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1990 Observational Survey of Seat Belt Usage in Florida

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by

Robert L. Degner
Stephenie K. Mack
Susan D. Moss

University of Florida

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Final Report

Prepared by

Dr. Robert L. Degner,
Stephenie K. Mack and
Susan D. Moss

The Florida Agricultural Market Research Center
University of Florida
Gainesville, Florida 32601
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FORWARD

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The conclusions and opinions expressed in these reports are those of the Subgrantee, and do not necessarily represent those of the State of Florida, Department of Community Affairs, Bureau of Public Safety Management, Division of Emergency Management, the U.S. Department of Transportation, or any other agency of the state or federal government.

ABSTRACT

An observational survey of seat belt use in Florida was conducted in June and July 1990. Observations were made at 75 randomly selected traffic count locations. The sample was stratified by federal functional classification with strata weighted by estimates of vehicle miles traveled. Statewide, seat belt usage was slightly over 40 percent. Vehicles on rural and urban interstates had the highest usage rates, with 53.5 and 47.4 percent respectively. Lowest usage was on rural minor arterials, where 25 percent were wearing seat belts. Blacks and Hispanics had significantly lower usage rates than whites, and females had higher usage rates than males.

Key Words: safety, automobile, seat belt use

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SUMMARY

- # The objective of this study was to provide current, unbiased estimates of seat belt usage by drivers and front-seat riders of cars, vans, and light trucks in Florida.
- # Seventy-five observation sites in 35 counties were randomly selected from 8,000 permanent traffic count locations throughout Florida.
- # A stratified random sampling technique was used, with strata being the various federal highway functional classifications, weighted by vehicle miles traveled in 1988. This technique results in estimates of seat belt usage that reflect motorists' risk exposure on a mileage basis.
- # Observations were made in June and July. Observation schedules were randomized by time-of-day (morning vs. afternoon) and time-of-week (weekday vs weekend).
- # Statewide, overall seat belt usage was slightly over 40 percent.
- # The highest seat belt usage was observed on rural and urban interstates and urban expressways, with 53.5, 47.4 and 46.3 percent using seat belts, respectively. The margin of error on these estimates is approximately ± 2 percent.
- # The lowest observed usage was on rural minor arterials, where approximately 25 percent were wearing seat belts.
- # Overall, over 46 percent of all females were using seat belts, compared to 35.6 percent of all males.
- # Statewide, 42.8 percent of all whites were restrained by seat belts, compared with 25.3 and 24.8 percent of all blacks and Hispanics.
- # Drivers tend to wear seat belts more often than passengers, 42.6 versus 33.9 percent.
- # Over 47 percent of the occupants in vehicles registered out-of-state used seat belts, compared with 40 percent of Florida-registered vehicles.
- # Cars had higher seat belt usage than vans or light trucks; usage in cars was 43.8 percent, in vans 40.7 percent and only 27 percent in trucks.
- # Weekday usage was 41.3 percent, compared with 38.3 percent during weekends.
- # Seat belt usage was higher in the morning (7:00 A.M. to approximately 10:00 A.M.) than in the afternoon (3:00 P.M. to approximately 6:00 P.M.)
- # Relatively few passengers were found to be improperly using restraint systems; less than one percent were wearing shoulder belts behind their

backs and about two percent were wearing shoulder belts without lap belts.

In conclusion, seat belt use is relatively high on Florida's interstate and expressway systems. Improvements in usage should be sought on other types of highways, particularly in rural areas, and among males and minorities

1990 Automotive Safety Belt Usage Survey

INTRODUCTION

Motor vehicle accidents continue to be a major cause of death and injury throughout the United States. Nationwide, approximately 50,000 people lose their lives each year as a result of motor vehicle accidents, with nearly 3,000 of these deaths occurring in Florida (Statistical Abstract of the U.S., 1989; 1989 Florida Statistical Abstract). Of these, from half to two-thirds occur in passenger vehicles (Fatal Accident Reporting System; Adkison, 1988).

In passenger automobiles, the effectiveness of safety belts (the term seat belts is used interchangeably with safety belts throughout this report) in reducing fatalities and injuries is well documented. According to one estimate, 12,000 fatalities and 150,000 moderate to critical injuries could be prevented each year by 100 percent usage of seat belts by front-seat occupants. Eliminating these fatalities and injuries would also result in enormous economic benefits to society as a whole by reducing medical and legal expenses and lost productivity (Sapolsky, 1989).

As a result of the demonstrated effectiveness of safety seat belts in passenger vehicles, the Highway Safety Acts of 1966 and 1978 were promulgated to encourage the use of safety belts by drivers of and passengers in motor vehicles (Public Law 89-564; Public Law 95-599). In Florida, the use of seat belts was given impetus when the State Legislature passed the Florida Safety Belt Law in 1986. This statute designated the period from July 1 through December 31, 1986 as an educational period and provided for enforcement on a secondary violation basis beginning January 1, 1987 (Florida Statutes, 316.614).

The Department of Community Affairs, through its Bureau of Public Safety Management (BPSM), has monitored seat belt usage within the state of Florida on a continuing, periodic basis through observational surveys since 1983 (Table 1). The periodic surveys provide an objective basis for detecting trends in the general public's use of safety belts. Survey results are used to evaluate current education and enforcement programs and to identify areas where additional efforts are needed.

OBJECTIVES

The primary objective of this study was to provide current, unbiased estimates of seat belt usage by drivers and front-seat riders of passenger motor vehicles in Florida, excluding buses. Secondary objectives were to provide detailed seat belt usage rates by type of roadway, i.e. federal functional classification, by race, gender, type of passenger vehicle, in-state vs. out-of-state registration, by time of day, weekday vs. weekend, and by geographic region of the state. Proper and improper seat belt usage was also to be observed and reported.

An overriding objective, suggested by administrators of the National Highway Traffic Safety Administration (NHTSA), was to develop a research methodology which would allow greater comparability of usage estimates among the eight states comprising Region IV of NHTSA.

Table 1.--Reported and observed seat belt use in Florida, 1983-1990.

Survey period	Seat belt use		Sample size (No.)	Survey area, number of counties
	Reported (----Percent-----)	Observed		
May 24-June 8, 1983	33.01	--	522	Selected counties
Nov. 2-Nov. 17, 1983	43.81	--	454	Selected counties
June 19-July 1, 1984	36.01	--	604	Statewide
Sept. 25-Oct. 4, 1984	42.51	--	617	Statewide
Jan. 22-Feb. 28, 1985	41.71	--	4,136	Selected MSAs (8)
Jan. 14-Mar. 9, 1985	--	22.3	49,016	Selected MSAs (8)
Sept. 23-Oct. 1, 1985	46.42	--	622	Statewide
Nov. 17-Nov. 26, 1985	43.02	--	611	Statewide
Feb. 5-Feb. 21, 1986	--	28.1	20,000	Selected MSAs (10)
Sept. 1986	--	40.8	23,670	Selected co.'s (14)
Jan. 1987	--	60.5	22,062	Selected co.'s (14)
July-Aug. 1987	--	49.8	24,296	Selected co.'s (13)
Nov. 1987	--	49.8	23,155	Selected co.'s (13)
July-Aug. 1988	--	47.1	9,262	Selected co.'s (14)
July 1989	--	55.0	18,142	Selected co.'s (15)
June-July 1990	--	40.5	30,209	Selected co.'s (35)

Sources: Communication Research Center, Florida State University, 1989, and observational survey of seat belt usage by Florida Agricultural Market Research Center, University of Florida, 1990 .

Table 2.--Proportionate distribution of all Florida vehicle miles traveled and sample distribution, by federal highway functional classification.

Federal highway functional classification	Vehicle miles traveled	Observation sites in sample
	(Percent) ^a	(Number)
<u>Urban</u>		
Interstates	8.9	7
Expressways	4.2	3
Primary arterial	17.5	13
Minor arterial	13.2	10
Collector	8.7	21
Local ^b	<u>19.6</u>	<u>0</u>
All urban	72.1	54
<u>Rural</u>		
Interstates	7.4	6
Primary arterial	8.2	6
Minor arterial	5.4	4
Collector	4.2	5
Local ^b	<u>2.8</u>	<u>0</u>
All rural	28.0	21
Total	100.0 ^c	75

^aPercentages are based upon a total of 105,319 million vehicle miles traveled statewide in 1988. Source: U.S. Department of Transportation.

^bThe Florida Department of Transportation has very few traffic count locations classified as urban or rural "local" streets or roads. Thus, the proportions of the sample that would have been allocated to the "local" stratum was included in the "collector" stratum.

^cPercentage does not sum to 100.0 due to rounding.

PROCEDURE

Representatives from the eight southeastern states comprising Region IV of NHTSA met in October 1989 in Atlanta to formulate general guidelines for conducting observational traffic safety surveys. The intent of the guidelines was to foster greater comparability of methods and results among states. The guidelines resulting from the Atlanta meeting were the basis for the survey methodology developed, although some deviations were made in order to be pragmatic, yet statistically defensible. The sampling procedure was formulated with the assistance of Dr. John A. Cornell, Professor of Statistics at the University of Florida. Dr. Cornell specializes in the design of experiments.

The sampling frame was comprised of all permanent traffic count locations for which the Florida Department of Transportation (DOT) had sufficient data for proper identification as to federal functional classification. The sampling frame contained over 8,000 individual locations distributed throughout all counties.

A stratified random sample of 75 observational sites was drawn from the various federal highway functional classifications (U.S. Department of Transportation). Strata were weighted by their respective estimates of vehicle miles traveled (VMTs) for 1988 (Table 2). The 75 sites constituted the primary sample. If a primary site proved to be unusable because of construction, lack of control devices to stop traffic, or observer safety considerations, the nearest traffic count location within the same federal functional classification was used as an alternate. Because the Florida DOT monitors very few traffic count locations in the "local" category, the proportion of the sample that should have been "local" was included in the "collector" category. The rationale for using "collectors" in lieu of

"local" sites was that (1) there were too few local sites to complete the stratum, (2) they were not geographically dispersed, and (3) much traffic from "local" sites feeds into "collectors."

To provide reasonably accurate estimates of seat belt usage at individual observation sites, a quota of 400 observations per site was established. The fixed quota for each site within each stratum (federal functional classification), which in turn is weighted by vehicle miles traveled, results in overall statewide estimates of seat belt usage that reflect motorists' risk exposure on a mileage basis. Estimates of seat belt usage within each stratum indicate motorists' risk exposure for a particular type of highway. This quota results in confidence limits around point estimates at each site of approximately ± 5 percentage points at the 95 percent probability level. However, when larger aggregations of data are made, confidence limits are frequently in the range of one to two percentage points. In order to obtain the relatively large quota at each site within a half-day period, only those traffic count locations with average daily traffic counts (ADTs) of 2,400 or more were included in the sample. This restriction only affected the "collector" category, and it served to exclude very few sites. Thus, it is likely that the minimum ADT restriction interjected little bias into the overall results.

After the primary sample was drawn within each of the urban and rural federal highway functional classifications, the sample was further stratified to allow for proportionate numbers of weekday-weekend and morning-evening observation periods. Thus, 21 sites (2/7) were randomly selected statewide for weekend observations, with the remaining sites reserved for weekdays. Then, in order to facilitate efficient scheduling, the 75 observational sites were organized into regions around major urban areas. After a random start, sites within a given region were alternately assigned to a morning-afternoon

observation schedule. The morning schedule began at 7:00 AM and continued until the prescribed quota of 400 observations had been recorded or until 12:00 noon. The afternoon schedule began at 3:00 PM and continued until the quota had been attained or until 8:00 PM. The average amount of time required at each of the 75 sites was approximately three hours. Thus, observations at virtually every location included a cross section of "rush hour" and "non-rush hour" traffic.

Plans were to select an alternate site for observation on a later date if fewer than 200 observations were obtained at a primary site during a five-hour period because of low traffic flows. However, quotas were achieved at all sites during the prescribed time periods. If fewer than 200 observations were obtained because of inclement weather, the same site was revisited on a later date. Approximately ten sites had to be rescheduled because of rain. In all cases, observations made at alternate sites or on substitute days were made during similar time periods as initially scheduled, i.e. weekdays or weekends, mornings or afternoons.

The state was divided into three geographic regions for analysis. The three regions and the number of observation sites within each county are shown in Figure 1.

The observational sites used in this study are classified by county and federal functional class and identified by Florida Department of Transportation (FDOT) traffic count station numbers (Appendix Table 1). The form used to record observations is found in Appendix B.

FINDINGS

In general, the 1990 study found the same pattern of usage rates among the various subgroups as in previous years (Table 3). Seat belt usage was higher for drivers, females and whites. Occupants of out-of-state vehicles buckled up more often than in-state, and urban areas showed a higher rate of seat belt usage than rural areas. However, overall reported safety belt usage in 1990 was 40.5 percent compared with 55.0 percent in 1989 (Table 3). Thus, there appears to be a 15-point decline in overall seat belt usage between the 1989 study and the 1990 study. However, part of this apparent decrease is probably due to a change in sampling methodology. The methodology developed for the 1990 study is based largely upon the guidelines developed at the Region IV NHTSA meeting in October, 1989, in Atlanta. The new methodology, while more costly to implement, is thought to be more accurate because of greater numbers of observation sites, greater geographic dispersion, inclusion of weekend, morning and afternoon observation periods, longer observation periods to include rush hour/non-rush hour traffic and weighting by vehicle miles traveled by federal functional classification. The findings which follow will show that each federal highway functional class has a different rate of seat belt usage, thus the proportion observed from each class will affect the overall seat belt usage rate. Since the 1990 study was stratified and weighted by different criteria, the statistics are not directly comparable to 1989. Even so, the highest observed usage rates in the current study (for urban and rural interstates) were slightly below the average usage rates reported in 1989. Thus, it is likely that seat belt usage has declined somewhat over the past year.

Table 3.--A comparison of safety belt usage studies, 1986-1990.

Category of occupant	Sept. 1986	Jan. 1987	Aug. 1987	Nov. 1987	Aug. 1988	July ^a 1989	July ^b 1990
(-----Percent-----)							
All	40.8	60.5	49.8	49.8	47.1	55.0	40.5
Drivers	41.8	61.0	51.0	51.0	48.8	55.2	42.6
Passengers	36.5	58.4	45.4	45.6	41.1	54.1	33.9
Males	37.4	56.9	47.6	46.3	42.8	49.9	35.6
Females	45.1	65.0	52.7	53.9	52.4	61.5	46.4
Whites	42.7	61.0	51.7	51.3	49.2	56.5	42.8
Blacks	23.2	56.2	35.9	36.2	36.7	42.7 ^c	25.3
In-state	40.9	59.9	50.1	49.4	46.2	54.7	40.0
Out-of-state	39.1	63.8	43.4	56.1	56.0	58.6	47.3
Urban	40.8	60.0	49.8	51.3	46.3	56.0	41.5
Rural	40.8	61.6	49.9	43.9	42.2	47.8	37.8
Freeway exits ^d	--	--	--	--	54.7	58.4	49.5

^aPercentages from July 1989 are derived from a weighted analysis.

^bThe July 1990 results are based upon a survey conducted in June and July.

^cThe July 1989 figure represents all non-white drivers/passengers.

^dThe August 1988 survey was the first survey to include freeway exits as a category. The 1990 figure reflects observations made at exits of rural and urban interstates and urban expressways.

Source: 1986-1989 data, Sapolsky; 1990 data, calculated from current survey data.

Seat Belt Usage by Urban and Rural Federal

Functional Classification

Discussions which follow are organized by federal highway functional class and by various demographic and descriptive variables. Numbers of observations associated with all demographic and other descriptive variables appear in Appendix A (Appendix Table 2). Federal highway functional classifications identify roads as part of a network linking smaller tributary roads to increasingly larger roads. The smallest classifications are locals and collectors. As mentioned previously, locals and collectors are combined for this study's purposes because there were too few local sites specified by FDOT. Collectors feed into minor arterials which in turn feed into primary arterials. In rural areas, primary arterials feed into interstates, whereas in urban areas primary arterials may feed into expressways or interstates (Highway Functional Classification: Concepts, Criteria and Procedures, U.S. Department of Transportation, March 1989).

Within both rural and urban categories, observed seat belt usage followed the same pattern (Table 4). Usage was highest at interstate locations and lowest at minor arterial locations. On collectors, the smallest highway classification observed, usage was higher than either primary or minor arterials but lower than interstate or expressway usage. It is unclear as to why higher usage rates were observed on collectors than on primary or minor arterials. Initially, this phenomenon was thought to be caused by disproportionate numbers of females observed on collectors, but this was not found to be the case (Table 5).

Although overall usage in urban areas was higher than in rural areas, usage at rural interstate locations was 53.5 percent, more than six

Table 4.--Statewide seat belt use by federal functional classification.

Federal functional classification	Sites	Observations	Percent using seat belts ^a	
<u>Rural</u>				
Interstate	6	2,419	53.5	+2.0
Primary arterial	6	2,445	31.3	+1.8
Minor arterial	3	1,639	24.9	+2.1
Collector	5	2,021	37.5	+2.1
All rural	28	8,524	37.8	+1.0
<u>Urban</u>				
Interstate	7	2,795	47.4	+1.9
Expressway	3	1,232	46.3	+2.8
Primary arterial	13	5,207	38.8	+1.3
Minor arterial	10	3,960	35.2	+1.5
Collector	21	8,491	43.5	+1.1
All urban	64	21,685	41.5	+0.7
All locations	75	30,209	40.5	+0.6

^aConfidence limits are computed at the 95 percent probability level.

Table 5.--Percentage of females observed by functional classification.

Federal functional classification	Percentage of females in sample
<u>Rural</u>	
Interstate	41.9
Primary arterial	44.6
Minor arterial	46.8
Collector	40.4
All rural	43.3
<u>Urban</u>	
Interstate	42.2
Expressway	53.7
Primary arterial	46.4
Minor arterial	42.7
Collector	45.4
All urban	45.2
All locations	44.7

percentage points above urban interstate locations. This difference between rural and urban interstate usage might be attributed to a greater number of long distance travelers at rural locations than at urban; long distance travelers may be more likely to wear safety belts than short distance commuters using urban interstates. Urban interstates and expressways showed similar seat belt usage rates at 47.4 and 46.3 percent respectively (Table 4).

Urban usage at primary and minor arterials was 38.8 and 35.2 percent respectively, higher than usage rates for the same functional classes in rural locations. Rural usage at primary and minor arterials was 31.3 and 24.9 percent respectively, the lowest of all functional classifications (Table 4).

Urban collectors' overall usage rate was 43.5 percent, six percentage points higher than rural collectors and higher than any other functional class, with the exception of interstates and expressways (Table 4).

Seat Belt Usage by Gender

Over all functional classifications, both urban and rural, females were wearing safety belts more often than males. Over 46 percent of all females observed were using seat belts compared to only 35.6 percent of males. Females on rural interstates had the highest usage rate, 59.1 percent, while males on rural minor arterials had the lowest, 22.9 percent. Urban males were restrained by seat belts more often than rural males and likewise urban females had a higher usage rate than rural females (Table 6).

Table 6.--Seat belt use by federal functional classification and gender.

Federal functional classification	Gender ^a	
	Male	Female
	(Percent using seat belts)	
<u>Rural</u>		
Interstate	49.7	59.1
Primary arterial	28.4	34.6
Minor arterial	22.9	26.9
Collector	32.2	44.7
All rural	34.5	42.0
<u>Urban</u>		
Interstate	39.8	57.5
Expressway	39.9	51.7
Primary arterial	35.7	42.3
Minor arterial	31.4	40.2 ^a
Collector	36.6	51.7
All urban	36.0	48.1
All locations	35.6	46.4

^aChi-square analysis indicates that seat belt use was significantly related to gender for all data groups (P<0.05).

Seat Belt Usage by Race

The aggregation of all functional classes by race showed 42.8 percent of all whites to be restrained by seat belts. Blacks and Hispanics followed with overall seat belt usage at 25.3 and 24.8 percent, respectively (Table 7).

Within both urban and rural categories, whites were belted more often than blacks, except for blacks on urban expressways. Larger proportions of whites than Hispanics were also found to be belted on almost all types of highways; there were too few observations of Hispanics on rural minor arterials to draw any meaningful conclusions.

Whites traveling on rural interstates showed the highest level of safety belt usage, 55.8 percent. Seat belt usage was lowest, under 12 percent, for blacks traveling on rural primary arterials and rural minor arterials and for Hispanics on rural collectors (Table 7).

Seat Belt Usage by Drivers and Riders

Statewide, only 1.53 percent of all front-seat passengers were in the "center" position, and only 6.6 percent of these were using seat belts. Because of the small numbers of center position passengers, the center and right-hand position passengers were combined into the "rider" category.

Over all functional classifications, 42.6 percent of drivers wore safety belts while only 33.9 percent of riders were belted (Table 8). Drivers wore seat belts more often in urban areas than rural, and likewise urban riders were belted more often than rural. In rural areas, nearly 40 percent of drivers were belted compared to only 33.1 percent of riders. Similarly, in urban areas, nearly 44 percent of drivers were wearing seat belts whereas only about 34 percent of riders were restrained.

Table 7.--Seat belt use by federal functional classification and race.

Federal functional classification	Race ^a		
	White	Black	Hispanic
	(----Percent of seat belt use----)		
<u>Rural</u>			
Interstate	55.8	30.2	29.7
Primary arterial	33.7	10.6	16.1
Minor arterial	26.4	11.3	33.3 N.S.
Collector	39.8	18.9	9.1
All rural	40.1	17.5	18.5
<u>Urban</u>			
Interstate	49.3	33.8	25.7
Expressway	47.4	52.1	29.4
Primary arterial	40.7	22.3	16.1
Minor arterial	40.3	18.0	21.4
Collector	45.4	27.6	26.6
All urban	44.0	27.5	26.0
All locations	42.8	25.3	24.8

^aChi-square analysis indicates that seat belt use was significantly related to race for all data groups ($P < 0.05$), except for Hispanics in the rural minor arterial category for which there were too few observations for a valid Chi-square test.

Table 8.--Seat belt use by federal functional classification and location of front-seat occupants.

Federal functional classification	Location ^a	
	Drivers	Riders ^b
	(Percent using seat belts)	
<u>Rural</u>		
Interstate	55.7	48.1
Primary arterial	33.0	27.6
Minor arterial	26.9	20.5
Collector	38.6	33.8
All rural	39.7	33.1
<u>Urban</u>		
Interstate	49.1	40.4
Expressway	49.5	34.9
Primary arterial	41.0	32.2
Minor arterial	37.1	29.3
Collector	45.7	36.4
All urban	43.7	34.3
All locations	42.6	33.9

^aChi-square analysis indicates that seat belt use was significantly related to location for all data groups ($P < 0.05$).

^bStatewide, only 1.53 percent of all front-seat passengers were in the "center" position and 6.6 percent were using a seat belt. The center and right-hand position passengers were combined into the "rider" category.

Nearly 56 percent of the rural interstate drivers wore seat belts, compared with 49.1 and 49.5 percent of the urban interstate and urban expressway drivers respectively. The lowest usage rate was by riders on rural minor arterials; only 20.5 percent were belted (Table 8).

Seat belt usage by drivers and riders categorized by gender

Overall, female drivers and riders were restrained more often than their male counterparts. Over 50 percent of female drivers wore seat belts compared to only 37.6 percent of male drivers. Over 38 percent of female riders were belted compared to about 26 percent of male riders (Table 9).

Within gender categories, rural versus urban seat belt usage varied more for females than males. Usage for urban female drivers was 52.2 percent, nearly seven percentage points higher than rural female drivers. The difference was less for female riders; 39.2 percent of female riders in urban areas wore seat belts compared to 37 percent of female riders in rural areas. Usage for urban male drivers and rural male drivers was 38 and 36.6 percent respectively. For male riders, there was no difference between those observed in urban areas and those observed at rural locations; the proportions using seat belts were 25.8 percent in both types of locations.

The high and low usage rates across all functional classes were 63.1 percent for female drivers on rural interstates and 16.7 percent for male riders on rural minor arterials. Within each gender category, the same was true; the highest usage was found on rural interstates and the lowest on rural minor arterials (Table 9).

Table 9.--Seat belt use in front seat, by federal functional classification, gender and location.

Federal functional classification	Gender ^a			
	Male		Female	
	Driver	Rider ^b	Driver	Rider ^b
	(----Percent using seat belts----)			
<u>Rural</u>				
Interstate	52.0	38.8	63.1	53.8
Primary arterial	30.5	20.2	37.2	31.4
Minor arterial	24.7	16.7	29.9	22.4
Collector	33.2	26.6	48.3	36.8
All rural	36.6	25.8	45.3	37.0
<u>Urban</u>				
Interstate	41.2	32.0	61.4	46.2
Expressway	41.9	28.0	57.3	37.4
Primary arterial	37.4	26.5 ^b	46.3	34.5
Minor arterial	33.7	20.4	42.7	35.1
Collector	38.8	25.9	55.8	42.9
All urban	38.0	25.8	52.2	39.2
All locations	37.6	25.8	50.5	38.5

^aChi-square analysis indicates that seat belt use was significantly related to gender and location for all data groups (P<0.05).

^bPassengers in the center position were included in the rider category.

Seat belt usage by drivers and riders categorized by race

Greater proportions of both white drivers and white riders were observed to be wearing safety belts than black and Hispanic drivers or riders (Table 10). Nearly 45 percent of white drivers were wearing seat belts compared to about 29 percent of black drivers and about 27 percent of Hispanic drivers. Overall usage rates for white, black and Hispanic riders were 37.1, 15.7, and 20.9 percent respectively. Caution should be used in interpreting some of the usage figures for Hispanics on individual federal functional classifications because of small numbers of observations.

Seat belt usage across all functional classes was highest for white drivers on rural interstates and lowest for black riders on primary arterials in rural areas. For all races, urban drivers tended to be belted more often than rural drivers, and likewise, urban riders generally wore seat belts more often than rural riders.

Seat Belt Usage By Registration

Vehicles registered out-of-state had a consistently higher rate of seat belt usage than in-state vehicles (Table 11). The overall seat belt usages for out-of-state and in-state registered vehicles were 47.3 percent and 40.0 percent respectively.

Over all rural functional classifications, seat belt usage was 36.3 percent for in-state registered vehicles compared with 49.3 percent for out-of-state vehicles. Much of this large overall difference in rural seatbelt usage was attributable to collectors, where there was nearly a 20 percent difference in seat belt usage between in-state and out-of-state registered vehicles. For all urban classifications, the overall difference between

Table 10.--Seat belt use in front seat, by federal functional classification, race, and location.

Federal functional classification	Race					
	White		Black		Hispanic	
	Driver	Rider	Driver	Rider	Driver	Rider
(-----Percent using seat belts-----)						
<u>Rural</u>						
Interstate	57.5	51.2	33.6	23.8	-- ^a	-- ^a
Primary arterial	35.0	30.9	14.6	2.8	18.2	13.8
Minor arterial	28.4	22.2	13.3	6.4	-- ^a	-- ^a
Collector	40.5	37.1	21.3	12.5	9.5	-- ^a
All rural	41.7	35.9	20.4	11.3	20.6	16.1
<u>Urban</u>						
Interstate	50.6	43.6	38.1	20.5	27.3	-- ^a
Expressway	49.1	39.3	56.5	37.2	31.9	25.4
Primary arterial	42.7	34.4	24.6	16.9	25.0	-- ^a
Minor arterial	41.5	36.4	21.1	10.0	23.1	17.7
Collector	47.5	38.7	31.1	16.9	27.6	24.2
All urban	45.8	37.7	31.2	17.2	27.8	22.3
All locations ^a	44.7	37.1	28.9	15.7	26.8	20.9

^aOverall percentages for white drivers and riders were based upon 19,609 and 6,258 observations, respectively. For blacks there were 2,388 drivers and 909 riders, and for Hispanics, 541 drivers and 282 riders. Caution should be used in interpreting percentages of blacks and Hispanics for individual functional classifications because of small numbers of observations. Percentages are not shown where there were fewer than 20 observations.

Table 11.--Seat belt use by federal functional classification and registration.

Federal functional classification	Registration ^a	
	In-state	Out-of-state
	(----Percent using seat belts----)	
<u>Rural</u>		
Interstate	53.0	55.8 N.S.
Primary arterial	30.9	36.6 N.S.
Minor arterial	24.3	32.0 N.S.
Collector	35.4	54.3
All rural	36.3	49.3
<u>Urban</u>		
Interstate	46.8	57.1
Expressway	46.0	61.1 N.S.
Primary arterial	38.6	41.8 N.S.
Minor arterial	34.8	42.2
Collector	43.4	45.7 N.S.
All urban	41.3	45.5
All locations	40.0	47.3

^aChi-square analysis indicates that seat belt use was significantly related to registration for all data groups except those with the designation N.S., for not significant (P<0.05).

seat belt usage in in-state and out-of-state registered vehicles was not as great as it was for the rural locations; 41.3 percent of the occupants of in-state vehicles were observed wearing seat belts, compared with 45.5 percent of the out-of-state registered vehicles (Table 11).

The higher and more consistent rates of seat belt usage for out-of-state vehicles as compared to in-state vehicles may be due to distance traveled and to anxiety caused by unfamiliar highways. Logically, out-of-state vehicles would be traveling longer distances than in-state vehicles, and there appears to be a tendency for people to buckle-up more often for longer trips than shorter trips, thus resulting in higher seat belt usage in out-of-state vehicles.

Seat Belt Usage by Vehicle Type

Cars generally had higher seat belt usage than either trucks or vans. Across all locations, seat belt usage in cars was 43.8 percent, vans had a 40.7 percent usage rate and trucks had a 27.0 percent usage rate. This pattern was reflected in both rural and urban locations (Table 12).

Seat Belt Usage by Time of Week

Over all locations, weekday usage was higher than weekend usage: 41.3 percent and 38.3 percent respectively. Urban areas followed this overall pattern with weekday usage over five percentage points higher than weekend seat belt usage. The opposite was true for rural areas where weekend seat belt usage was at 39.9 percent, higher than the weekday usage level of 37.2 percent. This reversal for rural areas could possibly be explained by urban residents traveling to rural locations for weekend recreational outings (Table 13).

Table 12.--Seat belt use by federal functional classification and type of vehicle.

Federal functional classification	Type of vehicle ^a		
	Car	Truck ^b	Van
	(----Percent of seat belt use----)		
<u>Rural</u>			
Interstate	58.8	34.9	52.4
Primary arterial	35.8	17.4	30.7
Minor arterial	25.2	20.2	38.0
Collector	41.7	25.0	37.6
All rural	41.9	24.3	40.1
<u>Urban</u>			
Interstate	52.5	30.6	39.9
Expressway	47.8	32.7	44.0
Primary arterial	40.6	28.9	44.0
Minor arterial	37.0	26.1	41.5
Collector	47.2	28.2	39.1
All urban	44.5	28.4	41.0
All locations	43.8	27.0	40.7

^aChi-square analysis indicates that seat belt use was significantly related to type of vehicle for all data groups (P<0.05).

^bIncludes light trucks only.

Table 13.--Seat belt use by federal functional classification and time of week.

Federal functional classification	Time of week ^a	
	Weekday	Weekend
	(Percent using seat belts)	
<u>Rural</u>		
Interstate	54.8	50.9 N.S.
Primary arterial	28.5	36.9
Minor arterial	25.0	24.6 N.S.
Collector	37.5	-- ^b
All rural	37.2	39.9
<u>Urban</u>		
Interstate	47.4	-- ^b
Expressway	51.8	35.4
Primary arterial	41.5	32.6
Minor arterial	33.0	44.0
Collector	46.2	39.0
All urban	43.0	37.7
All locations	41.3	38.3

^aChi-square analysis indicates that seat belt use was significantly related to time of week for all data groups ($P < 0.05$) except those designated N.S., for not significant.

^bThere were no observations in this category.

Seat Belt Usage by Time of Day

In general, seat belt usage in the morning was higher than seat belt usage in the afternoon (Table 14). Over all locations, the percentage using seat belts was 43.9 percent in the mornings and 37.3 percent in the afternoons. Afternoon seat belt usage was substantially lower for both urban and rural areas. Urban usage was 44.2 percent in mornings and rural morning usage was 43 percent. In the afternoon, urban usage was 38.8 percent, while rural usage was 34 percent. Time-of-day differences were not significantly different for rural or urban interstates nor for urban collectors. However, time-of-day differences for all other functional classifications were statistically significant. One plausible explanation for the time-of-day difference might be a greater propensity for short shopping trips to be taken in the mid- to late afternoon and a possibility that such trips might include more unrestrained children.

Seat Belt Usage by Region

Three geographic regions were defined for the state. The northern, central and southern regions were comprised of 33, 16, and 18 counties, respectively (Figure 1). Across all locations, seat belt usage varied slightly with the northern region having the highest usage at 42.8 percent, and the central and southern regions lower, at 40.1 percent and 38.2 percent respectively (Table 15).

In rural areas, overall seat belt usage was higher in the northern and central regions than in the southern region: 40.1 percent, 40.0 percent and 28.6 percent respectively. Seat belt usage in the urban areas was similar in the central and southern regions (40.1 percent and 40.5 percent respectively), and somewhat higher in the northern region (44.1 percent).

Table 14.--Seat belt use by federal functional classification and time of day.

Federal functional classification	Time of day ^a	
	Morning	Afternoon
	(Percent using seat belts)	
<u>Rural</u>		
Interstate	53.9	52.8 N.S.
Primary arterial	43.8	28.7
Minor arterial	34.6	21.7
Collector	31.1	47.2
All rural	43.0	34.0
<u>Urban</u>		
Interstate	48.4	46.0 N.S.
Expressway	51.8	35.4
Primary arterial	40.7	37.2
Minor arterial	45.0	32.8
Collector	43.3	43.7 N.S.
All urban	44.2	38.8
All locations	43.9	37.3

^a"Time of day" refers to the morning and afternoon schedules which began at 7:00 AM and 3:00 PM, respectively, and lasted approximately three hours each. Chi-square analysis indicates that seat belt use was significantly related to time of day for the data groups except those designated N.S., for not significant ($P < 0.05$).

Table 15.--Seat belt use by federal functional classification and region.

Federal functional classification	Region ^{a,c}		
	Northern	Central	Southern
	(----Percent of seat belt use----)		
<u>Rural</u>			
Interstate	50.9	56.2 ^a	-- ^b
Primary arterial	31.8	34.3	27.9
Minor arterial	26.2	23.6	-- ^b
Collector	52.1	38.6	29.2
All rural	40.1	40.0	28.6
<u>Urban</u>			
Interstate	49.8	41.3	54.1
Expressway	57.4	-- ^b	40.5
Primary arterial	46.9	36.7	35.9
Minor arterial	35.9	32.1	38.3
Collector	45.3	44.3	40.4
All urban	44.1	40.1	40.5
All locations	42.8	40.1	38.2

^aSee Figure 1 for definitions of regions.

^bThere were no observations in this category.

^cChi-square analysis indicates that seat belt use was significantly related to region for all data groups ($P < 0.05$).

Proper vs. Improper Seat Belt Usage

Observers also recorded specific information as to how seat belts were worn (Coding Form, Appendix B). Observations fell into one of six categories: "lap belt with shoulder belt", "lap belt only", "lap belt with shoulder belt behind", "shoulder belt only", "child restraint device" and "none". Approved child restraint devices were also considered proper restraint, and passengers with lap belts with their shoulder straps behind the back, though improper, were considered belted for the purpose of seat belt usage tabulation. Thus, the "shoulder belt only" and "none" categories were defined as not belted, while the other four categories were defined as belted.

Of all observations, 38.8 percent wore lap belts with shoulder straps properly in place, 0.7 percent used a lap belt with the shoulder belt behind their backs, 0.6 percent wore a lap belt only, and 0.4 percent were in child restraint devices (Table 16). Thus, 40.5 percent were considered belted. It should be noted that some of the passengers wearing lap belts with shoulder belts behind their backs were children which were too large for child restraint devices but too small for comfortable use of shoulder harnesses.

Table 16--Type of safety restraint observed.

Type of Restraint	Number	Percent
Lap and shoulder belts	11,713	38.8
Lap belt with shoulder belt behind back	225	0.7
Lap belt only	169	0.6
Child restraint device	119	0.4
Total belted	12,226	40.5
Shoulder belt only	627	2.1
None	17,355	57.4
Total not restrained	<u>17,982</u>	<u>59.5</u>
Grand Totals	30,208	100.0

CONCLUSIONS

The 1990 survey of seat belt usage in Florida found 40.5 percent of front seat occupants restrained by seat belts. A new sampling methodology was developed which weights seat belt use by driving risk exposure, i.e., vehicle miles traveled. The sample of observation points was stratified by federal functional classification and data were examined in detail by race, gender, type of passenger vehicle, in-state vs. out-of-state registration, time of day, weekday vs. weekend, and by geographic region of the state.

Drivers were observed wearing seat belts more often than front seat passengers, females were belted more often than males, and the usage rate for whites was higher than for blacks or Hispanics. Occupants of out-of-state vehicles used seat belts more often than in-state, and urban areas showed a higher rate of seat belt usage than rural areas. Usage was highest in cars and vans while light trucks had the lowest usage level. Overall usage was higher in the morning than in the afternoon, and weekday usage was higher than weekend. Overall, there was little difference in usage among three regions of the state, but on rural roads, the southern region had the lowest seat belt use. Within both rural and urban areas, observed seat belt usage followed the same general pattern. Seat belt usage was highest at the interstate level and use diminished as the federal functional classifications decreased except for increased seat belt usage at the collector level. This pattern was consistent even when broken down into the various subgroups mentioned above.

Relatively few passengers were found to be improperly using restraint systems. Less than one percent of all passengers were observed wearing their shoulder belts behind their backs and only 0.6 percent were wearing lap belts only. Further, some of those wearing lap belts only were in older cars that

were manufactured without shoulder belts. About two percent of all passengers were wearing shoulder belts only, risking serious injury.

In conclusion, this study provides an indication that seat belt use is relatively high on Florida's interstate and expressway systems. However, improvement in usage should be sought on other types of highways, particularly in rural areas. Further, educational programs and enforcement efforts might target males, minorities, light trucks, and afternoon and weekend traffic.

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APPENDIX A

Tables

Appendix Table 1.--Seat belt use by county and individual observation sites.

County, federal functional class	Identification number ^a	Number of observations	Percent using seatbelts ^b	
<u>Bay</u>				
Urban primary arterial	849	403	38.7	+4.8
Urban minor arterial	868	405	38.3	+4.7
Urban collector	118	401	39.7	+4.8
Urban collector	122	423	43.7	+4.7
<u>Bradford</u>				
Urban collector	95	423	38.8	+4.6
<u>Brevard</u>				
Rural interstate	165	397	66.8	+4.6
<u>Broward</u>				
Urban expressway	163	399	45.9	+4.9
Urban minor arterial	1569	395	40.0	+4.8
Urban interstate	366	404	50.7	+4.9
<u>Calhoun</u>				
Rural primary arterial	405	407	19.4	+3.8
<u>Dade</u>				
Urban expressway	208	413	35.4	+4.6
Urban minor arterial	1687	349	36.4	+5.0
Urban collector	223	395	31.6	+4.6
<u>DeSoto</u>				
Urban primary arterial	66	397	23.4	+4.2
<u>Duval</u>				
Urban interstate	328	403	49.1	+4.9
Urban interstate	284	400	50.5	+4.9
Urban expressway	72	420	57.4	+4.7
Urban collector	169	409	60.4	+4.7

Continued

Appendix Table 1.--Seat belt use by county and individual observation sites continued.

County, Federal functional class	Identification number ^a	Number of observations	Percent using seatbelts ^b	
<u>Escambia</u>				
Rural collector	315	403	52.1	+4.9
Urban primary arterial	936	404	56.4	+4.8
Urban minor arterial	924	402	49.8	+4.9
Urban collector	128	424	51.4	+4.8
<u>Franklin</u>				
Rural minor arterial	642	404	17.8	+3.7
<u>Gadsden</u>				
Rural interstate	111	402	42.3	+4.8
Urban minor arterial	995	405	18.3	+3.8
<u>Hendry</u>				
Rural primary arterial	103	429	26.3	+4.2
<u>Highlands</u>				
Rural primary arterial	139	395	29.6	+4.5
Rural collector	A61	419	27.2	+4.3
Urban primary arterial	A104	399	32.3	+4.6
<u>Hillsborough</u>				
Rural primary arterial	159	397	33.2	+4.6
Urban interstate	66	399	45.6	+4.9
Urban interstate	45	398	37.9	+4.8
Urban primary arterial	174	399	32.8	+4.6
Urban primary arterial	14	401	41.4	+4.8
Urban minor arterial	A96	397	27.7	+4.4
Urban minor arterial	112	398	38.2	+4.8
<u>Indian River</u>				
Rural interstate	A220	391	52.4	+5.0
<u>Jackson</u>				
Rural minor arterial	748	405	34.6	+4.6

Continued

Appendix Table 1.--Seat belt use by county and individual observation sites continued.

County, Federal functional class	Identification number ^a	Number of observations	Percent using seatbelts ^b	
<u>Lake</u>				
Rural collector	79	406	35.0	± 4.6
<u>Lee</u>				
Urban primary arterial	328	399	35.6	± 4.7
<u>Leon</u>				
Urban primary arterial	1014	407	45.5	± 4.8
Urban minor arterial	1036	405	51.6	± 4.9
Urban collector	144	406	37.9	± 4.7
<u>Manatee</u>				
Urban primary arterial	356	397	40.1	± 4.8
Urban collector	30	395	33.4	± 4.7
<u>Marion</u>				
Urban primary arterial	813	406	30.0	± 4.5
<u>Martin</u>				
Urban collector	246	395	32.2	± 4.6
<u>Orange</u>				
Rural primary arterial	544	397	35.3	± 4.7
Urban collector	175	400	47.7	± 4.9
Urban collector	177	397	43.1	± 4.9
Urban collector	190	399	57.1	± 4.9
Urban collector	186	395	42.5	± 4.9
<u>Palm Beach</u>				
Urban interstate	418	393	57.5	± 4.9
Urban collector	265	400	46.5	± 4.9
Urban collector	263	449	54.8	± 4.6

Continued

Appendix Table 1.--Seat belt use by county and individual observation sites continued.

County, Federal functional class	Identification number ^a	Number of observations	Percent using seatbelts ^b	
<u>Pinellas</u>				
Urban interstate	150	398	40.2	+4.8
Urban collector	64	400	44.5	+4.9
Urban collector	35	403	38.5	+4.8
Urban collector	A57	398	41.2	+4.8
<u>Polk</u>				
Rural minor arterial	208	418	24.6	+4.1
Urban primary arterial	554	398	38.4	+4.8
Urban primary arterial	646	397	41.1	+4.8
Urban minor arterial	544	398	30.4	+4.5
Urban collector	66	379	39.6	+4.9
Urban collector	74	402	44.3	+4.9
<u>Santa Rosa</u>				
Rural interstate	149	420	53.1	+4.8
<u>Sarasota</u>				
Urban primary arterial	726	400	48.2	+4.9
<u>Seminole</u>				
Rural collector	425	397	42.3	+4.9
<u>St. Johns</u>				
Rural primary arterial	594	420	43.8	+4.7
<u>St. Lucie</u>				
Rural collector	473	396	31.3	+4.6
Urban collector	275	398	41.7	+4.8
<u>Sumter</u>				
Rural minor arterial	265	412	22.6	+4.0
<u>Suwannee</u>				
Urban minor arterial	772	406	21.9	+4.0

Continued

Appendix Table 1.--Seat belt use by county and individual observation sites continued.

County, Federal functional class	Identification number ^a	Number of observations	Percent using seatbelts ^b
<u>Volusia</u>			
Rural interstate	212	406	49.5 ±4.9
<u>Walton</u>			
Rural interstate	155	403	57.3 ±4.8

^aThe station number shown is that used by the Florida Department of Transportation to identify traffic count locations.

^bConfidence limits were computed at the 95 percent probability level.

Appendix Table 2.--Numbers of observations for various demographic and other descriptive variables.

Category	Observations	Percent of Category
	(Number)	
<u>Location</u>		
Rural	8,524	28.2
Urban	<u>21,685</u>	<u>71.8</u>
Totals	30,209	100.0
<u>Occupant</u>		
Driver	22,689	75.1
Rider	<u>7,520</u>	<u>24.9</u>
Totals	30,209	100.0
<u>Race</u>		
White	25,867	86.3
Black	3,297	11.0
Hispanics	<u>823</u>	<u>2.7</u>
Totals	29,987	100.0
<u>Gender</u>		
Male	16,641	55.3
Female	<u>13,427</u>	<u>44.7</u>
Totals	30,068	100.0
<u>Vehicle type</u>		
Car	22,344	74.0
Truck	5,591	18.5
Van	<u>2,272</u>	<u>7.5</u>
Totals	30,207	100.0
<u>Registration</u>		
Florida	28,048	92.9
Out-of-state	<u>2,156</u>	<u>7.1</u>
Totals	30,204	100.0

Continued

Appendix Table 2.--Numbers of observations for various demographic and other descriptive variables continued.

Category	Observations	Percent of Category
	(Number)	
<u>Time of day</u>		
Morning	14,492	48.0
Afternoon	<u>15,717</u>	<u>52.0</u>
Totals	30,209	100.0
<u>Time of week</u>		
Weekday	22,152	73.3
Weekend	<u>8,057</u>	<u>26.7</u>
Totals	30,209	100.0
All observations	30,209	100.0

APPENDIX B

1990 Observational Survey Coding Sheet

