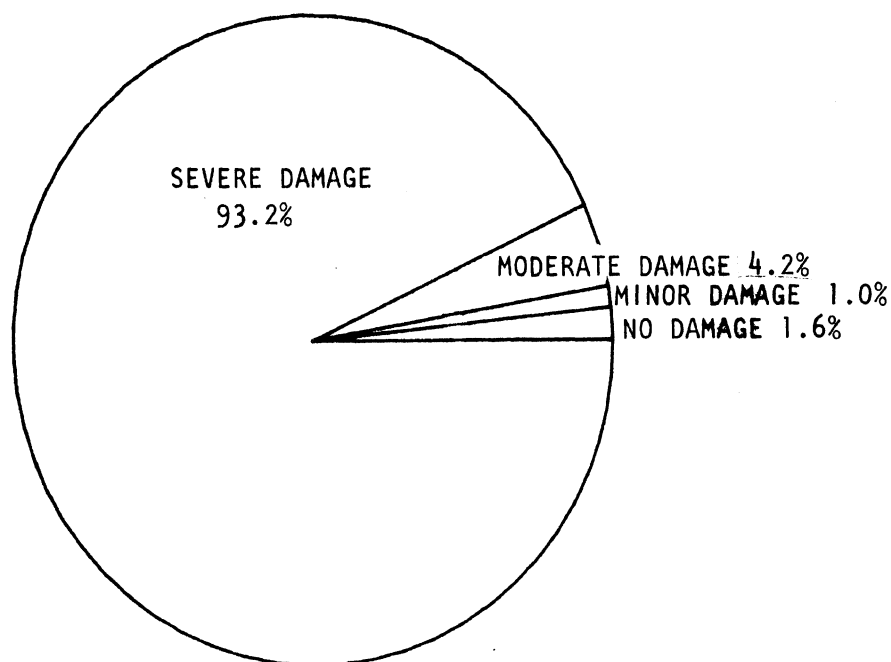


FIGURE 4.4
 Combination Vehicle Occupant Deaths
 by Extent of Vehicle Damage, 1976-1980

TABLE 4.5
 Fatally-Injured Combination Vehicle Occupants by
 Extent of Ejection and Accident Type, 1976-1980

Ejection Extent	Accident Type					Total
	Single Vehicle With Ped./Bic.	Single Vehicle With Train	Other Single Vehicle	Two Vehicles	Three or More Vehicles	
Not Ejected	N 1	88	1818	815	170	2892
	% 50.0	45.6	61.7	66.6	63.0	62.4
Totally Ejected	N 1	85	856	305	84	1331
	% 50.0	44.0	29.0	24.9	31.1	28.7
Partially Ejected	N 0	5	161	41	7	214
	% -	2.6	5.5	3.3	2.6	4.6
Unknown	N 0	15	113	63	9	200
	% -	7.8	3.8	5.1	3.3	4.3
Total	N 2	193	2948	1224	270	4637
	% 100.0	100.0	100.0	100.0	100.0	100.0

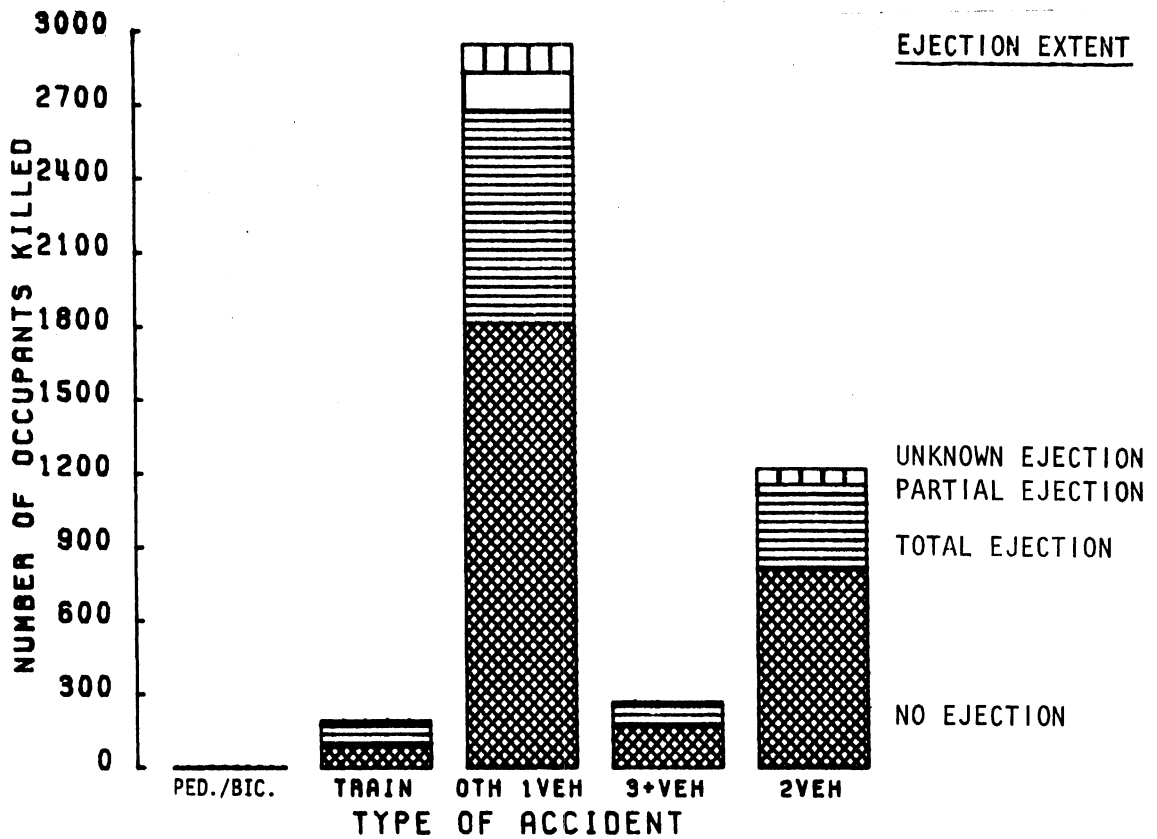


FIGURE 4.5
 Combination Vehicle Occupant Deaths
 by Extent of Ejection and Accident Type, 1976-1980

TABLE 4.6

Fatally-Injured and Surviving Combination Vehicle Occupants
by Seat Belt Use and Accident Type, 1976-1980

Seat Belt Use	Accident Type					Total	
	Single Vehicle With Ped./Bic.	Single Vehicle With Train	Other Single Vehicle	Two Vehicles	Three or More Vehicles		
<u>Fatalities</u>							
Lap and Shoulder	N	0	1	11	4	3	19
	%	-	.5	.4	.3	1.1	.4
Lap only	N	0	2	50	26	2	80
	%	-	1.0	1.7	2.1	.7	1.7
None	N	0	134	2243	885	192	3454
	%	-	69.4	76.1	72.3	71.1	74.5
Unknown	N	2	55	633	303	72	1065
	%	100.0	28.5	21.5	24.8	26.7	23.0
Used, Type Unknown	N	0	1	11	6	1	19
	%	-	.5	.4	.5	.4	.4
Total Fatalities	N	2	193	2948	1224	270	4637
	%	100.0	100.0	100.0	100.0	100.0	100.0
<u>Survivors</u>							
Lap and Shoulder	N	15	0	1	103	15	134
	%	1.0	-	.1	.8	.6	.7
Lap only	N	81	0	14	736	134	965
	%	5.2	-	1.5	5.6	5.5	5.4
None	N	1040	23	722	8968	1494	12,247
	%	67.1	60.5	79.0	68.5	61.5	68.0
Unknown	N	392	15	170	3013	744	4334
	%	25.3	39.5	18.6	23.0	30.6	24.1
Used, Type Unknown	N	21	0	7	249	43	320
	%	1.4	-	.8	1.9	1.8	1.8
Total Survivors	N	1551	38	914	13,086	2430	18,019
	%	100.0	100.0	100.0	100.0	100.0	100.0
Missing Data	N	1	0	0	16	1	18

While seat belts were not used by many combination vehicle occupants, they were used much more by survivors than by those killed.

TABLE 4.7
 Fatally-Injured Combination Vehicle Occupants by
 Seating Position and Accident Type, 1976-1980

Seating Position	Accident Type					Total	
	Single Vehicle With Ped./Bic.	Single Vehicle With Train	Other Single Vehicle	Two Vehicles	Three or More Vehicles		
Front Left	N %	1 50.0	171 91.0	2410 83.4	1048 87.3	224 84.8	3854 84.8
Front Middle	N %	0 -	1 .5	28 1.0	7 .6	1 .4	37 .8
Front Right	N %	1 50.0	15 8.0	303 10.5	98 8.2	25 9.5	442 9.7
Second Left*	N %	0 -	0 -	1 .0	1 .1	0 -	2 .0
Second Middle*	N %	0 -	0 -	1 .0	3 .2	0 -	4 .1
Second Right*	N %	0 -	0 -	1 .0	0 -	0 -	1 .0
Front Other	N %	0 -	0 -	1 .0	0 -	0 -	1 .0
Other Pass. Seat	N %	0 -	0 -	16 .6	4 .3	1 .4	21 .5
Sleeper Section	N %	0 -	1 .5	94 3.3	40 3.3	13 4.9	148 3.3
Vehicle Exterior	N %	0 -	0 -	33 1.1	0 -	0 -	33 .7
Total	N %	2 100.0	188 100.0	2888 100.0	1201 100.0	264 100.0	4543 100.0
Missing Data	N	0	5	60	23	6	94

*What is meant by these unusual combination vehicle seating positions is not known.

TABLE 4.8

Fatally-Injured Combination Vehicle Occupants by
Manner of Accident and Accident Type, 1976-1980

Manner of Accident		Accident Type					Total
		Single Vehicle With Ped./Bic.	Single Vehicle With Train	Other Single Vehicle	Two Vehicles	Three or More Vehicles	
Overturn	N	0	0	1104	23	11	1138
	%	-	-	37.5	1.9	4.1	24.6
Other Non-Collision	N	0	0	136	2	1	139
	%	-	-	4.6	.2	.4	3.0
Collision With Pedestrian	N	2	0	0	1	0	3
	%	100.0	-	-	.1	-	.1
Collision With Animal	N	0	0	52	0	0	52
	%	-	-	1.8	-	-	1.1
Collision With Train	N	0	193	0	0	0	193
	%	-	100.0	-	-	-	4.2
Collision With Parked Vehicle	N	0	0	111	8	2	121
	%	-	-	3.8	.7	.7	2.6
Collision With Non-fixed Object	N	0	0	17	4	1	22
	%	-	-	.6	.3	.4	.5
Collision With Fixed Object	N	0	0	1524	41	14	1579
	%	-	-	51.7	3.4	5.2	34.1
Rear-end Collision*	N	0	0	1	411	93	505
	%	-	-	.0	33.7	34.6	10.9
Head-on Collision	N	0	0	0	277	52	329
	%	-	-	-	22.7	19.3	7.1
Angle Collision	N	0	0	0	312	49	329
	%	-	-	-	25.6	18.2	7.8
Side-swipe Collision	N	0	0	2	140	46	188
	%	-	-	.1	11.5	17.1	4.1
Total	N	2	193	2947	1219	269	4630
	%	100.0	100.0	100.0	100.0	100.0	100.0
Missing Data	N	0	0	1	5	1	7

*Includes four rear-to-rear accident involvements.

Overturns and fixed object collisions account for well over half of combination vehicle occupant deaths.

TABLE 4.9
 Fatally-Injured Combination Vehicle Occupants by Urban/Rural
 Split and Road Class and Accident Type, 1976-1980

Rural/Urban Road Class		Accident Type					Total
		Single Vehicle With Ped./Bic.	Single Vehicle With Train	Other Single Vehicle	Two Vehicles	Three or More Vehicles	
Rural Limited Access	N %	0 -	1 .5	887 30.4	358 29.4	79 29.7	1325 28.8
Rural U.S./State Multi-Lane	N %	0 -	4 2.1	205 7.0	108 8.9	23 8.6	340 7.4
Rural U.S./State Two-Lane	N %	2 100.0	59 30.7	1104 37.8	479 39.3	102 38.3	1746 38.0
Rural Local Multi-Lane	N %	0 -	2 1.0	1 .0	2 .2	1 .4	6 .1
Rural Local Two-Lane Major**	N %	0 -	11 5.7	67 2.3	13 1.1	2 .8	93 2.0
Rural Local Other/Misc.*	N %	0 -	61 31.8	117 4.0	32 2.6	1 .4	211 4.6
Urban Limited Access	N %	0 -	0 -	333 11.4	115 9.4	35 13.2	483 10.5
Urban/U.S. State Multi-Lane	N %	0 -	2 1.0	63 2.2	49 4.0	13 4.9	127 2.8
Urban U.S./State Two-Lane	N %	0 -	10 5.2	58 2.0	39 3.2	5 1.9	112 2.4
Urban Local Multi-Lane	N %	0 -	4 2.1	17 .6	13 1.1	1 .4	35 .8
Urban Local Two-Lane Major**	N %	0 -	13 6.8	13 .4	8 .7	1 .4	35 .8
Urban Local Other/Misc.*	N %	0 -	25 13.0	52 1.8	3 .2	3 1.1	83 1.8

TABLE 4.9 (Continued)

Road Class	Accident Type					Total	
	Single Vehicle With Ped./Bic.	Single Vehicle With Train	Other Single Vehicle	Two Vehicles	Three or More Vehicles		
Total Limited Access	N %	0 -	1 .5	1221 41.4	473 38.6	114 42.2	1809 39.0
Total U.S./State Multi-Lane	N %	0 -	6 3.1	268 9.1	157 12.8	36 13.3	467 10.1
Total U.S./State Two-Lane	N %	2 100.0	69 35.8	1162 39.4	518 42.3	107 39.6	1858 40.1
Total Local Multi-Lane	N %	0 -	6 3.1	19 .6	15 1.2	3 1.1	43 .9
Total Local Two-Lane Major**	N %	0 -	24 12.4	80 2.7	21 1.7	3 1.1	128 2.8
Total Local Other/Misc.*	N %	0 -	87 45.1	198 6.7	40 3.3	7 2.6	332 7.2
Total Rural	N %	2 100.0	138 71.9	2381 81.6	992 81.4	208 78.2	3721 81.0
Total Urban	N %	0 -	54 28.1	536 18.4	227 18.6	58 21.8	875 19.0
Total	N %	2 100.0	192 100.0	2917 100.0	1219 100.0	266 100.0	4596 100.0
Missing Urban Data	N	0	1	31	5	4	41

*Includes unknown road type.

**Local major roads are federal aid roads or other local roads considered to be arterials or collectors. This variable was not available in the 1976 and 1977 FARS data, and all local two-lane roads for those years are included in the Local Other/Misc. category.

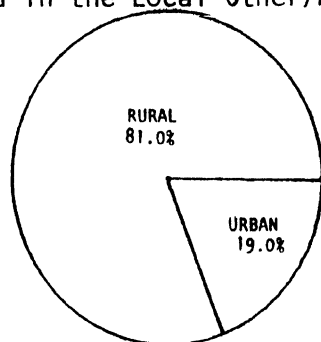


FIGURE 4.6
Combination Vehicle Occupant
Deaths by Rural/Urban Split
1976-1980

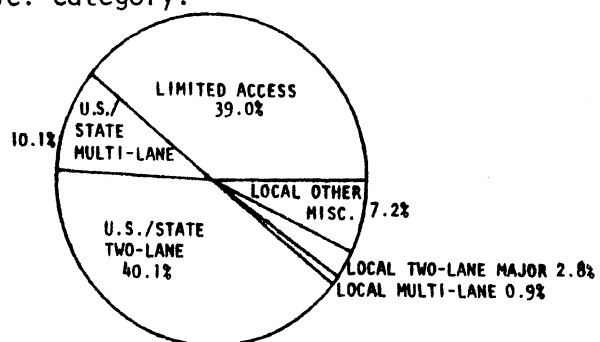


FIGURE 4.7
Combination Vehicle Occupant Deaths
by Road Class, 1976-1980

SECTION 5.

MISCELLANEOUS DETAILED ACCIDENT CHARACTERISTICS
DATA FOR COMBINATION VEHICLE INVOLVEMENTS
1976-1980

TABLE 5.1
Time of Day of Fatal Accident Involvements by
Combination Vehicle Type, 1976-1980

Time of Day		Combination Vehicle Type			Total
		Two-Unit	Multi-Unit	Bobtail*	
12-12:59 a.m.	N	683	31	6	720
	%	3.7	3.7	1.3	3.6
1-1:59 a.m.	N	765	39	14	818
	%	4.1	4.7	3.0	4.1
2-2:59 a.m.	N	854	44	20	918
	%	4.6	5.3	4.2	4.6
3-3:59 a.m.	N	630	28	3	661
	%	3.4	3.3	.6	3.3
4-4:59 a.m.	N	606	38	12	656
	%	3.3	4.5	2.5	3.3
5-5:59 a.m.	N	723	46	10	779
	%	3.9	5.5	2.1	3.9
6-6:59 a.m.	N	705	35	18	758
	%	3.8	4.2	3.8	3.8
7-7:59 a.m.	N	722	36	19	777
	%	3.9	4.3	4.0	3.9
8-8:59 a.m.	N	752	29	20	801
	%	4.1	3.5	4.2	4.0
9-9:59 a.m.	N	747	35	26	808
	%	4.0	4.2	5.5	4.1
10-10:59 a.m.	N	811	38	24	873
	%	4.4	4.5	5.1	4.4
11-11:59 a.m.	N	870	37	31	938
	%	4.7	4.4	6.6	4.7
12-12:59 p.m.	N	841	35	21	897
	%	4.5	4.2	4.5	4.5
1-1:59 p.m.	N	902	30	27	959
	%	4.9	3.6	5.7	4.8

TABLE 5.1 (Continued)

Time of Day		Combination Vehicle Type			Total
		Two-Unit	Multi-Unit	Bobtail*	
2-2:59 p.m.	N	1083	45	36	1164
	%	5.8	5.4	7.6	5.9
3-3:59 p.m.	N	978	31	38	1047
	%	5.3	3.7	8.1	5.3
4-4:59 p.m.	N	919	39	31	989
	%	5.0	4.7	6.6	5.0
5-5:59 p.m.	N	783	30	29	842
	%	4.2	3.6	6.2	4.2
6-6:59 p.m.	N	726	32	16	774
	%	3.9	3.8	3.4	3.9
7-7:59 p.m.	N	689	29	21	739
	%	3.7	3.5	4.5	3.7
8-8:59 p.m.	N	601	22	17	640
	%	3.2	2.6	3.6	3.2
9-9:59 p.m.	N	636	43	7	686
	%	3.4	5.1	1.5	3.5
10-10:59 p.m.	N	689	29	13	731
	%	3.7	3.5	2.8	3.7
11-11:59 p.m.	N	799	36	12	847
	%	4.3	4.3	2.5	4.3
Total	N	18514	837	471	19822
	%	100.0	100.0	100.0	100.0
Missing Data	N	16	1	0	17

*As explained in the Preface, the bobtail category in FARS appears to include all large single-unit trucks involved in fatal accidents in Pennsylvania for 1978-1981.

TABLE 5.2
Rural/Urban Split and Road Class of Fatal Accident
Involvements by Combination Vehicle Type, 1976-1980

Rural/Urban Road Class		Combination Vehicle Type			Total
		Two- Unit	Multi- Unit	Bobtail*	
Rural Limited Access	N %	3081 16.7	195 23.3	36 8.3	3312 16.8
Rural U.S./State Multi-Lane	N %	1810 9.8	70 8.4	40 9.2	1920 9.8
Rural U.S./State Two-Lane	N %	7489 40.7	264 31.5	169 38.9	7922 40.3
Rural Local Multi-Lane	N %	54 .3	17 2.0	3 .7	74 .4
Rural Local Two-lane Major**	N %	326 1.8	41 4.9	15 3.5	382 1.9
Rural Local Other/Misc.†	N %	580 3.2	37 4.4	13 3.0	630 3.2
Urban Limited Access	N %	1523 8.3	69 8.2	29 6.7	1621 8.2
Urban U.S./State Multi-Lane	N %	1351 7.3	48 5.7	40 9.2	1439 7.3
Urban U.S./State Two-Lane	N %	948 5.2	12 1.4	46 10.6	1006 5.1
Urban Local Multi-Lane	N %	494 2.7	46 5.5	15 3.5	555 2.8
Urban Local Two-Lane Major**	N %	264 1.4	9 1.1	18 4.1	291 1.5
Urban Local Other/Misc.†	N %	484 2.6	30 3.6	10 2.3	524 2.7
Total Limited Access	N %	4605 24.9	264 31.5	65 13.8	4934 24.9
Total U.S./State Multi-Lane	N %	3162 17.1	118 14.1	80 17.0	3360 16.9

TABLE 5.2 (Continued)

Rural/Urban Road Class		Combination Vehicle Type			Total
		Two- Unit	Multi- Unit	Bobtail*	
Total U.S./State Two-Lane	N %	8438 45.5	276 32.9	215 45.6	8929 45.0
Total Local Multi-Lane	N %	559 3.0	63 7.5	18 3.8	640 3.2
Total Local Two-Lane Major**	N %	590 3.2	50 6.0	33 7.0	673 3.4
Total Local Other/Misc.†	N %	1176 6.3	67 8.0	60 12.7	1303 6.6
Total Rural	N %	13340 72.5	624 74.5	276 63.6	14240 72.4
Total Urban	N %	5064 27.5	214 25.5	158 36.4	5436 27.6
Grand Total	N %	18404 100.0	838 100.0	434 100.0	19676 100.0
Missing Urban Data	N	126	0	37	163

*As explained in the Preface, the bobtail category in FARS appears to include all large single-unit trucks involved in fatal accidents in Pennsylvania for 1978-1981.

**Local major roads are federal aid roads or other local roads considered to be arterials or collectors. This variable was not available in the 1976 and 1977 FARS data, and all local two-lane roads for those years are included in the Local Other/Misc. category.

†Includes unknown road type.

TABLE 5.3

Light Condition of Fatal Accident Involvements by
Combination Vehicle Type, 1976-1980

Light Condition		Combination Vehicle Type			Total
		Two-Unit	Multi-Unit	Bobtail*	
Daylight	N	9919	410	319	10648
	%	53.6	49.0	67.9	53.7
Dawn or Dusk	N	738	44	12	794
	%	4.0	5.3	2.6	4.0
Dark With Street Lights	N	1286	77	38	1401
	%	6.9	9.2	8.1	7.1
Dark--Not Lighted	N	6576	306	101	6983
	%	35.5	36.6	21.5	35.2
Total	N	18519	837	470	19826
	%	100.0	100.0	100.0	100.0
Missing Data	N	11	1	1	13

*As explained in the Preface, the bobtail category in FARS appears to include all large single-unit trucks involved in fatal accidents in Pennsylvania for 1978-1981.

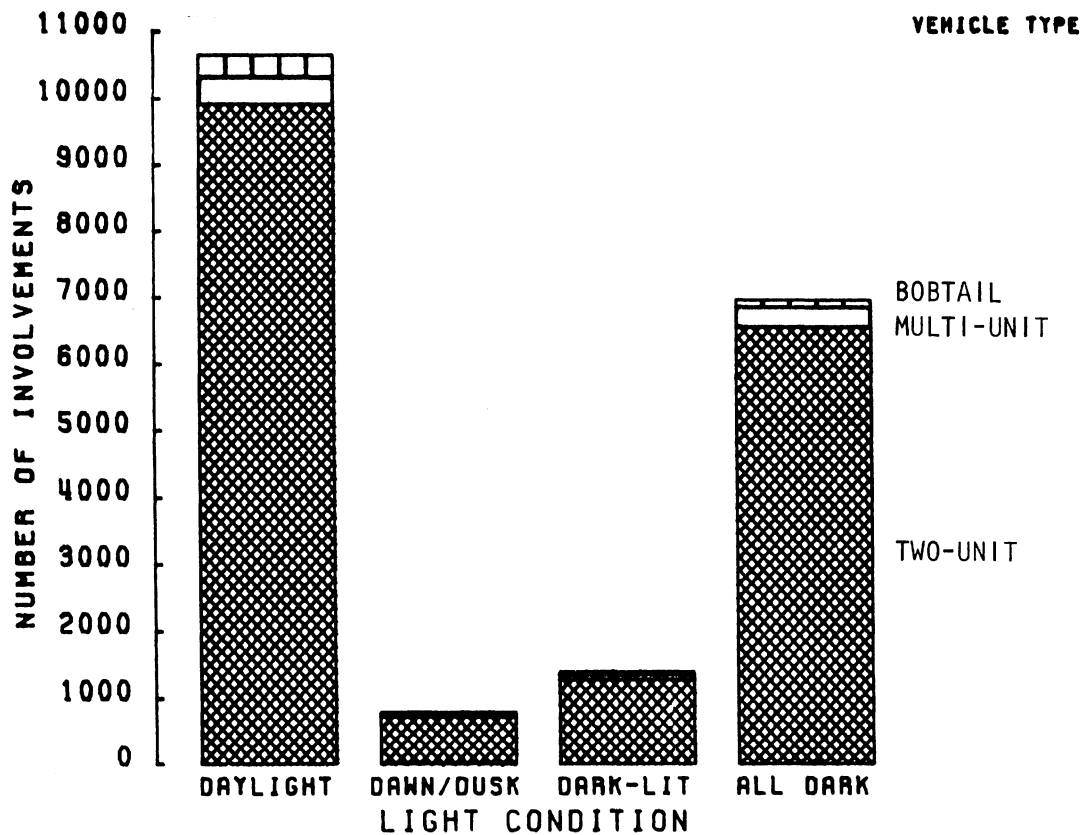


FIGURE 5.1

Combination Vehicle Involvements by Vehicle Type
by Light Condition, 1976-1980

TABLE 5.4
Manner of Accident by Road Class and Light Condition*
for Combination Vehicle Fatal Accident Involvements, 1976-1980

Road Class/ Light Condition	Manner of Accident							Total
	Non-Collision	Non-Fixed Object	Fixed Object	Rear-end**	Head-on	Angle	Side-swipe	
Limited Access N	170	198	350	686	175	256	196	2031
Daylight %	8.4	9.7	17.2	33.8	8.6	12.6	9.7	100.0
Limited Access N	213	457	506	1036	302	234	141	2889
Dark* %	7.4	15.8	17.5	35.9	10.5	8.1	4.9	100.0
U.S./State Multi-Lane N	72	135	94	294	167	898	90	1750
Daylight %	4.1	7.7	5.4	16.8	9.5	51.3	5.1	100.0
U.S./State Multi-Lane N	56	172	99	404	202	608	62	1603
Dark %	3.5	10.7	6.2	25.2	12.6	37.9	3.9	100.0
U.S./State Two-Lane N	392	297	271	448	1373	1937	409	5127
Daylight %	7.6	5.8	5.3	8.7	26.8	37.8	8.0	100.0
U.S./State Two-Lane N	240	269	250	341	1327	1029	328	3784
Dark %	6.3	7.1	6.6	9.0	35.1	27.2	8.7	100.0
Local Multi-Lane N	10	117	8	36	24	177	15	387
Daylight %	2.6	30.2	2.1	9.3	6.2	45.7	3.9	100.0
Local Multi-Lane N	4	34	15	56	23	115	6	253
Dark %	1.6	13.4	5.9	22.1	9.1	45.5	2.4	100.0
Local Major† Two-Lane N	25	82	31	21	73	196	14	442
Daylight %	5.7	18.6	7.0	4.8	16.5	44.3	3.2	100.0
Local Major† Two-Lane N	11	20	13	33	43	95	14	229
Dark %	4.8	8.7	5.7	14.4	18.8	41.5	6.1	100.0
Local Other, Misc.‡ N	72	261	50	55	120	298	33	889
Daylight %	8.1	29.4	5.6	6.2	13.5	33.5	3.7	100.0
Local Other, Misc.‡ N	38	65	41	55	56	146	6	407
Dark %	9.3	16.0	10.1	13.5	13.8	35.9	1.5	100.0
Total N	1303	2107	1728	3465	3885	5989	1314	19791
%	6.6	10.6	8.7	17.5	19.6	30.3	6.6	100.0

Missing Data = 48.

*Dark includes dawn, dusk, and darkness with or without street lights.

**Includes 33 rear-to-rear accident involvements.

†Local major roads are federal aid roads or other local roads considered to be arterials or collectors. This variable was not available in the 1976 and 1977 FARS data, and all local two-lane roads for those years are included in the Local Other/Misc. category.

‡Includes unknown road type.

TABLE 5.5
Manner of Accident by Road Class and Road Grade and Alignment
for Combination Vehicle Fatal Accident Involvements, 1976-1980

Road Class/Road Grade & Alignment		Manner of Accident							Total
		Non- Collision	Non- Fixed Object	Fixed Object	Rear- end*	Head- on	Angle	Side- swipe	
<u>Limited Access</u>									
Level	N	146	424	393	1042	253	302	195	2755
Straight	%	5.3	15.4	14.3	37.8	9.2	11.0	7.1	100.0
Level	N	43	39	81	48	46	29	23	309
Curved	%	13.9	12.6	26.2	15.5	14.9	9.4	7.4	100.0
Graded	N	88	137	192	481	105	110	70	1183
Straight	%	7.4	11.6	16.2	40.7	8.9	9.3	5.9	100.0
Graded	N	93	38	163	107	37	41	29	508
Curved	%	18.3	7.5	32.1	21.1	7.3	8.1	5.7	100.0
<u>U.S./State Multi-Lane</u>									
Level	N	52	233	87	526	218	1121	98	2335
Straight	%	2.2	10.0	3.7	22.5	9.3	48.0	4.2	100.0
Level	N	20	8	35	17	32	76	10	198
Curved	%	10.1	4.0	17.7	8.6	16.2	38.4	5.1	100.0
Graded	N	16	47	25	126	70	223	26	533
Straight	%	3.0	8.8	4.7	23.6	13.1	41.8	4.9	100.0
Graded	N	38	10	42	12	40	52	13	207
Curved	%	18.4	4.8	20.3	5.8	19.3	25.1	6.3	100.0
<u>U.S./State Two-Lane</u>									
Level	N	141	384	175	508	1321	1833	397	4759
Straight	%	3.0	8.1	3.7	10.7	27.8	38.5	8.3	100.0
Level	N	158	34	96	34	427	258	120	1127
Curved	%	14.0	3.0	8.5	3.0	37.9	22.9	10.6	100.0
Graded	N	80	108	83	187	518	590	104	1670
Straight	%	4.8	6.5	5.0	11.2	31.0	35.3	6.2	100.0
Graded	N	231	23	149	43	358	221	100	1125
Curved	%	20.5	2.0	13.2	3.8	31.8	19.6	8.9	100.0
<u>Local Multi-Lane</u>									
Level	N	10	129	10	64	26	225	17	481
Straight	%	2.1	26.8	2.1	13.3	5.4	46.8	3.5	100.0
Level	N	2	2	4	3	6	7	1	25
Curved	%	8.0	8.0	16.0	12.0	24.0	28.0	4.0	100.0
Graded	N	1	12	2	9	7	32	0	63
Straight	%	-	19.0	3.2	14.3	11.1	50.8	1.6	100.0
Graded	N	2	1	6	2	3	6	0	20
Curved	%	10.0	5.0	30.0	10.0	15.0	30.0	-	100.0
<u>Local Major Two-Lane</u>									
Level	N	12	77	15	37	56	211	15	423
Straight	%	2.8	18.2	3.5	8.7	13.2	49.9	3.5	100.0
Level	N	6	3	10	5	19	16	6	65
Curved	%	9.2	4.6	15.4	7.7	29.2	24.6	9.2	100.0
Graded	N	4	13	9	7	22	34	4	93
Straight	%	4.3	14.0	9.7	7.5	23.7	36.6	4.3	100.0
Graded	N	12	2	10	2	16	12	0	54
Curved	%	22.2	3.7	18.5	3.7	29.6	22.2	-	100.0

TABLE 5.5 (Continued)

Road Class/Road Grade & Alignment	Manner of Accident							Total	
	Non-Collision	Non-Fixed Object	Fixed Object	Rear-end*	Head-on	Angle	Side-swipe		
Local Other, Misc.**									
Level	N	25	227	29	69	76	301	6	754
Straight	%	3.3	30.1	3.8	9.2	10.1	39.9	3.6	100.0
Level	N	23	6	14	3	34	24	3	107
Curved	%	21.5	5.6	13.1	2.8	31.8	22.4	2.8	100.0
Graded	N	18	63	20	31	20	66	5	223
Straight	%	8.1	28.3	9.0	13.9	9.0	29.6	2.2	100.0
Graded	N	36	11	25	4	30	18	1	125
Curved	%	28.8	8.8	20.0	3.2	24.0	14.4	.8	100.0
Total	N	1256	2031	1675	3367	3740	5808	1265	19142
	%	6.6	10.6	8.8	17.6	19.5	30.3	6.6	100.0

Missing Data = 697.

*Includes 30 rear-to-rear accident involvements.

**Includes unknown road type.

†Local major roads are federal aid roads or other local roads considered to be arterials or collectors. This variable was not available in the 1976 and 1977 FARS data, and all local two-lane roads for those years are included in the Local Other/Misc. category.

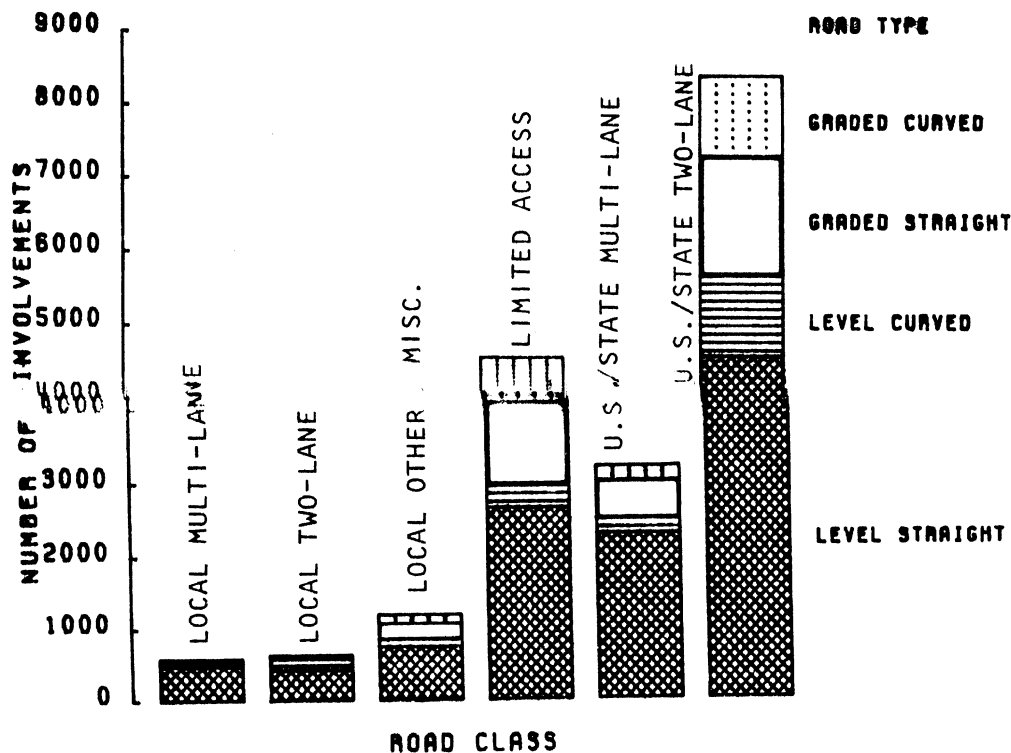


FIGURE 5.2
Combination Vehicle Fatal Accident Involvements by Road Grade
and Alignment by Road Class, 1976-1980

TABLE 5.6
Manner of Accident by Road Class and Junction Type for
Combination Vehicle Fatal Accident Involvements, 1976-80

Road Class/ Junction Type		Manner of Accident						Total	
		Non- Collision	Non- Fixed Object	Fixed Object	Rear- end*	Head- on	Angle		Side- swipe
<u>Limited Access</u>									
Non- Junction	N %	328 7.4	606 13.6	777 17.5	1615 36.3	455 10.2	372 8.4	299 6.7	4452 100.0
Inter- section	N %	55 12.1	47 10.4	79 17.4	103 22.7	22 4.8	112 24.7	36 7.9	454 100.0
Rail Crossing	N %	0 -	1 100.0	0 -	0 -	0 -	0 -	0 -	1 100.0
Driveway, Etc.	N %	1 9.1	1 9.1	0 -	3 27.3	0 -	4 36.4	2 18.2	11 100.0
<u>U.S./State Multi-Lane</u>									
Non- Junction	N %	110 6.6	221 13.4	169 10.2	458 27.7	326 19.7	244 14.7	127 7.7	1655 100.0
Inter- section	N %	16 1.1	70 4.7	23 1.5	196 13.2	38 2.6	1121 75.3	24 1.6	1488 100.0
Rail Crossing	N %	0 -	4 57.1	0 -	2 28.6	0 -	1 14.3	0 -	7 100.0
Driveway, Etc.	N %	2 1.1	12 6.3	1 .5	41 21.7	5 2.6	127 67.2	1 .5	189 100.0
<u>U.S./State Two-Lane</u>									
Non- Junction	N %	588 9.7	444 7.3	475 7.8	538 8.9	2453 40.5	900 14.9	654 10.8	6052 100.0
Inter- section	N %	36 1.6	73 3.2	38 1.7	165 7.3	194 8.5	1704 75.1	60 2.6	2270 100.0
Rail Crossing	N %	1 2.3	31 72.1	2 4.7	5 11.6	1 2.3	1 2.3	2 4.7	43 100.0
Driveway, Etc.	N %	7 1.3	18 3.3	6 1.1	81 14.7	55 10.0	362 65.7	22 4.0	551 100.0
<u>Local Multi-Lane</u>									
Non- Junction	N %	8 3.4	70 30.0	20 8.6	52 22.3	32 13.7	38 16.3	13 5.6	233 100.0
Inter- section	N %	4 1.2	72 21.1	3 .9	30 8.8	12 3.5	214 62.8	6 1.8	341 100.0
Rail Crossing	N %	0 -	2 50.0	0 -	0 -	0 -	0 -	2 50.0	4 100.0
Driveway, Etc.	N %	2 3.2	7 11.3	0 -	10 16.1	3 4.8	40 64.5	0 -	62 100.0

TABLE 5.6 (Continued)

Road Class/ Junction Type		Manner of Accident						Total	
		Non-Collision	Non-Fixed Object	Fixed Object	Rear-end*	Head-on	Angle		Side-swipe
<u>Local Major†</u>									
<u>Two-Lane</u>									
Non-Junction	N	33	57	41	37	106	42	24	340
	%	9.9	16.8	12.1	10.7	31.2	12.4	7.1	100.0
Inter-section	N	4	25	3	12	9	209	3	265
	%	1.1	9.4	1.1	4.5	3.4	78.9	1.5	100.0
Rail Crossing	N	0	15	0	1	0	0	0	16
	%	-	93.8	-	6.3	-	-	-	100.0
Driveway, Etc.	N	0	5	0	4	1	40	0	50
	%	-	10.0	-	8.0	2.0	80.0	-	100.0
<u>Local Other, Misc.**</u>									
Non-Junction	N	96	214	77	64	160	90	35	736
	%	13.0	29.1	10.5	8.7	21.7	12.2	4.8	100.0
Inter-section	N	11	80	15	31	13	305	2	457
	%	2.4	17.5	3.3	6.8	2.8	66.7	.4	100.0
Rail Crossing	N	0	20	0	0	0	0	0	20
	%	-	100.0	-	-	-	-	-	100.0
Driveway, Etc.	N	3	13	0	15	3	49	2	85
	%	3.5	15.3	-	17.6	3.5	57.6	2.4	100.0
Total	N	1304	2108	1729	3463	3888	5975	1315	19782
	%	6.6	10.7	8.7	17.5	19.7	30.2	6.6	100.0

Missing Data = 57.

*Includes 30 rear-to-rear accident involvements.

**Includes unknown road type.

†Local major roads are federal aid roads or other local roads considered to be arterials or collectors. This variable was not available in the 1976 and 1977 FARS data, and all local two-lane roads for those years are included in the Local Other/Misc. category.

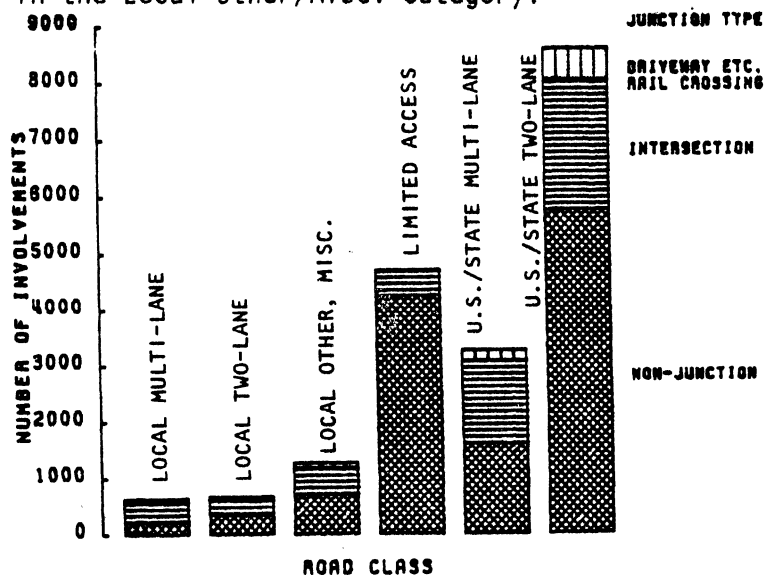


FIGURE 5.3
Combination Vehicle Fatal Accident Involvements
by Junction Type by Road Class, 1976-1980

TABLE 5.7
Weather Condition and Light Condition of Combination
Vehicle Fatal Accident Involvements, 1976-1980

Light Condition		Type of Weather				Total
		Normal	Rain	Snow/ Sleet	Fog, Smoke	
Daylight	N	8702	1180	414	282	10578
	ROW%	82.3	11.2	3.9	2.7	100.0
	COL%	53.7	55.7	57.2	43.7	53.7
	TOT%	44.2	6.0	2.1	1.4	53.7
Dawn or Dusk	N	598	93	31	65	787
	ROW%	76.0	11.8	3.9	8.3	100.0
	COL%	3.7	4.4	4.3	10.1	4.0
	TOT%	3.0	.5	.2	.3	4.0
Dark with Lights	N	1162	163	36	34	1395
	ROW%	83.3	11.7	2.6	2.4	100.0
	COL%	7.2	7.7	5.0	5.3	7.1
	TOT%	5.9	.8	.2	.2	7.1
Dark, No Lights	N	5733	684	243	265	6925
	ROW%	82.8	9.9	3.5	3.8	100.0
	COL%	35.4	32.3	33.6	41.0	35.2
	TOT%	29.1	3.5	1.2	1.3	35.2
Total	N	16195	2120	724	646	19685
	ROW%	82.3	10.8	3.7	3.3	100.0
	COL%	100.0	100.0	100.0	100.0	100.0

Missing Data = 154.

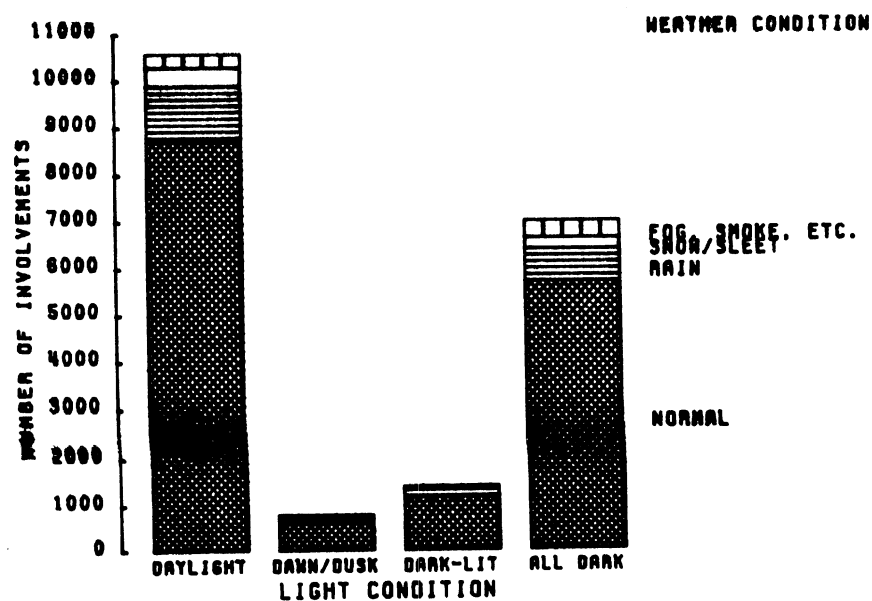


FIGURE 5.4
Combination Vehicle Fatal Accident Involvements
by Weather Condition by Light Condition, 1976-1980

TABLE 5.8

Road Grade, Alignment, and Light Condition of Combination Vehicle Fatal Accident Involvements, 1976-1980

Light Condition	Road Grade and Alignment				Total	
	Level Straight	Level Curved	Graded Straight	Graded Curved		
Daylight	N	6055	1002	2004	1204	10265
	ROW%	59.0	9.8	19.5	11.7	100.0
	COL%	52.5	54.7	53.1	59.0	53.6
	TOT%	31.6	5.2	10.5	6.3	53.6
Dawn or Dusk	N	460	81	147	82	770
	ROW%	59.7	10.5	19.1	10.6	100.0
	COL%	4.0	4.4	3.9	4.0	4.0
	TOT%	2.4	.4	.8	.4	4.0
Dark with Lights	N	909	96	221	112	1338
	ROW%	67.9	7.2	16.5	8.4	100.0
	COL%	7.9	5.2	5.9	5.5	7.0
	TOT%	4.7	.5	1.2	.6	7.0
Dark, No Lights	N	4100	652	1399	641	6792
	ROW%	60.4	9.6	20.6	9.4	100.0
	COL%	35.6	35.6	37.1	31.4	35.4
	TOT%	21.4	3.4	7.3	3.3	35.4
Total	N	11524	1831	3771	2039	19165
	ROW%	60.1	9.6	19.7	10.6	100.0
	COL%	100.0	100.0	100.0	100.0	100.0

Missing Data = 674.

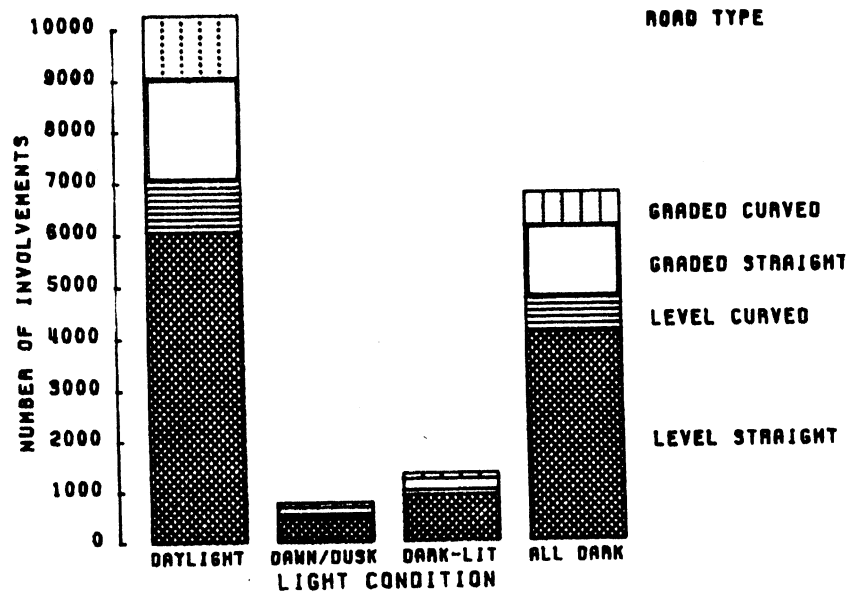


FIGURE 5.5

Combination Vehicle Fatal Accident Involvements by Road Grade and Alignment by Light Condition, 1976-1980

TABLE 5.9

Road Grade and Alignment and Weather Condition of Combination Vehicle Fatal Accident Involvements, 1976-1980

Weather Condition		Road Grade and Alignment				Total
		Level Straight	Level Curved	Graded Straight	Graded Curved	
Normal	N	9581	1513	3006	1595	15695
	ROW%	61.0	9.6	19.2	10.2	100.0
	COL%	83.5	83.0	80.5	78.8	82.4
	TOT%	50.3	7.9	15.8	8.4	82.4
Rain	N	1170	219	390	285	2064
	ROW%	56.7	10.6	18.9	13.8	100.0
	COL%	10.2	12.0	10.5	14.1	10.8
	TOT%	6.1	1.1	2.0	1.5	10.8
Snow/Sleet	N	329	43	204	97	673
	ROW%	48.9	6.4	30.3	14.4	100.0
	COL%	2.9	2.4	5.5	4.8	3.5
	TOT%	1.7	.2	1.1	.5	3.5
Fog, Smoke, Etc.	N	395	48	132	47	622
	ROW%	63.5	7.7	21.2	7.6	100.0
	COL%	3.4	2.6	3.5	2.3	3.3
	TOT%	2.1	.3	.7	.2	3.3
Total	N	11475	1823	3732	2024	19054
	ROW%	60.2	9.6	19.6	10.6	100.0
	COL%	100.0	100.0	100.0	100.0	100.0

Missing Data = 785.

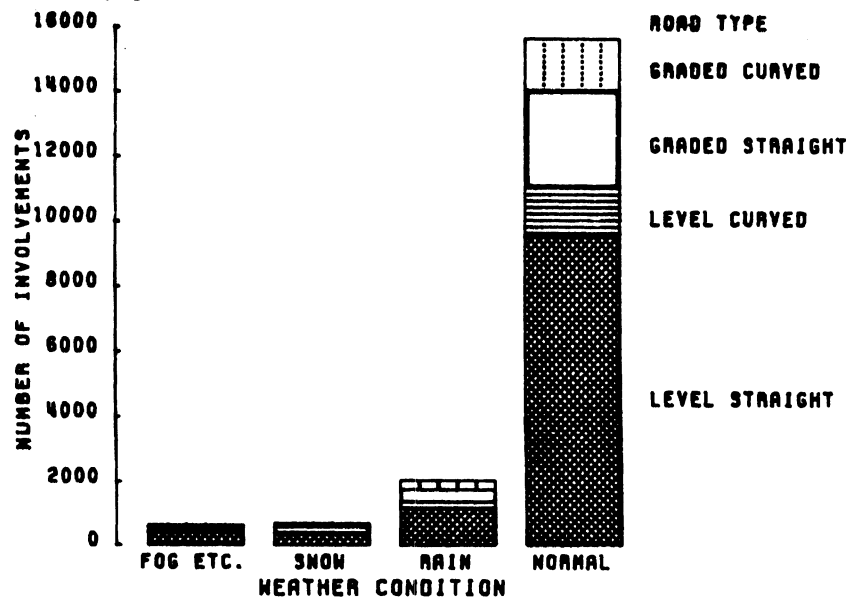


FIGURE 5.6
Combination Vehicle Fatal Accident Involvements by Road Grade and Alignment by Weather Condition, 1976-1980

TABLE 5.10
Rollover of Combination Vehicles Involved in Fatal Accidents
by Manner of Collision and Road Class, 1978-1980*

Manner of Collision		Road Class					Total	
		Limited Access	U.S./State Multi-Lane	U.S./State Two-Lane	Local Multi-Lane	Local Major** Two-Lane		Local Other, Misc.†
Non-Collision	N %	223 85.8	67 82.7	377 92.0	4 66.7	25 69.4	36 66.7	732 86.4
Non-Fixed Object	N %	42 9.1	8 3.7	43 12.4	1 1.2	3 2.9	8 5.6	105 7.7
Fixed Object	N %	244 47.3	48 39.3	161 54.9	5 29.4	18 42.9	22 51.2	498 48.2
Head-on	N %	125 11.5	10 2.2	40 8.6	0 -	2 3.8	0 -	177 8.2
Rear-end	N %	25 8.9	20 8.7	152 8.7	1 3.2	8 6.9	4 4.7	210 8.4
Angle	N %	73 15.4	101 9.6	188 9.9	5 2.6	22 7.5	12 6.3	401 9.8
Side-swipe	N %	5 9.3	4 7.4	41 10.0	0 -	3 12.5	0 -	53 9.5
Total	N %	737 23.6	258 11.7	1002 18.0	16 4.2	81 12.1	82 14.3	2176 17.4

Missing Data = 32.

*This variable was coded in FARS 1978-80. The % shown is the percentage of rollover among all combination vehicles in that category.

**Local major roads are federal aid roads or other local roads considered to be arterials or collectors. This variable was not available in the 1976 and 1977 FARS data, and all local two-lane roads for those years are included in the Local Other/Misc. category.

†Includes unknown road type.

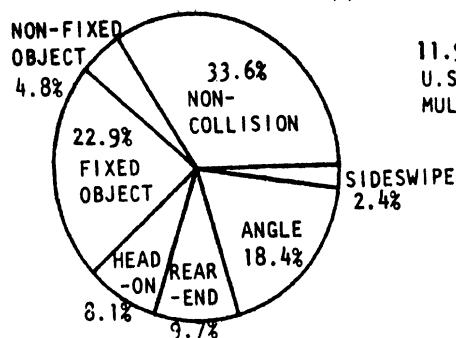


FIGURE 5.7
Combination Vehicle Rollovers in
Fatal Accidents by Manner of
Collision, 1978-1980

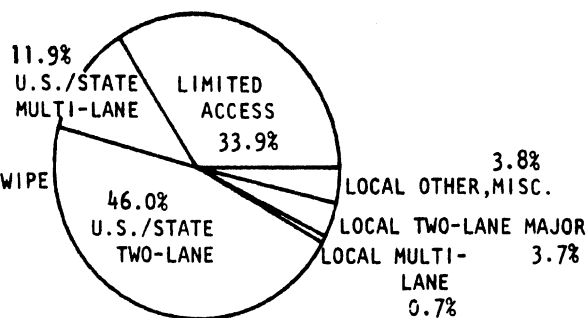


FIGURE 5.8
Combination Vehicle Rollovers in Fatal
Accidents by Road Class, 1978-1980

TABLE 5.11

Rollover of Combination Vehicles Involved in Fatal Accidents by Weather Condition and Combination Vehicle Type, 1978-1980*

Combination Vehicle Type		Weather Condition				Total
		Normal	Rain	Snow/Sleet	Fog, Smoke, Etc.	
Two-Unit	N	1703	198	49	55	2005
	%	17.7	15.5	11.6	14.5	17.1
Multi-Unit	N	94	11	4	5	114
	%	22.8	35.5	33.3	15.2	23.3
Bobtail**	N	58	13	4	0	75
	%	18.2	21.0	22.2	-	18.4
Total	N	1855	222	57	60	2194
	%	17.9	16.2	12.6	14.2	17.4

Missing Data = 10.

*This variable was coded in FARS 1978-80. The % shown is the percentage of rollover among all combination vehicles in that category.

**As explained in the Preface, the bobtail category in FARS appears to include all large single-unit trucks involved in fatal accidents in Pennsylvania for 1978-1981.

TABLE 5.12

Rollover of Combination Vehicles Involved in Fatal Accidents by Road Grade and Alignment and Combination Vehicle Type, 1978-1980*

Combination Vehicle Type		Road Grade and Alignment				Total
		Level Straight	Level Curved	Graded Straight	Graded Curved	
Two-Unit	N	786	313	378	491	1968
	%	11.5	29.2	16.7	39.5	17.2
Multi-Unit	N	62	14	16	21	113
	%	20.5	25.9	20.8	46.7	23.6
Bobtail**	N	34	8	16	14	72
	%	16.9	28.6	13.8	24.6	17.9
Total	N	882	335	410	526	2153
	%	12.00	29.00	16.7	39.1	17.5

Missing Data = 51.

*This variable was coded in FARS 1978-80. The % shown is the percentage of rollover among all combination vehicles in that category.

**As explained in the Preface, the bobtail category in FARS appears to include all large single-unit trucks involved in fatal accidents in Pennsylvania for 1978-1981.

TABLE 5.13
Weather Condition of Combination Vehicle Fatal
Accident Involvements by State, 1976-1980

State		Type of Weather				Total
		Normal	Rain	Snow/ Sleet	Fog, Smoke, Etc.	
Alabama	N	496	83	5	15	599
	ROW%	82.8	13.9	.8	2.5	100.0
Alaska	N	21	0	2	0	23
	ROW%	91.3	-	8.7	-	100.0
Arizona	N	305	9	6	3	323
	ROW%	94.4	2.8	1.9	.9	100.0
Arkansas	N	276	48	7	9	340
	ROW%	81.2	14.1	2.1	2.6	100.0
California	N	1192	95	7	109	1403
	ROW%	85.0	6.8	.5	7.8	100.0
Colorado	N	250	8	21	9	288
	ROW%	86.8	2.8	7.3	3.1	100.0
Connecticut	N	85	20	6	1	112
	ROW%	75.9	17.9	5.4	.9	100.0
Delaware	N	50	3	0	2	55
	ROW%	90.9	5.5	-	3.6	100.0
District of Columbia	N	2	0	0	0	2
	ROW%	100.0	-	-	-	100.0
Florida	N	772	80	2	42	896
	ROW%	86.2	8.9	.2	4.7	100.0
Georgia	N	528	86	1	12	627
	ROW%	84.2	13.7	.2	1.9	100.0
Hawaii	N	12	6	0	0	18
	ROW%	66.7	33.3	-	-	100.0
Idaho	N	107	6	8	4	125
	ROW%	85.6	4.8	6.4	3.2	100.0
Illinois	N	663	93	54	38	848
	ROW%	78.2	11.0	6.4	4.5	100.0

TABLE 5.13 (Continued)

State		Type of Weather				Total
		Normal	Rain	Snow/ Sleet	Fog, Smoke, Etc.	
Indiana	N	654	91	45	22	812
	ROW%	80.5	11.2	5.5	2.7	100.0
Iowa	N	282	15	22	24	343
	ROW%	82.2	4.4	6.4	7.0	100.0
Kansas	N	241	25	5	12	283
	ROW%	85.2	8.8	1.8	4.2	100.0
Kentucky	N	313	49	13	11	386
	ROW%	81.1	12.7	3.4	2.8	100.0
Louisiana	N	385	44	2	18	449
	ROW%	85.7	9.8	.4	4.0	100.0
Maine	N	47	6	7	2	62
	ROW%	75.8	9.7	11.3	3.2	100.0
Maryland	N	171	29	4	4	208
	ROW%	82.2	13.9	1.9	1.9	100.0
Massachusetts	N	140	19	2	2	163
	ROW%	85.9	11.7	1.2	1.2	100.0
Michigan	N	466	46	44	9	565
	ROW%	82.5	8.1	7.8	1.6	100.0
Minnesota	N	280	20	28	12	340
	ROW%	82.4	5.9	8.2	3.5	100.0
Mississippi	N	273	53	2	10	338
	ROW%	80.8	15.7	.6	3.0	100.0
Missouri	N	425	62	12	14	513
	ROW%	82.8	12.1	2.3	2.7	100.0
Montana	N	128	12	17	13	170
	ROW%	75.3	7.1	10.0	7.6	100.0
Nebraska	N	195	10	17	14	236
	ROW%	82.6	4.2	7.2	5.9	100.0
Nevada	N	98	1	3	0	102
	ROW%	96.1	1.0	2.9	-	100.0

TABLE 5.13 (Continued)

State	Type of Weather				Total	
	Normal	Rain	Snow/ Sleet	Fog, Smoke, Etc.		
New Hampshire	N	26	2	2	0	30
	ROW%	86.7	6.7	6.7	-	100.0
New Jersey	N	351	66	14	3	434
	ROW%	80.9	15.2	3.2	.7	100.0
New Mexico	N	260	17	18	5	300
	ROW%	86.7	5.7	6.0	1.7	100.0
New York	N	389	75	58	8	530
	ROW%	73.4	14.2	10.9	1.5	100.0
North Carolina	N	591	103	1	3	698
	ROW%	84.7	14.8	.1	.4	100.0
North Dakota	N	47	1	7	3	58
	ROW%	81.0	1.7	12.1	5.2	100.0
Ohio	N	688	103	70	18	879
	ROW%	78.3	11.7	8.0	2.0	100.0
Oklahoma	N	425	54	8	13	500
	ROW%	85.0	10.8	1.6	2.6	100.0
Oregon	N	182	24	7	23	236
	ROW%	77.1	10.2	3.0	9.7	100.0
Pennsylvania	N	867	177	77	30	1151
	ROW%	75.3	15.4	6.7	2.6	100.0
Rhode Island	N	7	2	0	0	9
	ROW%	77.8	22.2	-	-	100.0
South Carolina	N	263	55	2	11	331
	ROW%	79.5	16.6	.6	3.3	100.0
South Dakota	N	80	2	11	2	95
	ROW%	84.2	2.1	11.6	2.1	100.0
Tennessee	N	382	52	9	23	466
	ROW%	82.0	11.2	1.9	4.9	100.0
Texas	N	1621	211	13	47	1892
	ROW%	85.7	11.2	.7	2.5	100.0

TABLE 5.13 (Continued)

State		Type of Weather				Total
		Normal	Rain	Snow/ Sleet	Fog, Smoke, Etc.	
Utah	N	154	11	9	5	179
	ROW%	86.0	6.1	5.0	2.8	100.0
Vermont	N	17	3	3	1	24
	ROW%	70.8	12.5	12.5	4.2	100.0
Virginia	N	315	45	9	4	373
	ROW%	84.5	12.1	2.4	1.1	100.0
Washington	N	204	40	11	16	271
	ROW%	75.3	14.8	4.1	5.9	100.0
West Virginia	N	49	16	3	3	71
	ROW%	69.0	22.5	4.2	4.2	100.0
Wisconsin	N	287	25	28	11	351
	ROW%	81.8	7.1	8.0	3.1	100.0
Wyoming	N	143	17	22	7	189
	ROW%	75.7	9.0	11.6	3.7	100.0
TOTAL	N	16205	2120	724	647	19696
	ROW%	82.3	10.8	3.7	3.3	100.0

*Missing Data = 143.

TABLE 5.14
Injury Severity of Combination Vehicle Occupants in Fatal Accidents
by Vehicle Rollover and Ejection, 1978-1980*

Rollover/ Ejection	Extent of Occupant Injury					Total
	None	Possible	Non- incapac- itating	Incapac- itating	Fatal	
NO ROLLOVER						
No	N 6941	1296	1226	660	825	10948
Ejection	% 63.4	11.8	11.2	6.0	7.5	100.0
Total	N 2	17	32	68	386	505
Ejection	% .4	3.4	6.3	13.5	76.4	100.0
Partial	N 1	1	3	15	43	63
Ejection	% 1.6	1.6	4.8	23.8	68.3	100.0
Unknown	N 15	5	14	9	15	58
Ejection	% 25.9	8.6	24.1	15.5	25.9	100.0
SUBTOTAL	N 6959	1319	1275	752	1269	11574
	% 60.1	11.4	11.0	6.5	11.0	100.0
ROLLOVER AS FIRST EVENT						
No	N 39	36	60	75	479	689
Ejection	% 5.7	5.2	8.7	10.9	69.5	100.0
Total	N 0	0	15	17	200	232
Ejection	% 0.0	0.0	6.5	7.3	86.2	100.0
Partial	N 0	0	1	6	50	57
Ejection	% 0.0	0.0	1.8	10.5	87.7	100.0
Unknown	N 3	1	0	3	7	14
Ejection	% 21.4	7.1	0.0	21.4	50.0	100.0
SUBTOTAL	N 42	37	76	101	736	992
	% 4.2	3.7	7.7	10.2	74.2	100.0
ROLLOVER AS LATER EVENT						
No	N 163	156	284	230	559	1392
Ejection	% 11.7	11.2	20.4	16.5	40.2	100.0
Total	N 4	4	15	43	275	341
Ejection	% 1.2	1.2	4.4	12.6	80.6	100.0
Partial	N 1	0	0	3	45	49
Ejection	% 2.0	0.0	0.0	6.1	91.8	100.0
Unknown	N 2	1	6	12	5	26
Ejection	% 7.7	3.8	23.1	46.2	19.2	100.0
SUBTOTAL	N 170	161	305	288	884	1808
	% 9.4	8.9	16.9	15.9	48.9	100.0
GRAND TOTAL	N 7171	1517	1656	1141	2889	14374
	% 49.9	10.6	11.5	7.9	20.1	100.0

Missing data on injury severity = 26

*The rollover variable was added to FARS in 1978.

APPENDIX A

State Data on Truck-Type Vehicles in Fatal Accidents

As mentioned in the Preface, there seem to be substantial discrepancies in the accuracy and completeness of reporting of vehicle type in the FARS data for some states. This appendix contains a table showing the actual truck counts for fatal involvements by state for the seven FARS data sets from 1975 to 1981 as contained in the July 12, 1982, versions of the 1975-80 Summary file and of the 1981 individual year file. Tabulated are data for ten specific truck types, for unknown truck type, and also for unknown vehicle type. It should be noted that in the early releases of the 1975-80 FARS summary tape there was an error in the treatment of single-unit trucks of unknown weight in 1976 accidents. They were mistakenly combined with single-unit trucks over 26,000 pounds GVW. However, the corrected data are shown here.

Bobtail trucks (tractors pulling no trailers) were not given a separate category in 1975 and 1976, and they were presumably included with single-unit trucks in those years. In some states, particularly Florida and Pennsylvania, it appears that bobtail trucks were not distinguished in 1977 either. On the other hand, Ohio seems to have an overcount of bobtail trucks in 1977 (18), and Pennsylvania apparently has very large overcounts in 1978 through 1981.

The truck-based station wagon is another small category which may not always have been accurately distinguished from vans or regular station wagons in all states. Seventeen states showed no truck-based station wagons in fatal accidents in 1975, while only ten showed none in 1980. But only South Carolina reported no truck-based station wagons for the whole period. Michigan reported none for 1975-78 but then four in 1979, 15 in 1980, and six in 1981. It seems likely that this category is somewhat underreported in some states and overreported in others.

It is not surprising that another relatively small category, three- and four-unit trucks, is rarely reported in many states, since many states have laws prohibiting this type of vehicle. Seven states reported no such vehicles in their fatal accident data, 11 reported only one, five reported two, and four reported three. However, there were some questionable numbers reported in some states for some years. Kentucky reported two in 1975, 16 in 1976, one in 1978, and none in 1977 and 1979-81. Louisiana reported four in 1975 and one in 1977 but none in 1976 and 1978-81. Connecticut reported six in 1976 but none any other year. Utah reported none in 1975-1979 but five in 1980 and three in 1981. Oregon reported 15 in 1976 but only 13 in the other six years combined. Thus the accuracy of data in this category is also somewhat suspect.

There are also substantial yearly variations in some states which seem greater than would be expected by chance in such categories as pickups, vans, small single-unit trucks, and two-unit trucks. Also some

states show substantial yearly fluctuations in the two missing data categories, "unknown truck type" and "unknown vehicle type." Some of the major apparent discrepancies in the state vehicle classifications are indicated in the following comments.

Alabama - Vans and combination vehicles appear low in 1975, and vans also appear low in 1976. The fluctuation in single-unit trucks from six in 1977 to 43 in 1980 also seems odd.

Arkansas - The fluctuation from only three vans in 1975 to 25 vans in 1978 is unusually large.

California - The total of 25 truck-based station wagons for 1975-1979 seems low compared to 44 in just 1980 and 1981. There were very large numbers of unknown type trucks in 1976 (109), 1977 (62), and 1978 (142), years in which the numbers of single-unit trucks appear low.

Colorado - The eight truck-based station wagons in 1978 compared to none in 1976 and 1977 is surprising.

Connecticut - The six multi-unit vehicles in 1976 accidents with no such vehicles in other years seems strange.

Delaware - The numbers of two-unit trucks seem low in 1976 and 1977, and conversely the numbers of single-unit trucks seem large in those years.

Florida - The numbers of small single-unit trucks are very low in 1975, 1976, and 1981 and are suspiciously high in 1980. There are large numbers of unknown type trucks in 1975 (94), 1976 (84), 1977 (45), and 1981 (132), and also a very large number of unknown type vehicles (525) in 1981. The lack of truck-based station wagons for 1975, 1976, 1977, and 1978 is surprising.

Georgia - There are no truck-based station wagons and very few single-unit trucks in 1975, 1976, and 1977, years with large numbers of unknown type trucks. There is also a very high number of unknown type vehicles (255) in 1977.

Idaho - The fluctuation from only one multi-unit truck involvement in 1975 and in 1977 to 12 in 1979 seems large. The zero bobtail truck involvements 1977-1980 compared to four in 1981 is surprising. There are large numbers of unknown type vehicles in the first two FARS years, 1975 (14 percent) and 1976 (24 percent).

Illinois - Bobtail tractors seem low for a large state (three total for 1977-81).

Indiana - There is a rather low number of pickups in 1975 and there are low numbers of vans in 1975 and 1976, while there are large numbers of unknown type vehicles in the latter two years (100, 160) and also substantial numbers in 1977 (41) and 1978 (67). Bobtail tractors seem low throughout (three total) as do truck-based station wagons (one total).

Kansas - Single-unit trucks appear low in 1975 and even lower in 1976, while pickups appear somewhat high in those years.

Kentucky - Pickups, single-unit trucks, and two-unit trucks all appear low in 1975, a year when there was also a substantial number of unknown type trucks (57). The 16 multi-unit trucks in 1976 seems questionable.

Louisiana - The numbers of pickups and vans and especially two-unit trucks appear low in 1975, and single-unit trucks appear low in 1976 and especially 1977. There were fairly large numbers of missing type data for 1975 through 1979.

Maine - Pickups and vans appear low in 1981 when there was a sizeable number of unknown type vehicles--as there was in 1975 and 1976 also.

Maryland - The numbers of all types of trucks, especially single-unit trucks, appear low in 1976, a year with 178 unknown type vehicles.

Massachusetts - Two-unit trucks appear rather low in 1975 and again in 1981, single-unit trucks appear somewhat low in 1976 and 1980, and pickups appear unusually low in 1976.

Michigan - Pickups, single-unit trucks, and two-unit trucks appear low in 1975 when there were many unknown type trucks and vehicles. Two-unit trucks appear somewhat low in 1980, and large single-unit trucks appear low in 1981. There are no truck-based station wagons 1975 to 1978, but the 15 in 1980 seem unusually high. Small single-unit trucks appear underrepresented throughout the period.

Mississippi - Vans and single-unit trucks appear somewhat low 1975 through 1978, and two-unit trucks also seem quite low in 1975 when there were many unknown type vehicles (91).

Missouri - Two-unit trucks seem a bit low in 1975. In 1977 and 1978 pickup trucks seem somewhat low, while small single-unit trucks are extremely high.

Montana - Single-unit trucks appear unusually low for 1978 through 1981, and multi-unit trucks appear low (zero) for 1975, 1976, and 1977.

Nebraska - Single-unit trucks appear rather low for 1977-1981 compared with 1975 and 1976, especially small ones.

North Carolina - Single-unit trucks are very low in 1976, a year with 127 unknown type vehicles. There were also 79 unknown type vehicles in 1977. The numbers of vans and truck-based station wagons (none for the latter) for 1976 through 1981 seem unusually low in comparison with neighboring states.

North Dakota - The number of pickups appears somewhat low in 1979, a year with a substantial number of unknown type vehicles (22).

Ohio - Pickup trucks appear somewhat low in 1975, and single-unit trucks appear low in 1975 and 1976. Large single-unit trucks continue to

appear low in 1977 through 1981 (except 1978), while small single-unit trucks appear surprisingly large in those years. The 18 bobtail tractors in 1977 seem suspiciously high. The two truck-based station wagons for 1976 through 1981 seem much too low.

Oklahoma - Vans appear quite low in 1975, and single-unit trucks appear rather low in 1980.

Oregon - In 1976 multi-unit trucks appear high, while two-unit trucks appear low.

Pennsylvania - Vans appear somewhat low 1975-1977 compared to subsequent years, and this is even more apparent for small single-unit trucks in those years. For 1978-1981 there are a total of 225 bobtail trucks (39 percent of all bobtail trucks reported in the nation for those years), while concomitantly, there are only two medium, large, and unknown weight single-unit trucks. There are no bobtail trucks in 1977. There are only two truck-based station wagons for the whole period. There are large numbers of unknown type vehicles in 1978 (83), 1979 (75), and 1980 (201).

Rhode Island - The two two-unit truck fatal involvements reported for 1977 through 1980 seem suspiciously low.

South Carolina - Two-unit trucks seem very low in 1975 (only three cases) and somewhat low in 1976 (37). Vans also seem somewhat low in 1975, and single-unit trucks seem very low in 1975 and 1977 and somewhat low in 1978. Concomitantly, the number of unknown type trucks is very high in 1975 (83), and they are still rather high in 1976 and 1977. There are no truck-based station wagons in any year.

Tennessee - Pickups and single-unit trucks seem low in 1975, when unknown type trucks were rather high (25) and unknown type vehicles were very high (110). The number of single-unit trucks also seems low in 1976. The seven bobtail trucks in 1977 seems unusually high especially compared to none in 1978.

Texas - The fluctuation from five truck-based station wagons in 1975 to 35 in 1979 seems rather large.

Utah - The zero number of multi-unit trucks for 1975 through 1979 seems somewhat suspicious.

Vermont - The zero two-unit trucks coupled with two multi-unit trucks in 1975 seems surprising, especially since there are no multi-unit trucks 1976 through 1981.

Virginia - Vans seem somewhat low in 1975, while single-unit trucks appear unusually high. However, in 1976, 1977, and 1978 single-unit trucks appear much too low. There are substantial numbers of unknown type trucks in 1976 (25), 1977 (59), 1978 (68), and 1979 (32). The eight bobtail trucks in 1980 and 13 in 1981 seem surprisingly high.

Washington - The 16 multi-unit trucks in 1977 seem suspiciously high, especially compared to only one in 1978 and none in 1975, 1979, and 1980. No bobtail truck involvements were reported in any year.

West Virginia - Two-unit trucks were zero in 1980 and 1981 and were quite low in 1977, 1978, and 1979, years in which single-unit trucks seem unusually high. No bobtail truck involvements were reported in any year. There was a substantial number of unknown type trucks in 1975 (23). There was an unusually large drop in total truck involvements from 1980 (188), to 1981 (130).

Wisconsin - The fluctuations in single-unit trucks (27 in 1975 to 75 in 1977) seems unusually great. The 13 truck-based station wagons in 1979 seem suspiciously high. There were substantial numbers of unknown type vehicles in 1975 (67) and 1976 (51).

In summary, there appear to be possible or real problems with the FARS truck type data for at least one year in the following states.

Pickups - Indiana, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Missouri, North Dakota, Ohio, and Tennessee.

Vans - Alabama, Arkansas, Indiana, Louisiana, Maine, Maryland, Mississippi, North Carolina, Oklahoma, Pennsylvania, South Carolina, and Virginia.

Truck-based Station Wagons - California, Colorado, Florida, Georgia, Indiana, Michigan, North Carolina, Ohio, Pennsylvania, South Carolina, Texas, and Wisconsin.

Single-unit Trucks - Alabama, Colorado, Delaware, Florida, Georgia, Kansas, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Mississippi, Montana, Missouri, Nebraska, North Carolina, Ohio, Oklahoma, Pennsylvania, South Carolina, Tennessee, Virginia, West Virginia, Wisconsin.

Two-unit Trucks - Alabama, Delaware, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Mississippi, Missouri, Oregon, Rhode Island, South Carolina, Virginia, West Virginia.

Three- or Four-unit Trucks - Connecticut, Arizona, Kentucky, Montana, Oregon, Utah, Vermont, Washington.

Bobtail Tractors - Idaho, Illinois, Indiana, Ohio, Pennsylvania, Tennessee, Virginia, Washington, West Virginia.

The following ten states have substantial numbers of unknown type trucks for at least one FARS year: California, Florida, Georgia, Kentucky, Louisiana, Michigan, South Carolina, Tennessee, Virginia, and West Virginia.

Also the following twelve states have substantial numbers of unknown type vehicles for at least one FARS year: Florida, Georgia,

Idaho, Indiana, Louisiana, Maine, Maryland, Michigan, North Carolina, North Dakota, Tennessee, and Wisconsin.

It is hoped that this documentation of some of the problems with the FARS vehicle classification data will be helpful to other FARS analysts and to NHTSA in its efforts to improve the quality of future FARS data collections.

TABLE A.1
Truck Type Vehicles and Unknown Type Vehicles in Fatal
Accidents for Each State and the United States, 1975-1981
(SOURCE: Fatal Accident Reporting System [FARS] of the NHTSA.)

Vehicle Type	1975	1976	1977	1978	1979	1980	1981
ALABAMA							
Pickup	158	179	226	243	196	183	163
Van	2	3	13	31	33	16	32
Trk-based StaWag	0	1	0	2	1	0	0
One-Unit (10-19)	0	0	1	0	0	1	0
One-Unit (20-26)	0	0	0	0	0	1	0
One-Unit (>26)	8	0	0	0	0	0	0
One-Unit (Wt UK)	20	17	5	18	13	41	31
Two-Unit (semi)	54	101	146	129	136	83	89
Three or 4 Unit	5	0	0	0	0	0	0
Bobtail Tractor	-	-	1	2	1	0	2
Unknown Trk Type	15	4	0	1	0	2	0
Total Trucks	262	305	392	426	380	327	317
Total Trucks %	23.2	25.5	28.3	29.5	29.1	27.2	27.5
Unknown Veh Type	0	5	20	6	6	2	0
Unkn Veh Type %	0.0	0.4	1.4	0.4	0.5	0.2	0.0
Total Vehicles	1129	1196	1387	1446	1306	1200	1154
ALASKA							
Pickup	33	40	48	29	26	25	22
Van	1	2	1	4	5	5	7
Trk-based StaWag	1	1	2	0	0	2	3
One-Unit (10-19)	0	1	0	0	3	4	7
One-Unit (20-26)	2	1	0	0	1	1	0
One-Unit (>26)	0	0	0	0	0	0	0
One-Unit (Wt UK)	4	0	3	5	0	1	0
Two-Unit (semi)	13	7	4	4	4	4	5
Three or 4 Unit	0	0	0	0	0	0	0
Bobtail Tractor	-	-	0	0	0	0	0
Unknown Trk Type	1	0	0	0	0	0	0
Total Trucks	55	52	58	42	39	42	44
Total Trucks %	35.9	34.2	32.6	26.1	35.5	39.3	36.1
Unknown Veh Type	4	8	11	5	8	2	6
Unkn Veh Type %	2.6	5.3	6.2	3.1	7.3	1.9	4.9
Total Vehicles	153	152	178	161	110	107	122
ARIZONA							
Pickup	187	185	220	308	262	266	264
Van	28	20	35	54	48	34	52
Trk-based StaWag	1	3	5	8	7	4	8
One-Unit (10-19)	8	0	1	0	7	11	4
One-Unit (20-26)	1	0	0	1	3	2	2
One-Unit (>26)	0	0	1	0	6	3	4
One-Unit (Wt UK)	2	29	14	24	14	5	3

Vehicle Type	1975	1976	1977	1978	1979	1980	1981
Two-Unit (semi)	45	51	48	51	81	55	57
Three or 4 Unit	1	4	5	13	5	8	7
Bobtail Tractor	-	-	0	0	3	0	0
Unknown Trk Type	4	0	0	2	3	0	1
Total Trucks	277	292	329	461	439	388	402
Total Trucks %	32.2	33.0	30.7	35.4	35.0	33.4	34.0
Unknown Veh Type	27	46	32	24	26	10	9
Unkn Veh Type %	3.1	5.2	3.0	1.8	2.1	0.9	0.8
Total Vehicles	861	884	1070	1301	1253	1162	1183
ARKANSAS							
Pickup	141	154	152	154	154	147	155
Van	3	11	7	25	13	15	15
Trk-based StaWag	1	1	1	0	0	3	0
One-Unit (10-19)	6	11	11	17	17	17	11
One-Unit (20-26)	9	5	4	6	1	0	6
One-Unit (>26)	8	2	4	5	4	4	4
One-Unit (Wt UK)	4	7	5	0	0	0	0
Two-Unit (semi)	63	47	62	82	88	58	92
Three or 4 Unit	0	0	0	0	1	0	0
Bobtail Tractor	-	-	1	1	0	0	0
Unknown Trk Type	0	0	0	0	0	0	0
Total Trucks	235	238	247	290	278	244	283
Total Trucks %	34.2	37.1	35.2	40.2	40.2	36.9	41.1
Unknown Veh Type	24	17	11	0	1	0	1
Unkn Veh Type %	3.5	2.7	1.6	0.0	0.1	0.0	0.1
Total Vehicles	687	641	702	722	691	662	689
CALIFORNIA							
Pickup	712	747	869	954	1011	1047	961
Van	149	151	227	229	288	304	265
Trk-based StaWag	5	1	1	12	6	23	21
One-Unit (10-19)	51	33	40	45	81	55	40
One-Unit (20-26)	5	0	3	1	1	3	4
One-Unit (>26)	0	0	0	3	0	0	1
One-Unit (Wt UK)	37	6	8	10	13	15	9
Two-Unit (semi)	148	118	168	175	181	213	191
Three or 4 Unit	83	101	89	95	134	89	94
Bobtail Tractor	-	-	7	12	10	15	8
Unknown Trk Type	18	109	62	142	31	0	1
Total Trucks	1208	1266	1474	1678	1756	1764	1595
Total Trucks %	23.2	23.0	23.5	24.4	24.4	25.3	23.9
Unknown Veh Type	23	8	38	5	1	4	0
Unkn Veh Type %	0.4	0.1	0.6	0.1	0.0	0.1	0.0
Total Vehicles	5208	5499	6265	6874	7201	6979	6679
COLORADO							
Pickup	101	134	134	165	166	165	162
Van	25	19	20	23	38	25	20

Vehicle Type	1975	1976	1977	1978	1979	1980	1981
Trk-based StaWag	4	0	0	8	3	1	1
One-Unit (10-19)	0	0	0	1	1	0	1
One-Unit (20-26)	1	0	0	0	1	0	0
One-Unit (>26)	1	0	0	0	0	0	0
One-Unit (Wt UK)	12	20	22	18	9	23	11
Two-Unit (semi)	39	47	58	54	67	49	47
Three or 4 Unit	1	1	2	1	1	3	1
Bobtail Tractor	-	-	1	3	1	0	3
Unknown Trk Type	1	0	2	4	4	0	2
Total Trucks	185	221	239	277	291	266	248
Total Trucks %	27.0	30.7	28.7	32.5	32.9	31.1	26.2
Unknown Veh Type	4	5	1	7	4	3	2
Unkn Veh Type %	0.6	0.7	0.1	0.8	0.5	0.4	0.2
Total Vehicles	686	721	832	852	885	856	948
<u>CONNECTICUT</u>							
Pickup	24	22	39	38	45	44	38
Van	14	13	16	20	34	23	20
Trk-based StaWag	2	0	4	1	1	3	2
One-Unit (10-19)	0	7	2	2	5	4	8
One-Unit (20-26)	1	0	2	0	1	0	0
One-Unit (>26)	5	3	3	6	4	6	4
One-Unit (Wt UK)	0	4	5	3	2	4	5
Two-Unit (semi)	9	12	26	21	21	17	34
Three or 4 Unit	0	6	0	0	0	0	0
Bobtail Tractor	-	-	4	1	3	1	1
Unknown Trk Type	14	8	5	3	0	0	0
Total Trucks	69	75	106	95	116	102	112
Total Trucks %	13.6	14.7	17.7	16.2	16.2	13.8	16.0
Unknown Veh Type	13	1	2	2	1	0	0
Unkn Veh Type %	2.6	0.2	0.3	0.3	0.1	0.0	0.0
Total Vehicles	506	510	599	586	718	738	702
<u>DELAWARE</u>							
Pickup	10	6	11	13	14	23	16
Van	6	2	7	7	9	11	8
Trk-based StaWag	0	0	2	0	0	1	1
One-Unit (10-19)	1	1	0	1	1	3	0
One-Unit (20-26)	0	0	1	3	2	1	1
One-Unit (>26)	0	0	8	4	0	0	2
One-Unit (Wt UK)	4	2	9	3	0	1	0
Two-Unit (semi)	8	17	0	3	12	22	12
Three or 4 Unit	0	0	0	0	0	0	0
Bobtail Tractor	-	-	0	1	0	0	0
Unknown Trk Type	0	0	0	0	0	0	0
Total Trucks	29	28	38	35	38	62	40
Total Trucks %	19.1	18.7	23.9	22.4	23.9	30.4	26.5
Unknown Veh Type	0	0	3	7	0	1	0
Unkn Veh Type %	0.0	0.0	1.9	4.5	0.0	0.5	0.0

Vehicle Type	1975	1976	1977	1978	1979	1980	1981
Total Vehicles	152	150	159	156	159	204	151
<u>DISTRICT OF COLUMBIA</u>							
Pickup	0	0	2	2	1	2	3
Van	2	1	4	1	2	7	5
Trk-based StaWag	0	1	1	1	1	0	0
One-Unit (10-19)	2	1	0	3	1	0	0
One-Unit (20-26)	0	0	0	0	0	1	0
One-Unit (>26)	0	1	0	0	2	0	0
One-Unit (Wt UK)	1	0	4	0	0	1	0
Two-Unit (semi)	0	0	0	0	1	1	0
Three or 4 Unit	0	0	0	0	0	0	0
Bobtail Tractor	-	-	0	0	0	0	0
Unknown Trk Type	0	0	0	0	0	0	0
Total Trucks	5	4	11	7	8	12	8
Total Trucks %	5.4	6.3	14.5	10.9	13.8	22.6	11.9
Unknown Veh Type	2	5	1	0	0	1	3
Unkn Veh Type %	2.2	7.8	1.3	0.0	0.0	1.9	4.5
Total Vehicles	92	64	76	64	58	53	67
<u>FLORIDA</u>							
Pickup	242	230	290	346	399	382	383
Van	71	71	85	99	131	144	175
Trk-based StaWag	0	0	0	0	6	2	2
One-Unit (10-19)	1	5	17	48	39	105	2
One-Unit (20-26)	1	4	0	9	3	1	0
One-Unit (>26)	1	4	1	2	1	0	2
One-Unit (Wt UK)	0	6	3	3	5	1	10
Two-Unit (semi)	134	124	162	194	198	194	199
Three or 4 Unit	1	4	0	1	0	1	0
Bobtail Tractor	-	-	0	4	5	9	4
Unknown Trk Type	94	84	45	1	9	0	132
Total Trucks	545	532	603	707	796	839	909
Total Trucks %	21.4	21.9	23.3	24.4	24.5	23.9	22.4
Unknown Veh Type	8	12	22	4	1	6	525
Unkn Veh Type %	0.3	0.5	0.9	0.1	0.0	0.2	12.9
Total Vehicles	2548	2426	2584	2894	3249	3509	4056
<u>GEORGIA</u>							
Pickup	196	187	193	247	282	262	242
Van	27	25	22	35	53	49	47
Trk-based StaWag	0	0	0	4	4	2	0
One-Unit (10-19)	2	0	0	8	10	9	3
One-Unit (20-26)	2	0	1	10	11	9	8
One-Unit (>26)	0	0	0	2	5	8	7
One-Unit (Wt UK)	11	3	1	12	15	4	10
Two-Unit (semi)	83	111	96	123	153	146	120
Three or 4 Unit	0	0	0	0	0	0	0

Vehicle Type	1975	1976	1977	1978	1979	1980	1981
Bobtail Tractor	-	-	2	2	1	4	5
Unknown Trk Type	27	50	60	35	14	14	12
Total Trucks	348	376	375	478	548	507	454
Total Trucks %	21.0	23.3	21.7	25.9	28.4	26.5	25.3
Unknown Veh Type	11	14	255	3	2	0	0
Unkn Veh Type %	0.7	0.9	14.8	0.2	0.1	0.0	0.0
Total Vehicles	1659	1612	1727	1848	1931	1915	1795
<u>HAWAII</u>							
Pickup	11	21	14	26	32	26	29
Van	5	3	6	6	9	11	4
Trk-based StaWag	0	2	1	0	0	0	0
One-Unit (10-19)	0	1	0	0	4	3	0
One-Unit (20-26)	0	1	0	0	0	1	0
One-Unit (>26)	0	0	0	0	1	1	0
One-Unit (Wt UK)	2	0	6	8	1	0	0
Two-Unit (semi)	3	4	3	8	1	1	2
Three or 4 Unit	0	0	1	0	0	0	0
Bobtail Tractor	-	-	0	0	0	1	0
Unknown Trk Type	1	0	0	1	0	0	0
Total Trucks	22	32	31	49	48	44	35
Total Trucks %	13.0	16.7	16.1	20.3	19.2	19.4	18.9
Unknown Veh Type	0	3	0	0	0	0	0
Unkn Veh Type %	0.0	1.6	0.0	0.0	0.0	0.0	0.0
Total Vehicles	169	192	192	241	250	227	185
<u>IDAHO</u>							
Pickup	74	75	87	98	84	112	100
Van	8	5	4	5	6	11	6
Trk-based StaWag	8	0	3	4	2	3	2
One-Unit (10-19)	5	3	1	3	1	5	3
One-Unit (20-26)	1	1	2	3	1	2	1
One-Unit (>26)	0	1	5	2	12	4	1
One-Unit (Wt UK)	2	4	4	4	3	8	1
Two-Unit (semi)	27	19	16	20	30	17	31
Three or 4 Unit	1	2	1	4	12	4	6
Bobtail Tractor	-	-	0	0	0	0	4
Unknown Trk Type	1	0	0	0	0	0	0
Total Trucks	127	110	123	143	151	166	155
Total Trucks %	39.6	35.3	34.6	37.3	39.0	39.7	42.2
Unknown Veh Type	46	75	8	0	0	0	0
Unkn Veh Type %	14.3	24.0	2.3	0.0	0.0	0.0	0.0
Total Vehicles	321	312	355	383	387	418	367
<u>ILLINOIS</u>							
Pickup	168	231	211	238	266	221	228
Van	66	66	84	116	105	99	76
Trk-based StaWag	1	4	1	5	4	11	6
One-Unit (10-19)	16	14	9	15	11	10	4

Vehicle Type	1975	1976	1977	1978	1979	1980	1981
One-Unit (20-26)	3	1	19	17	11	14	5
One-Unit (>26)	0	1	8	14	17	21	16
One-Unit (Wt UK)	26	60	34	23	22	11	12
Two-Unit (semi)	151	152	200	182	177	138	156
Three or 4 Unit	0	0	0	0	1	1	0
Bobtail Tractor	-	-	0	0	2	1	0
Unknown Trk Type	5	2	0	0	0	1	2
Total Trucks	436	531	566	610	616	528	505
Total Trucks %	16.7	20.6	20.2	21.5	23.0	20.4	20.9
Unknown Veh Type	10	6	13	0	0	1	7
Unkn Veh Type %	0.4	0.2	0.5	0.0	0.0	0.0	0.3
Total Vehicles	2611	2583	2802	2839	2674	2587	2416
<u>INDIANA</u>							
Pickup	115	205	234	231	220	230	172
Van	16	9	31	52	48	50	46
Trk-based StaWag	0	0	0	0	0	1	0
One-Unit (10-19)	13	0	8	4	3	3	1
One-Unit (20-26)	5	0	1	0	2	1	2
One-Unit (>26)	3	0	1	0	1	0	2
One-Unit (Wt UK)	7	0	1	1	1	3	5
Two-Unit (semi)	137	168	154	178	196	123	122
Three or 4 Unit	1	0	0	0	0	0	0
Bobtail Tractor	-	-	2	0	1	0	0
Unknown Trk Type	23	1	1	1	3	8	23
Total Trucks	320	383	433	467	475	419	373
Total Trucks %	21.9	24.4	27.0	28.2	28.0	28.7	25.4
Unknown Veh Type	100	160	41	67	21	19	2
Unkn Veh Type %	6.9	10.2	2.6	4.0	1.2	1.3	0.1
Total Vehicles	1458	1571	1604	1655	1697	1460	1466
<u>IOWA</u>							
Pickup	89	130	95	116	126	124	123
Van	20	16	16	25	22	12	18
Trk-based StaWag	0	2	0	0	3	2	0
One-Unit (10-19)	2	8	4	5	9	13	3
One-Unit (20-26)	2	3	7	14	7	5	7
One-Unit (>26)	1	12	8	9	11	7	8
One-Unit (Wt UK)	34	8	9	6	18	4	8
Two-Unit (semi)	58	77	57	76	68	67	81
Three or 4 Unit	0	2	0	0	0	0	1
Bobtail Tractor	-	-	2	3	2	3	2
Unknown Trk Type	4	0	0	1	0	2	0
Total Trucks	210	258	198	255	266	239	251
Total Trucks %	23.9	27.0	24.8	30.4	30.6	29.7	31.6
Unknown Veh Type	1	2	5	5	4	1	0
Unkn Veh Type %	0.1	0.2	0.6	0.6	0.5	0.1	0.0
Total Vehicles	880	956	797	840	869	804	795

Vehicle Type	1975	1976	1977	1978	1979	1980	1981
<u>KANSAS</u>							
Pickup	104	123	92	108	94	111	90
Van	19	12	15	17	22	15	12
Trk-based StaWag	1	1	3	3	1	4	1
One-Unit (10-19)	10	1	30	35	44	34	41
One-Unit (20-26)	4	2	8	9	14	15	6
One-Unit (>26)	1	1	8	11	9	5	4
One-Unit (Wt UK)	9	7	2	2	2	4	8
Two-Unit (semi)	37	39	55	68	51	58	47
Three or 4 Unit	3	2	4	1	3	4	2
Bobtail Tractor	-	-	1	0	0	1	0
Unknown Trk Type	2	0	0	0	0	0	0
Total Trucks	190	188	218	254	240	251	211
Total Trucks %	29.1	28.8	31.1	33.9	36.4	34.5	28.5
Unknown Veh Type	3	4	3	1	0	0	0
Unkn Veh Type %	0.5	0.6	0.4	0.1	0.0	0.0	0.0
Total Vehicles	654	653	700	749	659	727	740
<u>KENTUCKY</u>							
Pickup	115	149	144	149	185	181	160
Van	19	25	22	28	18	21	35
Trk-based StaWag	0	0	2	4	4	0	1
One-Unit (10-19)	2	3	11	7	9	10	7
One-Unit (20-26)	1	0	9	7	11	6	3
One-Unit (>26)	3	0	9	17	29	10	15
One-Unit (Wt UK)	4	25	0	11	13	9	13
Two-Unit (semi)	25	59	86	87	69	56	73
Three or 4 Unit	2	16	0	1	0	0	0
Bobtail Tractor	-	-	2	1	3	6	5
Unknown Trk Type	57	6	19	15	3	2	5
Total Trucks	228	283	304	327	344	301	317
Total Trucks %	21.0	26.7	26.3	28.7	30.0	29.2	30.7
Unknown Veh Type	6	15	13	1	0	1	1
Unkn Veh Type %	0.6	1.4	1.1	0.1	0.0	0.1	0.1
Total Vehicles	1084	1058	1155	1138	1148	1032	1032
<u>LOUISIANA</u>							
Pickup	162	210	208	227	326	321	321
Van	15	29	24	31	23	51	47
Trk-based StaWag	2	1	0	2	3	3	4
One-Unit (10-19)	7	3	0	15	15	12	13
One-Unit (20-26)	0	0	0	5	7	11	12
One-Unit (>26)	0	1	0	9	11	3	2
One-Unit (Wt UK)	24	15	3	8	6	17	11
Two-Unit (semi)	16	72	81	82	90	113	128
Three or 4 Unit	4	0	0	1	0	0	0
Bobtail Tractor	-	-	0	0	3	7	1
Unknown Trk Type	1	0	19	17	26	0	1
Total Trucks	231	331	335	397	510	538	540

Vehicle Type	1975	1976	1977	1978	1979	1980	1981
Total Trucks %	20.7	28.8	26.7	30.0	34.3	34.5	34.2
Unknown Veh Type	66	42	26	26	21	8	2
Unkn Veh Type %	5.9	3.7	2.1	2.0	1.4	0.5	0.1
Total Vehicles	1116	1149	1254	1322	1486	1559	1581
<u>MAINE</u>							
Pickup	25	24	31	26	39	39	15
Van	10	13	9	10	10	17	4
Trk-based StaWag	1	0	0	1	3	1	0
One-Unit (10-19)	0	0	1	1	2	3	1
One-Unit (20-26)	0	0	0	0	2	0	2
One-Unit (>26)	0	0	1	3	4	0	1
One-Unit (Wt UK)	5	7	2	3	0	0	0
Two-Unit (semi)	7	9	12	10	13	16	11
Three or 4 Unit	0	2	0	0	0	0	0
Bobtail Tractor	-	-	0	1	0	0	0
Unknown Trk Type	7	2	0	0	0	0	0
Total Trucks	55	57	56	55	73	76	34
Total Trucks %	21.6	21.2	22.0	20.5	27.0	24.8	13.4
Unknown Veh Type	57	33	7	14	1	4	40
Unkn Veh Type %	22.4	12.3	2.7	5.2	0.4	1.3	15.8
Total Vehicles	255	269	255	268	270	307	253
<u>MARYLAND</u>							
Pickup	72	30	63	66	83	93	91
Van	16	11	23	28	29	34	19
Trk-based StaWag	7	3	2	3	0	1	2
One-Unit (10-19)	14	0	1	0	1	0	0
One-Unit (20-26)	0	0	1	0	1	2	0
One-Unit (>26)	0	0	2	1	0	8	0
One-Unit (Wt UK)	1	4	28	38	16	23	16
Two-Unit (semi)	38	20	57	50	36	43	41
Three or 4 Unit	1	0	0	0	0	0	0
Bobtail Tractor	-	-	2	1	0	1	1
Unknown Trk Type	1	0	0	1	6	0	2
Total Trucks	150	68	179	188	172	205	172
Total Trucks %	17.5	8.7	22.2	21.5	20.4	22.5	18.2
Unknown Veh Type	39	178	22	28	41	3	1
Unkn Veh Type %	4.5	22.7	2.7	3.2	4.9	0.3	0.1
Total Vehicles	858	783	805	875	843	913	945
<u>MASSACHUSETTS</u>							
Pickup	44	24	49	50	75	58	66
Van	37	21	23	35	55	38	35
Trk-based StaWag	2	2	1	2	0	1	0
One-Unit (10-19)	4	1	6	5	7	4	3
One-Unit (20-26)	6	1	2	1	2	0	1
One-Unit (>26)	6	1	8	9	5	1	4
One-Unit (Wt UK)	8	7	2	4	2	0	1

Vehicle Type	1975	1976	1977	1978	1979	1980	1981
Two-Unit (semi)	12	40	27	28	36	29	14
Three or 4 Unit	1	0	0	0	0	0	0
Bobtail Tractor	-	-	1	2	0	0	0
Unknown Trk Type	1	2	1	1	0	1	5
Total Trucks	121	99	120	137	182	132	129
Total Trucks %	11.7	10.7	13.4	13.2	15.8	12.1	14.2
Unknown Veh Type	12	4	10	3	2	0	6
Unkn Veh Type %	1.2	0.4	1.1	0.3	0.2	0.0	0.7
Total Vehicles	1036	929	894	1041	1153	1088	911
<u>MICHIGAN</u>							
Pickup	214	271	260	327	320	255	250
Van	48	45	76	76	77	77	72
Trk-based StaWag	0	0	0	0	4	15	6
One-Unit (10-19)	3	1	3	3	3	2	3
One-Unit (20-26)	1	3	12	8	8	7	5
One-Unit (>26)	5	9	16	11	13	21	5
One-Unit (Wt UK)	1	3	11	12	15	8	3
Two-Unit (semi)	41	83	110	149	124	68	87
Three or 4 Unit	3	4	2	0	5	12	9
Bobtail Tractor	-	-	1	0	3	5	5
Unknown Trk Type	56	18	6	12	6	11	4
Total Trucks	372	437	497	598	578	481	449
Total Trucks %	16.4	17.1	19.0	22.0	23.6	21.1	21.2
Unknown Veh Type	30	6	10	0	0	1	4
Unkn Veh Type %	1.3	0.2	0.4	0.0	0.0	0.0	0.2
Total Vehicles	2275	2556	2620	2716	2447	2275	2117
<u>MINNESOTA</u>							
Pickup	110	126	127	171	165	149	127
Van	18	23	22	25	37	17	23
Trk-based StaWag	2	2	2	1	4	6	1
One-Unit (10-19)	14	0	18	16	34	24	11
One-Unit (20-26)	7	0	6	6	8	2	1
One-Unit (>26)	8	0	21	24	27	18	17
One-Unit (Wt UK)	1	32	1	0	0	1	0
Two-Unit (semi)	55	62	72	71	82	59	39
Three or 4 Unit	1	0	0	0	0	0	0
Bobtail Tractor	-	-	0	0	0	0	1
Unknown Trk Type	10	5	8	9	5	5	4
Total Trucks	226	250	277	323	362	281	224
Total Trucks %	23.2	25.2	26.5	25.9	31.2	26.2	23.4
Unknown Veh Type	7	4	4	1	5	0	1
Unkn Veh Type %	0.7	0.4	0.4	0.1	0.4	0.0	0.1
Total Vehicles	973	992	1045	1245	1161	1074	957
<u>MISSISSIPPI</u>							
Pickup	94	114	135	164	156	175	159
Van	7	6	10	9	25	24	23

Vehicle Type	1975	1976	1977	1978	1979	1980	1981
Trk-based StaWag	0	0	1	2	0	1	0
One-Unit (10-19)	0	0	1	0	3	1	0
One-Unit (20-26)	0	0	0	1	0	1	0
One-Unit (>26)	0	0	0	0	0	1	1
One-Unit (Wt UK)	0	5	7	4	17	23	14
Two-Unit (semi)	30	56	59	71	88	71	74
Three or 4 Unit	0	0	0	0	1	0	0
Bobtail Tractor	-	-	0	0	1	0	0
Unknown Trk Type	6	1	3	22	13	4	9
Total Trucks	137	182	216	273	304	301	280
Total Trucks %	20.3	26.0	25.4	27.3	34.0	34.4	31.1
Unknown Veh Type	91	35	36	1	37	67	4
Unkn Veh Type %	13.5	5.0	4.2	0.1	4.1	7.7	0.4
Total Vehicles	674	699	851	999	895	874	901
<u>MISSOURI</u>							
Pickup	174	225	129	182	265	237	218
Van	28	28	32	48	45	25	40
Trk-based StaWag	3	4	0	4	1	2	3
One-Unit (10-19)	17	20	78	79	9	9	0
One-Unit (20-26)	7	4	16	19	0	2	0
One-Unit (>26)	19	23	32	28	2	15	21
One-Unit (Wt UK)	17	23	17	10	38	42	4
Two-Unit (semi)	62	88	94	112	110	89	90
Three or 4 Unit	2	3	5	5	2	4	2
Bobtail Tractor	-	-	1	0	1	1	0
Unknown Trk Type	1	0	0	0	0	0	0
Total Trucks	330	418	404	487	473	426	378
Total Trucks %	24.9	28.7	27.0	31.9	32.6	29.9	28.6
Unknown Veh Type	6	4	2	1	0	0	0
Unkn Veh Type %	0.5	0.3	0.1	0.1	0.0	0.0	0.0
Total Vehicles	1326	1458	1498	1526	1453	1427	1323
<u>MONTANA</u>							
Pickup	66	71	66	76	105	107	101
Van	13	7	6	5	5	8	13
Trk-based StaWag	0	0	0	2	2	4	3
One-Unit (10-19)	2	0	0	0	1	2	0
One-Unit (20-26)	0	0	0	0	0	0	0
One-Unit (>26)	0	0	2	0	0	0	0
One-Unit (Wt UK)	8	12	7	2	1	1	2
Two-Unit (semi)	29	32	34	29	35	35	33
Three or 4 Unit	0	0	0	4	1	2	5
Bobtail Tractor	-	-	0	1	1	0	2
Unknown Trk Type	2	0	3	11	0	0	0
Total Trucks	120	122	118	130	151	159	159
Total Trucks %	36.9	37.5	34.5	41.3	40.4	43.9	43.0
Unknown Veh Type	0	5	3	2	4	13	0
Unkn Veh Type %	0.0	1.5	0.9	0.6	1.1	3.6	0.0

Vehicle Type	1975	1976	1977	1978	1979	1980	1981
Total Vehicles	325	325	342	315	374	362	370
NEBRASKA							
Pickup	67	83	84	61	86	88	81
Van	9	4	10	15	6	12	12
Trk-based StaWag	1	3	3	3	4	0	3
One-Unit (10-19)	3	15	0	0	2	0	2
One-Unit (20-26)	8	0	4	2	5	0	3
One-Unit (>26)	3	0	1	0	0	0	0
One-Unit (Wt UK)	5	5	5	2	2	1	2
Two-Unit (semi)	37	40	30	49	48	58	51
Three or 4 Unit	3	2	1	1	3	6	0
Bobtail Tractor	-	-	0	1	0	4	3
Unknown Trk Type	1	0	1	3	0	0	0
Total Trucks	137	152	139	137	156	169	157
Total Trucks %	29.0	31.3	31.5	31.7	36.2	33.9	33.1
Unknown Veh Type	8	2	11	0	0	0	1
Unkn Veh Type %	1.7	0.4	2.5	0.0	0.0	0.0	0.2
Total Vehicles	472	485	441	432	431	498	475
NEVADA							
Pickup	43	44	41	60	88	85	74
Van	12	11	6	13	14	5	17
Trk-based StaWag	0	0	0	0	1	0	1
One-Unit (10-19)	0	2	0	1	2	0	0
One-Unit (20-26)	0	0	0	0	0	0	0
One-Unit (>26)	0	0	0	0	0	0	0
One-Unit (Wt UK)	2	3	1	2	4	7	3
Two-Unit (semi)	10	11	11	13	17	22	13
Three or 4 Unit	0	4	6	9	4	3	3
Bobtail Tractor	-	-	0	0	0	2	0
Unknown Trk Type	0	1	0	0	0	0	1
Total Trucks	67	76	65	98	130	124	112
Total Trucks %	27.5	30.6	22.8	25.9	31.1	29.8	31.9
Unknown Veh Type	3	3	16	4	4	5	0
Unkn Veh Type %	1.2	1.2	5.6	1.1	1.0	1.2	0.0
Total Vehicles	244	248	285	379	418	416	351
NEW HAMPSHIRE							
Pickup	20	12	18	21	22	22	14
Van	2	2	5	4	7	8	3
Trk-based StaWag	0	3	0	1	2	4	1
One-Unit (10-19)	0	1	2	3	1	2	1
One-Unit (20-26)	0	0	1	0	1	2	0
One-Unit (>26)	5	1	2	1	0	5	3
One-Unit (Wt UK)	1	0	4	2	0	0	0
Two-Unit (semi)	7	8	5	5	5	6	9
Three or 4 Unit	0	0	0	0	0	0	0
Bobtail Tractor	-	-	0	1	0	0	0

Vehicle Type	1975	1976	1977	1978	1979	1980	1981
Unknown Trk Type	0	0	0	0	0	0	1
Total Trucks	35	27	37	38	38	49	32
Total Trucks %	19.4	14.4	19.3	17.0	17.5	21.3	17.7
Unknown Veh Type	0	1	1	0	0	0	0
Unkn Veh Type %	0.0	0.5	0.5	0.0	0.0	0.0	0.0
Total Vehicles	180	188	192	224	217	230	181
<u>NEW JERSEY</u>							
Pickup	37	44	49	73	86	90	101
Van	34	31	55	61	65	62	72
Trk-based StaWag	6	3	8	8	7	4	2
One-Unit (10-19)	11	17	10	10	10	5	19
One-Unit (20-26)	4	2	5	5	6	2	2
One-Unit (>26)	1	9	14	10	7	8	3
One-Unit (Wt UK)	15	4	6	6	5	3	8
Two-Unit (semi)	59	64	95	90	94	83	80
Three or 4 Unit	1	1	0	0	0	0	1
Bobtail Tractor	-	-	1	2	2	2	0
Unknown Trk Type	15	23	2	4	2	4	1
Total Trucks	183	198	245	269	284	263	289
Total Trucks %	13.9	15.3	17.4	17.9	19.3	18.5	19.3
Unknown Veh Type	15	13	5	0	1	12	0
Unkn Veh Type %	1.1	1.0	0.4	0.0	0.1	0.8	0.0
Total Vehicles	1321	1296	1406	1499	1472	1423	1495
<u>NEW MEXICO</u>							
Pickup	161	158	191	237	237	206	151
Van	13	22	24	24	14	15	17
Trk-based StaWag	1	2	3	0	2	1	3
One-Unit (10-19)	3	10	3	4	4	3	1
One-Unit (20-26)	1	0	4	0	2	2	0
One-Unit (>26)	0	0	2	0	0	1	0
One-Unit (Wt UK)	2	3	1	2	0	1	5
Two-Unit (semi)	37	46	66	65	45	58	58
Three or 4 Unit	3	3	9	1	1	5	3
Bobtail Tractor	-	-	0	0	1	2	1
Unknown Trk Type	4	0	0	0	0	3	2
Total Trucks	225	244	303	333	306	297	241
Total Trucks %	37.2	40.0	39.6	42.0	42.2	42.5	40.1
Unknown Veh Type	2	3	8	4	5	7	7
Unkn Veh Type %	0.3	0.5	1.0	0.5	0.7	1.0	1.2
Total Vehicles	605	610	765	792	725	699	601
<u>NEW YORK</u>							
Pickup	126	124	169	169	231	207	189
Van	107	80	90	139	143	158	152
Trk-based StaWag	4	2	1	4	19	7	13
One-Unit (10-19)	29	59	41	47	52	36	38
One-Unit (20-26)	8	6	7	14	12	5	9

Vehicle Type	1975	1976	1977	1978	1979	1980	1981
One-Unit (>26)	23	40	41	41	34	49	58
One-Unit (Wt UK)	4	3	8	4	9	4	7
Two-Unit (semi)	87	91	104	121	121	95	105
Three or 4 Unit	1	4	2	1	0	0	0
Bobtail Tractor	-	-	2	1	3	0	1
Unknown Trk Type	14	7	4	6	1	5	2
Total Trucks	403	416	469	547	625	566	574
Total Trucks %	14.1	14.9	16.0	17.9	20.4	17.9	18.7
Unknown Veh Type	8	9	19	2	3	1	0
Unkn Veh Type %	0.3	0.3	0.6	0.1	0.1	0.0	0.0
Total Vehicles	2854	2788	2935	3058	3062	3170	3076
<u>NORTH CAROLINA</u>							
Pickup	173	223	228	276	278	272	262
Van	29	8	2	10	15	10	7
Trk-based StaWag	1	0	0	0	0	0	0
One-Unit (10-19)	4	1	10	6	6	8	6
One-Unit (20-26)	7	2	5	7	9	7	4
One-Unit (>26)	11	0	17	20	11	10	5
One-Unit (Wt UK)	4	2	1	1	1	1	14
Two-Unit (semi)	117	150	126	160	134	127	125
Three or 4 Unit	0	0	0	0	0	0	0
Bobtail Tractor	-	-	1	0	0	2	1
Unknown Trk Type	16	0	4	3	2	0	2
Total Trucks	362	386	394	483	456	437	426
Total Trucks %	19.1	21.3	22.5	25.6	23.7	23.9	23.4
Unknown Veh Type	25	127	79	5	0	4	2
Unkn Veh Type %	1.3	7.0	4.5	0.3	0.0	0.2	0.1
Total Vehicles	1894	1810	1749	1885	1923	1828	1821
<u>NORTH DAKOTA</u>							
Pickup	34	46	52	52	28	40	40
Van	1	2	4	7	3	3	3
Trk-based StaWag	1	1	1	0	0	1	5
One-Unit (10-19)	4	3	1	0	3	2	0
One-Unit (20-26)	3	2	3	0	0	3	5
One-Unit (>26)	1	4	3	1	1	3	4
One-Unit (Wt UK)	0	2	0	8	2	1	4
Two-Unit (semi)	14	8	9	13	13	12	17
Three or 4 Unit	0	0	1	1	0	0	0
Bobtail Tractor	-	-	1	0	2	0	0
Unknown Trk Type	0	0	1	0	0	2	0
Total Trucks	58	68	76	82	52	67	78
Total Trucks %	28.6	31.6	34.7	39.2	31.3	37.2	36.8
Unknown Veh Type	7	1	3	0	22	3	7
Unkn Veh Type %	3.4	0.5	1.4	0.0	13.3	1.7	3.3
Total Vehicles	203	215	219	209	166	180	212
<u>OHIO</u>							

Vehicle Type	1975	1976	1977	1978	1979	1980	1981
Pickup	136	215	185	221	285	220	191
Van	67	63	47	67	98	81	75
Trk-based StaWag	4	0	1	0	0	1	0
One-Unit (10-19)	4	5	67	71	89	58	45
One-Unit (20-26)	0	2	3	0	1	1	0
One-Unit (>26)	0	0	1	16	0	4	1
One-Unit (Wt UK)	1	6	2	1	0	2	0
Two-Unit (semi)	126	148	145	195	217	139	162
Three or 4 Unit	0	0	1	0	0	0	1
Bobtail Tractor	-	-	18	4	9	7	3
Unknown Trk Type	46	5	18	0	0	0	1
Total Trucks	384	444	488	575	699	513	479
Total Trucks %	16.6	18.4	20.4	21.8	24.5	20.2	20.7
Unknown Veh Type	4	5	22	5	2	4	6
Unkn Veh Type %	0.2	0.2	0.9	0.2	0.1	0.2	0.3
Total Vehicles	2317	2408	2392	2640	2850	2542	2318
<u>OKLAHOMA</u>							
Pickup	221	194	228	269	241	302	301
Van	6	30	22	23	20	34	34
Trk-based StaWag	2	2	2	1	3	3	0
One-Unit (10-19)	17	0	8	5	18	6	13
One-Unit (20-26)	16	0	14	7	5	3	9
One-Unit (>26)	11	0	4	9	2	2	1
One-Unit (Wt UK)	4	36	7	3	3	0	7
Two-Unit (semi)	65	85	101	104	103	99	106
Three or 4 Unit	2	1	1	1	1	2	0
Bobtail Tractor	-	-	1	2	0	1	1
Unknown Trk Type	0	0	0	0	0	2	2
Total Trucks	344	348	388	424	396	454	474
Total Trucks %	34.4	34.3	35.0	38.3	36.2	38.6	37.1
Unknown Veh Type	4	4	6	0	0	10	1
Unkn Veh Type %	0.4	0.4	0.5	0.0	0.0	0.8	0.1
Total Vehicles	999	1015	1110	1108	1094	1177	1278
<u>OREGON</u>							
Pickup	129	177	160	195	181	175	129
Van	20	27	27	40	29	42	30
Trk-based StaWag	5	0	2	4	2	5	6
One-Unit (10-19)	2	2	4	1	7	3	4
One-Unit (20-26)	2	0	4	0	1	2	1
One-Unit (>26)	4	3	7	18	19	8	8
One-Unit (Wt UK)	1	3	1	9	0	0	2
Two-Unit (semi)	38	26	47	36	52	55	55
Three or 4 Unit	2	15	0	2	3	1	5
Bobtail Tractor	-	-	0	2	0	0	0
Unknown Trk Type	2	0	7	1	1	0	4
Total Trucks	205	253	259	308	295	291	244
Total Trucks %	29.3	32.5	31.6	34.3	35.4	35.5	30.0

Vehicle Type	1975	1976	1977	1978	1979	1980	1981
Unknown Veh Type	11	7	2	8	1	1	0
Unkn Veh Type %	1.6	0.9	0.2	0.9	0.1	0.1	0.0
Total Vehicles	699	778	819	898	833	819	814
PENNSYLVANIA							
Pickup	215	218	207	231	252	233	275
Van	27	25	42	79	94	82	74
Trk-based StaWag	0	1	1	0	0	0	0
One-Unit (10-19)	19	9	9	41	57	28	55
One-Unit (20-26)	8	5	18	0	0	0	0
One-Unit (>26)	10	10	22	0	0	0	0
One-Unit (Wt UK)	6	6	16	1	0	0	1
Two-Unit (semi)	179	182	188	199	212	172	181
Three or 4 Unit	0	0	0	1	0	0	0
Bobtail Tractor	-	-	0	66	68	64	27
Unknown Trk Type	2	4	19	0	0	0	0
Total Trucks	466	460	522	618	683	579	613
Total Trucks %	17.5	18.4	19.4	22.5	24.9	22.1	23.6
Unknown Veh Type	13	19	22	83	75	201	42
Unkn Veh Type %	0.5	0.8	0.8	3.0	2.7	7.7	1.6
Total Vehicles	2662	2505	2690	2741	2747	2622	2594
RHODE ISLAND							
Pickup	4	6	6	6	9	14	8
Van	5	7	4	4	1	10	2
Trk-based StaWag	1	1	0	0	0	1	0
One-Unit (10-19)	1	2	1	0	1	2	0
One-Unit (20-26)	1	0	0	1	0	0	0
One-Unit (>26)	0	1	2	0	1	0	0
One-Unit (Wt UK)	0	0	0	0	0	1	0
Two-Unit (semi)	2	7	0	1	0	1	6
Three or 4 Unit	0	0	0	0	0	0	0
Bobtail Tractor	-	-	0	0	0	0	0
Unknown Trk Type	0	0	1	0	1	0	2
Total Trucks	14	24	14	12	13	29	18
Total Trucks %	10.5	15.2	9.0	9.4	8.8	18.0	11.8
Unknown Veh Type	6	1	19	25	14	4	24
Unkn Veh Type %	4.5	0.6	12.3	19.7	9.5	2.5	15.8
Total Vehicles	133	158	155	127	148	161	152
SOUTH CAROLINA							
Pickup	92	92	125	124	134	125	125
Van	10	21	19	19	22	21	19
Trk-based StaWag	0	0	0	0	0	0	0
One-Unit (10-19)	0	13	1	0	0	0	0
One-Unit (20-26)	0	3	0	0	0	0	0
One-Unit (>26)	0	2	0	0	0	0	0
One-Unit (Wt UK)	1	8	2	13	32	29	39
Two-Unit (semi)	3	37	65	66	87	67	58

Vehicle Type	1975	1976	1977	1978	1979	1980	1981
Three or 4 Unit	0	3	1	1	0	0	0
Bobtail Tractor	-	-	1	0	2	1	0
Unknown Trk Type	83	28	29	18	7	0	0
Total Trucks	189	207	243	241	284	243	241
Total Trucks %	19.0	21.7	22.1	22.3	25.5	23.8	22.7
Unknown Veh Type	2	2	15	0	0	0	0
Unkn Veh Type %	0.2	0.2	1.4	0.0	0.0	0.0	0.0
Total Vehicles	997	956	1102	1082	1113	1023	1060
<u>SOUTH DAKOTA</u>							
Pickup	46	55	53	50	54	62	41
Van	4	4	7	4	1	4	3
Trk-based StaWag	1	1	0	3	0	1	1
One-Unit (10-19)	3	6	1	1	4	0	1
One-Unit (20-26)	2	0	0	0	0	0	0
One-Unit (>26)	0	0	3	1	1	1	0
One-Unit (Wt UK)	0	0	1	3	11	4	5
Two-Unit (semi)	10	17	16	13	18	28	15
Three or 4 Unit	0	1	0	0	2	0	0
Bobtail Tractor	-	-	0	0	2	0	0
Unknown Trk Type	0	1	0	1	3	7	0
Total Trucks	66	85	81	76	96	107	66
Total Trucks %	28.9	32.1	32.1	31.4	37.6	39.9	31.4
Unknown Veh Type	3	4	13	2	0	7	0
Unkn Veh Type %	1.3	1.5	5.2	0.8	0.0	2.6	0.0
Total Vehicles	228	265	252	242	255	268	210
<u>TENNESSEE</u>							
Pickup	138	205	206	243	208	188	217
Van	28	33	31	29	39	43	26
Trk-based StaWag	0	1	0	0	1	3	0
One-Unit (10-19)	5	1	7	3	4	15	7
One-Unit (20-26)	4	0	2	2	9	5	5
One-Unit (>26)	0	0	3	19	8	19	12
One-Unit (Wt UK)	3	8	13	6	11	5	10
Two-Unit (semi)	87	74	111	112	76	78	76
Three or 4 Unit	0	3	0	0	0	0	0
Bobtail Tractor	-	-	7	0	3	3	5
Unknown Trk Type	25	8	5	11	1	0	1
Total Trucks	290	333	385	425	360	359	359
Total Trucks %	20.6	22.5	24.2	26.4	23.0	24.8	25.6
Unknown Veh Type	110	9	37	4	6	3	0
Unkn Veh Type %	7.8	0.6	2.3	0.2	0.4	0.2	0.0
Total Vehicles	1411	1483	1594	1610	1564	1450	1400
<u>TEXAS</u>							
Pickup	789	741	872	975	1017	1093	1208
Van	71	75	101	115	127	151	159
Trk-based StaWag	5	10	8	16	35	34	21

Vehicle Type	1975	1976	1977	1978	1979	1980	1981
One-Unit (10-19)	22	37	28	29	49	35	33
One-Unit (20-26)	9	17	31	32	23	22	32
One-Unit (>26)	3	23	35	43	40	58	54
One-Unit (Wt UK)	35	7	14	5	7	7	7
Two-Unit (semi)	303	300	312	384	453	428	492
Three or 4 Unit	2	4	1	4	2	2	4
Bobtail Tractor	-	-	0	1	0	1	4
Unknown Trk Type	13	4	2	0	2	0	0
Total Trucks	1252	1218	1404	1604	1755	1831	2014
Total Trucks %	30.9	31.7	31.3	33.3	34.4	34.7	34.6
Unknown Veh Type	6	4	12	1	0	1	2
Unkn Veh Type %	0.1	0.1	0.3	0.0	0.0	0.0	0.0
Total Vehicles	4054	3845	4486	4812	5100	5280	5826
<u>UTAH</u>							
Pickup	62	54	78	110	86	80	87
Van	12	7	15	15	10	10	17
Trk-based StaWag	1	1	2	0	1	1	3
One-Unit (10-19)	1	0	1	0	0	2	1
One-Unit (20-26)	0	0	2	2	0	1	0
One-Unit (>26)	0	0	0	0	1	3	3
One-Unit (Wt UK)	0	4	0	5	7	1	4
Two-Unit (semi)	30	26	34	39	46	29	28
Three or 4 Unit	0	0	0	0	0	5	3
Bobtail Tractor	-	-	1	0	0	0	0
Unknown Trk Type	2	4	6	8	3	0	4
Total Trucks	108	96	139	179	154	132	150
Total Trucks %	32.4	30.9	33.7	37.5	39.3	32.6	34.0
Unknown Veh Type	4	5	7	1	2	0	0
Unkn Veh Type %	1.2	1.6	1.7	0.2	0.5	0.0	0.0
Total Vehicles	333	311	413	477	392	405	441
<u>VERMONT</u>							
Pickup	12	8	15	17	20	20	18
Van	2	3	1	4	12	5	4
Trk-based StaWag	2	1	1	1	1	2	0
One-Unit (10-19)	0	0	1	3	0	3	1
One-Unit (20-26)	0	0	0	0	0	0	0
One-Unit (>26)	1	0	0	0	0	0	1
One-Unit (Wt UK)	3	0	0	0	0	0	0
Two-Unit (semi)	0	5	2	7	9	3	4
Three or 4 Unit	2	0	0	0	0	0	0
Bobtail Tractor	-	-	0	0	0	0	0
Unknown Trk Type	0	0	2	0	0	0	0
Total Trucks	22	17	22	32	42	33	28
Total Trucks %	14.6	12.6	15.6	22.9	23.6	20.4	22.2
Unknown Veh Type	9	6	5	0	4	3	16
Unkn Veh Type %	6.0	4.4	3.5	0.0	2.2	1.9	12.7
Total Vehicles	151	135	141	140	178	162	126

Vehicle Type	1975	1976	1977	1978	1979	1980	1981
<u>VIRGINIA</u>							
Pickup	98	111	140	140	148	192	154
Van	15	26	41	28	41	50	37
Trk-based StaWag	1	0	1	0	2	2	2
One-Unit (10-19)	15	3	1	4	4	15	8
One-Unit (20-26)	2	0	0	1	4	3	3
One-Unit (>26)	18	0	2	1	11	2	17
One-Unit (Wt UK)	10	0	2	1	0	2	3
Two-Unit (semi)	68	79	70	76	84	66	56
Three or 4 Unit	0	1	0	0	0	0	0
Bobtail Tractor	-	-	1	0	4	8	13
Unknown Trk Type	6	25	59	68	32	2	1
Total Trucks	233	245	317	319	330	342	294
Total Trucks %	19.4	20.4	22.9	23.2	25.8	26.8	23.2
Unknown Veh Type	33	9	4	4	5	2	0
Unkn Veh Type %	2.8	0.7	0.3	0.3	0.4	0.2	0.0
Total Vehicles	1199	1201	1385	1376	1280	1274	1266
<u>WASHINGTON</u>							
Pickup	145	164	200	203	196	227	158
Van	35	23	23	41	44	45	47
Trk-based StaWag	3	8	4	14	11	13	5
One-Unit (10-19)	4	8	14	7	4	6	6
One-Unit (20-26)	1	2	0	3	2	0	2
One-Unit (>26)	0	0	1	2	2	2	3
One-Unit (Wt UK)	0	1	0	0	0	5	3
Two-Unit (semi)	41	44	36	53	70	46	42
Three or 4 Unit	0	7	16	1	0	0	5
Bobtail Tractor	-	-	0	0	0	0	0
Unknown Trk Type	3	1	8	2	0	0	0
Total Trucks	232	258	302	326	329	344	271
Total Trucks %	24.8	26.3	26.4	25.8	25.6	28.5	24.2
Unknown Veh Type	2	8	10	2	0	0	2
Unkn Veh Type %	0.2	0.8	0.9	0.2	0.0	0.0	0.2
Total Vehicles	934	981	1145	1262	1284	1208	1118
<u>WEST VIRGINIA</u>							
Pickup	70	74	101	102	125	121	96
Van	4	7	5	1	0	5	4
Trk-based StaWag	0	1	0	0	0	0	0
One-Unit (10-19)	1	1	3	3	1	6	0
One-Unit (20-26)	0	2	1	0	1	0	0
One-Unit (>26)	1	1	5	22	44	53	33
One-Unit (Wt UK)	6	11	35	39	14	1	1
Two-Unit (semi)	30	40	11	10	10	0	0
Three or 4 Unit	0	1	0	0	0	0	0
Bobtail Tractor	-	-	0	0	0	0	0
Unknown Trk Type	23	12	7	2	2	0	0
Total Trucks	135	150	168	179	197	186	134

Vehicle Type	1975	1976	1977	1978	1979	1980	1981
Total Trucks %	24.2	24.8	25.8	31.0	31.9	29.1	27.0
Unknown Veh Type	1	10	6	0	0	2	0
Unkn Veh Type %	0.2	1.7	0.9	0.0	0.0	0.3	0.0
Total Vehicles	559	604	651	578	617	640	497
<u>WISCONSIN</u>							
Pickup	88	86	96	91	120	122	111
Van	18	34	19	36	35	39	40
Trk-based StaWag	2	3	3	2	13	6	1
One-Unit (10-19)	5	33	50	25	21	25	16
One-Unit (20-26)	6	7	7	3	7	5	6
One-Unit (>26)	2	10	15	7	13	18	8
One-Unit (Wt UK)	14	6	3	7	10	3	7
Two-Unit (semi)	57	72	70	52	86	70	71
Three or 4 Unit	0	0	0	0	1	0	1
Bobtail Tractor	-	-	0	0	0	0	1
Unknown Trk Type	2	1	2	0	0	1	2
Total Trucks	194	252	265	223	306	289	264
Total Trucks %	16.6	21.3	23.1	18.1	23.6	23.8	23.0
Unknown Veh Type	67	51	3	1	1	1	0
Unkn Veh Type %	5.7	4.3	0.3	0.1	0.1	0.1	0.0
Total Vehicles	1166	1183	1145	1233	1297	1212	1148
<u>WYOMING</u>							
Pickup	54	62	81	70	60	80	75
Van	4	4	6	9	7	3	10
Trk-based StaWag	1	1	1	0	0	2	2
One-Unit (10-19)	1	4	1	4	2	3	2
One-Unit (20-26)	0	2	0	3	2	0	1
One-Unit (>26)	1	1	1	0	1	2	3
One-Unit (Wt UK)	2	9	8	7	9	6	6
Two-Unit (semi)	20	30	32	50	44	27	36
Three or 4 Unit	1	0	1	3	3	2	1
Bobtail Tractor	-	-	1	2	2	0	0
Unknown Trk Type	0	0	0	0	0	0	2
Total Trucks	84	113	132	148	130	125	138
Total Trucks %	38.2	40.9	44.7	52.1	48.3	44.8	45.8
Unknown Veh Type	2	1	1	0	0	0	0
Unkn Veh Type %	0.9	0.4	0.3	0.0	0.0	0.0	0.0
Total Vehicles	220	276	295	284	269	279	301
<u>TOTAL U.S.</u>							
Pickup	6401	7109	7714	8750	9289	9249	8765
Van	1208	1186	1446	1831	2037	2041	1983
Trk-based StaWag	83	74	74	126	164	187	136
One-Unit (10-19)	334	346	507	581	662	607	425
One-Unit (20-26)	141	78	205	202	188	151	148
One-Unit (>26)	164	168	319	371	360	384	338
One-Unit (Wt UK)	363	435	343	359	353	334	315

Vehicle Type	1975	1976	1977	1978	1979	1980	1981
Two-Unit (semi)	2751	3205	3573	3970	4192	3594	3721
Three or 4 Unit	127	197	149	152	186	154	154
Bobtail Tractor	-	-	63	117	139	152	104
Unknown Trk Type	609	416	411	406	180	76	231
Total Trucks	12181	13214	14804	16865	17750	16929	16320
Total Trucks %	21.9	23.6	24.5	26.3	27.4	26.7	26.0
Unknown Veh Type	935	1001	925	364	331	418	724
Unkn Veh Type %	1.7	1.8	1.5	0.6	0.5	0.7	1.2
Total Vehicles	55531	56084	60515	64144	64762	63485	62666

APPENDIX B

Some Data on the Accuracy of
FARS Truck Classifications in 1980

As part of an MVMA-sponsored medium and heavy truck accident causation study at UMTRI, some data have been collected that can be used to check the accuracy of FARS medium and large truck classifications in 1980. The data base used in this study contained the 5,355 vehicles in the seven medium and large truck categories of the 1980 FARS Version of July 29, 1981, plus the 76 vehicles classified as unknown type trucks (total = 5,431).

Three sources of information were used to check the FARS vehicle classification. These were: (1) copies of the police accident report which were obtained for almost every FARS accident involving one of these trucks; (2) the computerized file of 1980 accidents reported to the Bureau of Motor Carrier Safety (BMCS); and (3) a telephone/mail survey of owners or drivers of the case vehicles.

The first step in the checking process was an attempt to match vehicles involved in fatal accidents in the BMCS file with the corresponding vehicles in the FARS file. Overall, 31 percent of the medium and large trucks in FARS were matched with a corresponding BMCS vehicle. When the body type was in agreement, further checking was carried out only for BMCS-reported double- or triple-trailer combinations. Further checking was also carried out if BMCS reported fewer trailers than FARS, but most other differences were resolved in favor of the BMCS report. If there was a discrepancy which could not be resolved by examination of the available information (including the police accident report), an attempt was made to contact the owner or driver.

For another 6.7 percent of the vehicles the police accident report (occasionally supplemented by owner or driver or FARS state analyst contact) showed that the case vehicle was a truck with less than a 10,000 pound GVW rating, or was not a truck, or was parked off the roadway at the time of the accident. These 364 vehicles were mostly misclassified pickups or other small trucks (e.g., tow trucks), but there were also such vehicles as a farm tractor, Chevrolet Blazer, Chevrolet El Camino, Chevrolet Impala, a van-based ambulance, a motor home, etc. The few parked vehicles should not have been included in the FARS data set in the first place because FARS treats vehicles parked off the roadway as a type of fixed object rather than as a traffic unit. It should be noted that FARS directions are somewhat vague about how to classify small trucks under 10,000 GVW which are not pickups, although the definition of the pickup category does include "those with stake or small dump bodies and campers."

For the remaining 62 percent of the vehicles, an attempt was made to survey the owner or driver by telephone or mail. At this writing this process is not quite completed, so the results reported here are

TABLE B.1
Comparison of the 1980 FARS Medium and Large Truck Body Type Classifications
with the UMTRI Classifications of the Same Vehicles

FARS Body Type Classification	UMTRI Body Type Classification										TOTAL
	Straight Truck Alone	Straight Truck Plus One Trailer*	Tractor Plus One Trailer>	Tractor Plus 2-3 Trailers+	Tractor Alone (Bobtail)	Other Truck Configuration#	Not a Medium or Large Truck<	Truck Type Undetermined			
Single-Unit (10-19 GVW#)	N 291 Row% 48.5	10 1.7	14 2.3	1 0.2	7 1.2	6 1.0	225 37.5	46 7.7		600	
Single-Unit (20-26 GVW#)	N 126 Row% 84.6	3 2.0	5 3.4	0 -	2 1.3	0 -	7 4.7	6 4.0		149	
Single-Unit (>26 GVW#)	N 291 Row% 76.2	12 3.1	46 12.0	0 -	2 0.5	1 0.3	4 1.0	26 6.8		382	
Single-Unit (GVW Unknown)	N 228 Row% 68.5	10 3.0	15 4.5	0 -	2 0.6	4 1.2	53 15.9	21 6.3		333	
Single-Unit Subtotal	N 936 Row% 63.9	35 2.4	80 5.5	1 0.1	13 0.9	11 0.8	289 19.7	99 6.8		1464	
Two-Unit Combination Three or 4 Unit	N 123 Row% 3.4	58 1.6	3178 88.6	34 0.9	51 1.4	16 0.4	33 0.9	93 2.6		3586	
Tractor Alone (Bobtail)	N 63 Row% 0.6	3 5.8	26 7.8	0 84.4	35 -	2 0.6	18 -	4 0.6		151	
Comb. Vehicle Subtotal	N 187 Row% 4.8	70 1.8	3216 82.7	164 4.2	86 2.2	19 0.5	51 1.3	98 2.5		3891	
Unknown Truck Type	N 40 Row% 52.6	0 -	5 6.6	0 -	2 2.6	0 -	24 31.6	5 6.6		76	
GRAND TOTAL	N 1163 Row% 21.4	105 1.9	3301 60.8	165 3.0	101 1.9	30 0.6	364 6.7	202 3.7		5431	

*These 105 cases include 74 full trailers and 31 other types of trailers (utility, etc.).
 >These 3301 cases include 3294 full trailers and 7 other types of trailers.
 †These 165 cases include 163 tractors with two trailers and two tractors with three trailers.
 ‡These 30 cases are mostly two or three road tractors in "piggyback" or "saddle-mount" configuration. These are mostly pickups and small trucks under 10,000 pounds GVW. There are also a number of non-trucks plus a few vehicles not "in transport" (i.e., parked off the roadway) which should not have been included as traffic units in FARS.
 #These are the Gross Vehicle Weight in thousands of pounds.

still preliminary. They are based on telephone or mail survey responses in 44 percent of the cases, while in 14 percent of the cases the police report alone was used to corroborate or change the FARS vehicle classification. In 39 cases (0.7 percent) no police report was available, and in another 163 cases (3.0 percent) insufficient information was available at this time to make a determination of the correct vehicle classification. Obviously the UMTRI procedures are not sufficient to guarantee accurate classification of every case vehicle, but they do provide a useful independent check of the vehicle classifications reported in the FARS data.

Table B.1 shows the two-way distribution of the FARS and UMTRI vehicle classifications for these 5,431 vehicles. UMTRI did not attempt to break single-unit trucks into the four weight categories used by FARS. If one looks at the single-unit subtotal row, one finds that 936 of these 1,464 vehicles, or 63.9 percent, were correctly classified as single-unit trucks over 10,000 pounds GVW. No determination was made on 99 of these vehicles, so another 6.8 percent could be correct. Almost 20 percent were found to be trucks under 10,000 pounds GVW, other types of smaller vehicles, or parked vehicles. Almost all of these errors were in the "10-19 GVW" or "GVW unknown" categories. The remaining 9.7 percent were misclassified single-unit trucks with one trailer (35), tractors with one or more trailers (81), tractors pulling no trailer (bobtails) (13), or some other type of truck configuration (11) (mostly two or three road tractors in "piggyback" or "saddlemount" configuration). There were also 187 vehicles found to be single-unit trucks which were classified by FARS as some type of combination vehicle and 40 unknown type trucks in FARS which were found to be single-unit trucks in the UMTRI survey.

The two-unit classification data were considerably more accurate than the single-unit data. Over 90 percent of the two-unit trucks were found to be tractor and semi-trailer combinations, while another 1.6 percent were single-unit trucks pulling a trailer. The correct classification for another 1.7 percent of these trucks was not determined, so the accuracy of the FARS classification could be as high as 92.8 percent. Only 0.9 percent (33) were found to be trucks under 10,000 pounds GVW, or some other type of vehicle, or a parked vehicle. UMTRI data show that 3.4 percent (123) were really single-unit trucks without a trailer, 0.9 percent (34) were pulling more than one trailer, 1.4 percent (51) were tractors pulling no trailer, and 0.4 percent (16) were some other truck configuration. There were 115 vehicles classified in FARS as straight trucks, 21 vehicles classified as three- or four-unit combinations, 29 vehicles classified as bobtails, and 6 vehicles of unknown truck type which were found to be two-unit combination vehicles in the UMTRI survey.

The FARS classification data for three- and four-unit trucks were also fairly accurate. One hundred and thirty (84.4 percent) of the 154 vehicles in this category were found to be correctly classified. With type undetermined for one vehicle the potential accuracy is 85 percent. One of these vehicles (0.6 percent) was found to be a single-unit truck alone, nine (5.8 percent) were single-unit trucks pulling only one trailer, 12 (7.8 percent) were tractors pulling one trailer, and one

(0.6 percent) was another vehicle configuration. There was one vehicle classified in FARS as a single-unit truck, 34 vehicles classified as a two-unit truck, and one vehicle classified as a bobtail which were found to be three- or four-unit trucks in the UMTRI survey.

As would be expected from the data in Appendix A, the FARS data are least accurate in their classification of bobtail trucks (tractors pulling no trailers). Only 35 of the 151 bobtails (23.2 percent) were found really to be road tractors pulling no trailer, while 4 more (2.6 percent) were undetermined and thus are potentially correct. Eighteen (11.9 percent) were small or parked vehicles, 63 (41.7 percent) were single-unit trucks alone, 29 (19.2 percent) were tractors or trucks pulling one trailer, and 2 (1.3 percent) were some other vehicle configuration. There were also 13 vehicles classified in FARS as single-unit trucks, 51 vehicles classified as two-unit trucks, and two unknown type trucks which were found really to be bobtails in the UMTRI survey.

For the 76 trucks of unknown type in FARS more than half (40) were found to be single-unit trucks alone, while almost one-third (24) were small or parked vehicles. Only five (6.6 percent) were two-unit combinations while two (2.6 percent) were bobtail tractors.

Looking at the three combination vehicle types together, 90.9 percent were correctly classified as some type of combination vehicle, while another 2.5 percent were not checked and thus are potentially correct. Only 1.3 percent of these vehicles were small trucks, other vehicle types, or parked vehicles, while 4.8 percent were really single-unit trucks, and 0.5 percent were some other vehicle configuration. So it appears that from 91 percent to 93 percent of the trucks classified by FARS as combination vehicles in 1980 really were combination vehicles. On the other hand, 8.8 percent of the trucks classified as single-units and 9.2 percent of the unknown truck types really should have been classified as combination trucks.