

SEAT BELT AND SHOULDER STRAP USE AMONG URBAN TRAVELERS  
Results of the Summer 1977 Survey

by

Charles B. Stoke  
Research Analyst

A report prepared by the Virginia Highway and Transportation  
Research Council under the sponsorship of the  
Department of Transportation Safety

(The opinions, findings, and conclusions expressed in this  
report are those of the author and not necessarily those of  
the sponsoring agencies.)

Virginia Highway & Transportation Research Council  
(A Cooperative Organization Sponsored Jointly by the Virginia  
Department of Highways & Transportation and  
the University of Virginia)

Charlottesville, Virginia

August 1978

VHTRC 79-R5

## SAFETY RESEARCH ADVISORY COMMITTEE

- MR. R. W. DUVAL, Chairman, Deputy Director, Virginia Department  
of Transportation Safety
- MR. FRANK ALTOBELLI, Regional Administrator, National Highway Traffic  
Safety Administration
- MAJOR C. M. BOLDIN, Field Supervisor, Va. Dept. of State Police
- MR. W. E. DOUGLAS, Asst. Director, Va. Dept. of Transportation Safety
- MR. W. S. FERGUSON, Research Analyst, VH&TRC
- MR. C. P. HEITZLER, JR., Program Manager, Div. of Management Analysis  
and Systems Development
- MR. S. S. HELLMAN, Asst. to the Director, Emergency Medical Services,  
State Department of Health
- MR. J. K. HICKMAN, VASAP Evaluator, Va. Dept. of Transportation Safety
- MR. D. O. MCALLISTER, Traffic Engineer, Va. Dept. of Transportation  
Safety
- MR. R. M. MCDONALD, Project Director, Hwy. Safety Training Center, V.C.
- MR. B. G. JOHNSON, Supervisor, Driver Education, State Dept. of Ed.
- MR. H. R. JOHNSON, Management Information Systems Director, Office of  
Secretary of Transportation
- MR. R. F. MCCARTY, Safety Program Coordinator, FHWA
- MR. R. E. SPRING, Driver Services Administrator, Div. of Motor Vehicles
- MR. A. L. THOMAS, Asst. Traffic & Safety Engineer, VDH&T
- MR. AMBROSE WOODROOF, Asst. Attorney General, Commonwealth of Virginia

## ABSTRACT

During nine days in June 1977, four major metropolitan areas of the state of Virginia were surveyed to determine seat belt use by summer urban travelers. Observer-data collectors were stationed at selected signalized intersections. Motorists in the lane adjacent to the curb were shown a clipboard bearing the question, Are you wearing seat belts? The observer then approached the vehicle and visually verified the response given, and recorded whether seat belts and/or shoulder straps were being used. He also recorded the license number of the vehicle and the sex and approximate age of each occupant.

An association between the driver's use of belts and the right front passenger's use was noted during the survey. In vehicles in which the driver was not using a seat belt, 96.7% of the right front passengers (RFP's) were not using a seat belt. When the driver was using only a lap belt, 42.7% of the RFP's were using either the lap belt or the lap and shoulder belts. When the driver was using both lap and shoulder belts, 54.6% of the RFP's were using either the lap belt or the lap and shoulder belts. The last two figures for RFP use do not include the use of child seats, which added 1.6% and 1.3% to the totals.

It was found that only 16.3% of the drivers, 9.8% of the RFP's, and 3.4% of the remaining passengers used a seat belt and/or shoulder strap. Overall, 10.3% of the infant occupants were restrained by approved child seats. The results indicate that in comparison to males, more of the female drivers and RFP's use belts. Belt use by drivers was found to be higher in the 1972/1973 vehicle group and by RFP's of 1975 model cars than in the other age categories of vehicles. A greater percentage of Northern Virginia drivers and RFP's used belts than those in the other survey areas, and use was lowest for all occupant categories in Eastern Virginia.



SEAT BELT AND SHOULDER STRAP USE AMONG URBAN TRAVELERS  
Results of the Summer 1977 Survey

by

Charles B. Stoke  
Research Analyst

INTRODUCTION

The safety advantage of using seat belts in automobile has been the subject of a number of papers, talks, and public relations campaigns. Both federal and state governments have required that all new cars be equipped with seat belts before they are offered for sale. The availability of seat belts, however, is not an indication of their use by the motoring public.

Numerous efforts have been initiated by government and private groups to persuade the motoring public to use the restraining devices. Most drivers are aware of some of these campaigns, and the public is also familiar with warning buzzers and lights, the interlock system, the three-point belt, and inertial reels. In addition, legislation requiring the use of seat belts has been sought by a number of jurisdictions.

Investigations have been conducted to determine whether seat belts in motor vehicles are actually being used. Early studies relied on questionnaire and interview formats, while later ones have used a variety of observational techniques. When motorists respond to questions on the use of seat belts they generally give the socially acceptable affirmative reply. When motorists are observed, however, their actual belt use is found to be less than that stated.

PURPOSE

This study was initiated to determine the extent to which summer urban travelers use available seat belts and shoulder straps within the state of Virginia.

## METHOD

In June 1977 observer-data collectors surveyed four metropolitan areas of the state; namely, Western Virginia (Roanoke-Salem-Vinton), Northern Virginia (Alexandria-Arlington-Fairfax-Belvoir), Central Virginia (Richmond-Henrico-Chesterfield), and Eastern Virginia (Norfolk-Virginia Beach-Hampton). Each day of the week, Sunday through Saturday, was sampled for at least one full day, and Thursday and Friday were sampled for two days.

Three sites were used each day. These sites were chosen because the throughfares carried relatively high traffic volumes and provided an adequate and safe vantage point for observations. Each day both primary and secondary routes were sampled. Although the study sites did not include any along interstate highways, vehicles going to and from such roadways were surveyed. Three time periods were used: (1) 8:00 a.m. to 10:30 a.m., (2) 11:30 a.m. to 2:00 p.m., and (3) 3:30 p.m. to 6:00 p.m.

The observations were made at signalized intersections and only the lane adjacent to the curb was used to obtain the sample. A clipboard bearing the question, Are you wearing seat belts? was displayed by the observer to alert travelers to the purpose of the survey. After the clipboard was presented, the observer approached the car from the front at a 45° angle. Approaching at the right front fender, the observer walked along the side and past the vehicle while looking in and recording the data. Upon seeing the question most occupants would reply. This reply was acknowledged, but only data verified by the observer were recorded. Volunteers were acknowledged, but their responses were not recorded.

At each site the data collectors recorded whether the driver and passengers were using only the lap belt, both the lap and shoulder belts, or no form of restraint. In addition, they also recorded whether any of the infants were using approved child seats. An "approved child seat" was defined as those models distributed by the automobile industry, such as the "Love Seat" and "Tot Guard", as well as models sold by other retailers that have the same design characteristics. This category did not include models which hook over the seat or those inadequately anchored, or not anchored at all, to the vehicle. The survey personnel also recorded the sex and approximate age of each occupant, their seat position in the vehicle, and the license number of the vehicle (see Figure 1).

FIGURE 1

SAFETY BELT USAGE SURVEY FORM

License Number	Driver		Mid Front		Rt. Front		Lt. Rear		Mid Rear		Rt. Rear		
	Belts	Sex	Age	Belts	Sex	Age	Belts	Sex	Age	Belts	Sex	Age	
	L	S	M	P	Y	M	O	L	S	M	L	S	M
	N	F	M	O	N	A	F	N	A	F	N	A	F
	L	S	M	P	Y	L	S	M	L	S	L	S	M
	N	F	M	O	N	A	F	N	A	F	N	A	F
	L	S	M	P	Y	L	S	M	L	S	L	S	M
	N	F	M	O	N	A	F	N	A	F	N	A	F
	L	S	M	P	Y	L	S	M	L	S	L	S	M
	N	F	M	O	N	A	F	N	A	F	N	A	F
	L	S	M	P	Y	L	S	M	L	S	L	S	M
	N	F	M	O	N	A	F	N	A	F	N	A	F
	L	S	M	P	Y	L	S	M	L	S	L	S	M
	N	F	M	O	N	A	F	N	A	F	N	A	F
	L	S	M	P	Y	L	S	M	L	S	L	S	M
	N	F	M	O	N	A	F	N	A	F	N	A	F
	L	S	M	P	Y	L	S	M	L	S	L	S	M
	N	F	M	O	N	A	F	N	A	F	N	A	F
	L	S	M	P	Y	L	S	M	L	S	L	S	M
	N	F	M	O	N	A	F	N	A	F	N	A	F
	L	S	M	P	Y	L	S	M	L	S	L	S	M
	N	F	M	O	N	A	F	N	A	F	N	A	F

Date \_\_\_\_\_  
Sheet No. \_\_\_\_\_

Start Time \_\_\_\_\_  
Stop Time \_\_\_\_\_

Location \_\_\_\_\_  
At \_\_\_\_\_

Restraint Use

- I = Infant (0-3 Yrs.)
- P = Pre Adult (4-16 Yrs.)
- Y = Young Adult (17-30 Yrs.)
- M = Middle Adult (31-60 Yrs.)
- O = Older Adult (61 and Up)

Occupant Age

- L = Lap
- S = Shoulder
- N = None
- A = Approved Child Seat

Occupant age was divided into five categories: (1) Infants (up to 3 years old), (2) pre-adults (4 to 16 years), (3) young adults (17 - 30 years), (4) middle adults (31 - 60 years), and (5) older adults (over 60 years). For this survey, vehicle age was divided into seven categories: (1) Pre-1963, (2) 1963 - 1967, (3) 1968 - 1971, (4) 1972/1973, (5) 1974, (6) 1975, and (7) 1976/1977. These divisions correspond to the following requirements and characteristics of seat belt installation in passenger cars: Belts not required, only lap belt installed, lap and shoulder belts, lap and shoulder belts with a continuous buzzer, belts coupled to the interlock system, a mix of vehicles with and without the interlock, and belts coupled to a 4 - 8 second buzzer.

This summer survey was the fourth in the series and was originally designed to determine if there were seasonal differences in seat belt and shoulder strap use. Just prior to the start of the survey, the NHTSA Region III office requested that the vehicle age classification system be modified. The original classification scheme had three vehicle age groups while the proposed system had seven. The new procedure required recording license plate numbers rather than classifying vehicles into age categories. This request was discussed with officials of the Virginia Division of Motor Vehicles and they indicated that they would furnish vehicle model years to match license plate numbers. The change in procedure was then made.

Because of this change, it was determined that comparisons with previous data would be inappropriate. Earlier studies had indicated that seat belt use was low, and with the change in procedure for classifying vehicle age a bias in a few vehicles could significantly affect the rate of use and statistical significance. Readers interested in the previous data can refer to the report "Seat Belt and Shoulder Strap Use Among Urban Travelers, A Comparison of Survey Results From 1974, 1975, and 1976."

#### ANALYSES

During the nine-day survey period in June 1977 data were collected on 6,479 occupants of 4,118 vehicles. Data on the number and percentages of individuals surveyed by time period, by age of the automobile, by area of the state, by sex of the occupant, and by age of the occupant are presented in Appendix Tables A-1 through A-5.

Approximately one-third of the data were collected during each of the three time periods. When the data are categorized by vehicle age, and considering the number of model years

in each category, the 1972/1973 vehicles comprise the largest single group. The fewest vehicles were surveyed in the eastern area of the state and the most in the central area. There were more male drivers and more female passengers, which is not an unexpected finding considering current U. S. social mores. There were more middle adult drivers and right front passengers (RFP's), but this classification encompasses the greatest spread of ages (30 years). When age groups are combined, youths under 16 years make up nearly three-fourths of the remaining passengers.

Table 1 presents the results on the use of seat belts. Total driver use was 16.3%, with those using only a lap belt making up 9.4% of the total. Belts were used by less than a tenth of the RFP's. Of the remaining passengers, 2.0% used lap belts and an additional 1.4% were children properly restrained in child seats. Generally, it can be seen that the use of seat belts and child seats was not very prevalent among urban Virginia motorists during the period under study.

The data on the association between driver and passenger use of seat belts, presented in Table 2, show that when the driver was not using belts, only 3.3% of the RFP's were using them; when the driver was using only his lap belt, then 44.3% of the RFP's were restrained; and when the driver was using both lap and shoulder belts, 55.8% of these same passengers also were using belts. These figures include children in child seats. It is apparent that as drivers increased their own safety, there was an increase in the use of belts by RFP's. The situation was not nearly so favorable for the remaining passengers. When the driver was not using belts, less than 2.0% of the remaining passengers were properly restrained. If the driver was using belts, either the lap belt only or both the lap and shoulder belts, less than 14% of the remaining passengers were belted. There was a variation in the use of child seats by the two groups of belted drivers, but the numbers of users were so few as to make percentages of use rather meaningless.

Data on belt use by occupant seat position and vehicle age are presented in Table 3. For drivers, the rate of use increased as the vehicle model classification became newer, up to the 1972/1973 group, and then declined. Use rates varied from just over 9.0% for the pre-1963 vehicles to 22.5% for the 1972/1973 vehicles. Vehicles in the latter group are equipped with a continuous buzzer system. In the 1974 vehicles, those with the interlock system, driver use of seat belts was 19.4%; for 1975 vehicles, which included cars with and cars without the interlock system, use was 17.5%; and for the 1976/1977 vehicles, those with the 4 to 8 second buzzer system, belt use by drivers was down to 15.9%.

Table 1  
Use of Seat Belts

Occupant Seat Position	Restraint Used	Number	Percent
Drivers	Lap only	389	9.4
	Lap/shoulder	283	6.9
	None	3,446	83.7
Right Front Passengers	Child seat	7	0.5
	Lap only	77	5.5
	Lap/shoulder	54	3.8
	None	1,269	90.2
Remaining Passengers	Child seat	13	1.4
	Lap only	19	2.0
	Lap/shoulder	0	-
	None	922	96.6

Table 2  
Association Between Driver and Passenger Use of Seat Belts

Occupant Position	Occupant Use of Belts	When Driver Not Using Belts		When Driver Using Only Lap Belts		When Driver Using Lap and Shoulder Belts	
		Number	Percent	Number	Percent	Number	Percent
Right Front Passengers Using	Child Seat	4	0.3	2	1.6	1	1.3
	Lap Only	13	1.5	48	38.7	11	14.3
	Lap/Shoulder	18	1.5	5	4.0	31	40.3
	None	1,166	96.7	69	55.7	34	44.2
Remaining Passengers Using	Child Seat	7	0.9	2	2.5	4	7.3
	Lap Only	7	0.9	9	11.3	3	5.9
	Lap/Shoulder	0	-	0	-	0	-
	None	809	98.3	69	86.3	44	86.3

Table 3  
Belt Use By Vehicle Age

Occupant Seat Position	Vehicle Age	Number		Percent Use
		Used	Not Used	
Drivers	Pre-63	5	50	9.1
	63-67	47	438	9.7
	68-71	132	894	12.9
	72/73	209	718	22.5
	74	85	353	19.4
	75	59	279	17.5
	76/77	135	714	15.9
Right Front Passengers	Pre-63	1	19	5.0
	63-67	8	170	4.5
	68-71	25	330	9.8
	72/73	37	281	11.6
	74	19	120	13.7
	75	18	104	14.8
	76/77	30	245	10.9
Remaining Passengers	Pre-63	0	14	—
	63-67	1	134	0.7
	68-71	6	249	2.4
	72/73	8	226	3.4
	74	4	89	4.3
	75	4	77	4.9
	76/77	7	133	5.0

For every vehicle age category, RFP use was lower than that for the drivers. With the exception of pre-1963 cars, use rates increased with the recency of manufacture, up to 1975 models with a rate of 14.8%. Other use rates by RFP's were 4.5% for the 1963-1967 models, 9.8% for the 1968-1971, 11.6% for the 1972/1973, 13.7% for the 1974, and 10.9% for the 1976/1977 model years.

The remaining passengers had belt use rates which did not exceed 5% and this rate was observed for only the newest model cars. For occupants of the three rear seats and center front seat, the percentages of belt use by vehicle age were 0.7% for the 1963-1967 category, 2.4% for the 1968-1971, 3.4% for the 1972/1973, 4.3% for the 1974, 4.9% for the 1975, and 5.0% for the 1976/1977 categories.

The data in Table 4 are for belt use according to the sex of the occupant. There it can be seen that 17.9% of the female drivers and 15.0% of the male drivers were using seat belts. For RFP's, 10.7% of the females and 7.9% of the males were observed to be using belts. For the remaining passengers, 2.7% of the females and 4.1% of the males had their belts fastened. Generally, it can be concluded that females are more apt than males to be using seat belts; but all rates of use are relatively low.

Table 4

## Belt Use by Sex of Occupant

Occupant Seat Position	Sex of Occupant	Number		Percent Use
		Used	Not Used	
Drivers	Male	343	1,938	15.0
	Female	329	1,508	17.9
Right Front Passengers	Male	36	422	7.9
	Female	102	847	10.7
Remaining Passengers	Male	18	418	4.1
	Female	14	504	2.7

In Table 5 belt use data according to the age of the occupant are presented. The two groups of drivers between the ages of 17 and 60 have nearly the same use rates; 16.7% of the young adults (17 to 30 years) and 16.4% of the middle adults (31 to 60 years) used belts. Of the older adult drivers, those over 60, 12.1% used seat belts; the pre-adults had the highest use rates for drivers, 20%.

With the exception of infants, use rates by RFP's were low. Among the infants, 29.7% were restrained with 18.9% using approved child seats. Other use rates were: 6.6% for pre-adults, 9.0% for young adults, 10.6% for middle adults, and 10.0% for older adults. For passengers over 17 years and riding in the out-board front passenger seat, the combined use rate was 10.0%.

Passengers riding in the center front seat and the three rear seats had the lowest rates of seat belt use. For all practical purposes, occupants other than infants do not use restraints while riding in these seats. Even for infants, the use rate was only 10.2%, with 8.3% being accounted for by use of child seats.

Table 5  
Belt Use by Age of Occupant

Occupant Seat Position	Age of Occupant	Number		Percent Use
		Used	Not Used	
Drivers	Pre-Adult	2	8	20.0
	Young Adult	222	1,109	16.7
	Middle Adult	425	2,162	16.4
	Older Adult	23	167	12.1
Right Front Passengers	Infant	11	26	29.7
	Pre-Adult	19	267	6.6
	Young Adult	33	333	9.0
	Middle Adult	61	517	10.6
	Older Adult	14	126	10.0
Remaining Passengers	Infant	16	141	10.2
	Pre-Adult	10	541	1.8
	Young Adult	1	85	1.2
	Middle Adult	3	109	2.7
	Older Adult	2	46	4.2

Data on belt use by survey time period are contained in Table 6. For both drivers and right front passengers, the highest use rates occurred during the midday survey period (17.4% of drivers and 10.9% of RFP's), followed by the morning period (16.1% of drivers and 10.0% of RFP's), and the lowest rates were during the afternoon period (15.4% of drivers and 8.2% of RFP's). For the remaining passengers, the rates of use in decreasing order occurred during midday (3.9%), afternoon (3.3%), and morning (2.8%). For each of the occupant seat position categories, there was little difference in use rates based on the time of day.

Table 6

## Belt Use by Time Periods

Occupant Seat Position	Period	Number		Percent Use
		Used	Not Used	
Drivers	A.M.	227	1,185	16.1
	MID.	248	1,179	17.4
	P.M.	197	1,082	15.4
Right Front Passengers	A.M.	37	332	10.0
	MID.	63	513	10.9
	P.M.	38	424	8.2
Remaining Passengers	A.M.	8	278	2.8
	MID.	14	349	3.9
	P.M.	10	295	3.3

Table 7 presents data on belt use according to the area of the state. A greater percentage of Northern Virginia drivers (22.2%) were using seat belts and shoulder straps than were drivers in the Central (14.7%), Western (14.5%), or Eastern (13.7%) parts of the state. More Northern RFP's (13.7%) were using belts than were those in the Central (9.0%), Western (9.0%), or Eastern (7.7%) areas. For the passengers in the remaining seat positions, use was greatest in the Central area (4.2%) followed by the Western (4.1%), the Northern (3.4%), and the Eastern (2.2%) areas. In general, belt use rates were greatest in the Northern area, lowest in the Eastern, and nearly identical in the Central and Western parts of the state.

Table 7  
Belt Use By Area Surveyed

Occupant Seat Position	Survey Area	Number		Percent Use
		Used	Not Used	
Drivers	Western	155	911	14.5
	Northern	226	793	22.2
	Central	162	940	14.7
	Eastern	129	802	13.7
Right Front Passengers	Western	33	334	9.0
	Northern	48	302	13.7
	Central	29	295	9.0
	Eastern	28	338	7.7
Remaining Passengers	Western	10	235	4.1
	Northern	8	230	3.4
	Central	8	185	4.2
	Eastern	6	272	2.2

The seat belt and shoulder strap use data according to the sex and age of the occupant in Table 8 show that young and middle adult female drivers used belts more than did their male counterparts. The respective comparative rates were 18.8% and 17.9% for females and 14.6% and 15.4% for males. For older adult drivers, males (12.7%) had a higher use rate than females (11.3%). There were too few pre-adult drivers or belt users to allow meaningful comparisons.

Of those passengers riding in the right front seat, young (10.8%), middle (11.2%), and older (11.8%) adult females had higher belt use rates than did males of the same age classifications (5.2%, 8.6%, and 3.3%). Male infants (31.3%) and pre-adults (7.7%) had rates greater than those for female infants (28.6%) and pre-adults (5.4%).

Use rates were also computed for the various age and sex categories of passengers in the remaining seats. A cursory glance at the table indicates just how few individuals were using their restraint systems. Except for male and female infants with rates of 9.8% and 10.8%, respectively, and male older adults with a rate of 9.1%, less than 3.5% of the passengers in any of the remaining categories used belts.

Table 8  
Belt Use by Sex and Age of Occupant

	Occupant Seat Position	Age of Occupant	Number		Percent Use
			Used	Not Used	
Male	Drivers	Pre-Adult	2	6	25.0
		Young Adult	97	569	14.6
		Middle Adult	230	1,267	15.4
		Older Adult	14	96	12.7
	Right Front Passengers	Infant	5	11	31.3
		Pre-Adult	12	144	7.7
		Young Adult	6	110	5.2
		Middle Adult	12	128	8.6
		Older Adult	1	29	3.3
	Remaining Passengers	Infant	9	83	9.8
		Pre-Adult	7	266	2.6
		Young Adult	1	33	2.9
		Middle Adult	0	26	-
		Older Adult	1	10	9.1
	Female	Drivers	Pre-Adult	0	2
Young Adult			125	540	18.8
Middle Adult			195	895	17.9
Older Adult			9	71	11.3
Right Front Passengers		Infant	6	15	28.6
		Pre-Adult	7	123	5.4
		Young Adult	27	223	10.8
		Middle Adult	49	389	11.2
		Older Adult	13	97	11.8
Remaining Passengers		Infant	7	58	10.8
		Pre-Adult	3	275	1.1
		Young Adult	0	52	-
		Middle Adult	3	83	3.5
		Older Adult	1	36	2.7

In Appendix Table B-1, data are presented on the use of seat belts and shoulder straps according to age of vehicle, occupant age, and seat position. In every vehicle age category, there were very few pre-adult and older adult drivers or belt users. For young and middle adult drivers, belt use increased by model year up to 1972/1973 vehicles; after this point use decreased.

Drivers of pre-1963 vehicles, those in which seat belts were not required to be installed, had very little belt use, in fact, so few used them that percentages provide little useful information. Belt use rates varied from 8.6% in 1963-1967 model vehicles to 21.8% in 1972/1973 cars for young adult drivers (see Table 9). Use rates varied from 10.5% in 1963-1967 autos to 23.3% in 1972/1973 cars for middle adult drivers (also see Table 9). Rates for drivers of cars in the last four model years were between 18.0% and 18.6% for young adults and from 14.6% to 19.5% for middle adults. Use rates ranged from 2.0% of older adult drivers in 1968-1971 vehicles to 25.0% of those in 1974 autos.

The data presented in Table 10 are for belt use by RFP's according to vehicle and occupant ages. The 1972/1973 vehicles had the highest use rates for pre-adult and older adult RFP's, while the 1975 vehicles had the highest rate of use for young and middle adults. There were several combinations of vehicle and occupant ages where no RFP was observed using seat belts or shoulder straps.

Where there were users of seat belts, pre-adult RFP use rates ranged from 5.0% in 1968-1971 autos to 11.4% in 1972/1973 cars; varied from 4.6% of young adults in 1963-1967 cars to 20.5% in 1975 vehicles; went from a low of 5.7% of middle adults in 1963-1967 autos to 16.0% in 1975's (the number of middle adults in pre-1963 vehicles and of those using seat belts were so few as to be insignificant); and ranged from 5.0% of older adults in 1963-1967 autos to 17.7% of those in 1972/1973 vehicles.

For 24 out of the 35 vehicle and occupant age categories of data on the remaining passengers, no one was observed using seat belts. In addition, other than for infants in 1968-1971 and 1976/1977 model year groups, belt users in the remaining categories of data exceeded three individuals in only two cases.

Data on seat belt and shoulder strap use according to vehicle age and area of the state surveyed are presented in Appendix Table B-2. Autos in the last six model years had the greatest percentage of restraint users. Generally, drivers of 1972/1973 cars and RFP's of 1974 cars had the highest rates of belt use. In addition, a greater percentage of drivers and RFP's in the Northern survey area used seat belts and shoulder straps than did those in other areas.

Table 9

## Driver Use Rates by Vehicle and Occupant Ages

	<u>Pre-63</u>	<u>63-67</u>	<u>68-71</u>	<u>72/73</u>	<u>74</u>	<u>75</u>	<u>76/77</u>
Young Adult	—	8.6	14.8	21.8	18.6	18.0	18.5
Middle Adult	11.1	10.5	12.8	23.3	19.5	17.0	14.6

Table 10

Right Front Passenger Use Rates by  
Vehicle and Occupant Ages

	<u>Pre-63</u>	<u>63-67</u>	<u>68-71</u>	<u>72/73</u>	<u>74</u>	<u>75</u>	<u>76/77</u>
Pre-Adult	—	—	5.0	11.4	11.1	—	7.5
Young Adult	—	4.6	5.6	8.0	6.9	20.5	12.7
Middle Adult	20.0	5.7	7.6	11.7	13.8	16.0	11.1
Older Adult	—	5.0	7.0	17.7	16.7	—	11.5

The highest percentage of belt use, 31.2%, was by Northern drivers of 1972/1973 cars. The lowest use of seat belts, none, was by Northern drivers of pre-1963 cars (see Table 11). For RFP's, the highest rate of use, 25.8%, was by Eastern area occupants of 1975 cars; while the lowest use, zero, was shared by several areas and vehicle ages (see Table 12). Use rates were generally low for the remaining passengers. There was no one using belts in 12 categories of data, and in another 12 use was less than 4.0% of the occupants. In 27 of the 28 remaining passenger data categories, three or fewer occupants were using seat belts (see Table 13). When the rate for each model year was rank ordered and an overall ranking was established, Northern drivers and RFP's had the highest rate of use, the Western area drivers and RFP's had the next highest overall rate of use, followed by drivers and RFP's from the Central and Eastern areas, which were tied (see Tables 11 and 12).

Table 11

## Driver Use Rates by Vehicle Age and Area Surveyed

	<u>Pre-63</u>	<u>63-67</u>	<u>68-71</u>	<u>72/73</u>	<u>74</u>	<u>75</u>	<u>76/77</u>
West(2) <sup>a</sup>	10.5(2) <sup>b</sup>	11.5(2)	10.5(3)	19.3(3)	22.6(1)	15.0(3)	12.8(4)
North(1)	— (4)	12.8(1)	21.0(1)	31.2(1)	21.7(2)	23.3(1)	19.7(1)
Central(3)	6.7(3)	8.3(3)	11.1(2)	19.3(3)	17.4(3)	12.4(4)	16.8(2)
East(3)	14.3(1)	5.7(4)	8.8(4)	21.2(2)	16.0(4)	19.0(2)	13.5(3)

<sup>a</sup>Overall rank order<sup>b</sup>Rank order for each model year

Table 12

## Right Front Passenger Use Rates by Vehicle Age and Area Surveyed

	<u>Pre-63</u>	<u>63-67</u>	<u>68-71</u>	<u>72/73</u>	<u>74</u>	<u>75</u>	<u>76/77</u>
West(2) <sup>a</sup>	16.7(1) <sup>b</sup>	8.3(1)	5.8(3)	8.5(4)	15.8(2)	11.1(3)	9.5(2)
North(1)	— (2)	8.3(1)	14.1(1)	13.9(1)	20.0(1)	10.0(4)	15.2(1)
Central(3)	— (2)	— (3)	8.1(2)	10.8(3)	13.9(3)	11.7(2)	8.8(4)
East(3)	— (2)	— (3)	2.0(4)	13.3(2)	3.3(4)	25.8(1)	9.2(3)

<sup>a</sup>Overall rank order<sup>b</sup>Rank order for each model year

Table 13

## Remaining Passenger Use Rates by Vehicle Age and Area Surveyed

	<u>Pre-63</u>	<u>63-67</u>	<u>68-71</u>	<u>72/73</u>	<u>74</u>	<u>75</u>	<u>76/77</u>
West	—	—	2.8	3.5	13.6	15.8	—
North	—	3.0	1.9	2.2	3.2	3.7	6.7
Central	—	—	2.0	3.9	—	—	13.9
East	—	—	2.5	3.8	—	—	3.2

## SUMMARY OF FINDINGS

During the summer 1977 survey, 4,118 drivers of passenger cars containing 1,407 RFP's and 954 remaining passengers (6,479 occupants) were surveyed. The data were obtained from the four major metropolitan areas of the state and included a variety of streets and roads within as well as those entering and leaving these urban areas during three daily time periods. The age of the vehicle was divided into seven categories and the age of the occupant into five.

The major findings of the study were as follows.

1. Overall, 16.3% of drivers, 9.8% of RFP's, and 3.4% of remaining passengers used seat belts and/or shoulder straps.
2. There was an association between driver and RFP use of belts. If one wore belts there was an increased tendency for the other to also use belts.
3. Belt use was highest in the newer cars. More drivers of 1972/1973 cars and RFP's of 1975 cars used belts than did occupants of vehicles in other model years.
4. A greater percentage of female drivers and RFP's used belts than did males.
5. Slightly over 16.0% of the young and middle adult drivers used belts. Belt use by the other passengers, when categorized by age of occupant, generally was less than 10.0%.
6. Overall, 10.3% of the infant occupants were restrained by approved child seats.
7. A greater percentage of Northern Virginia drivers and RFP's used belts than did those in the other survey areas. Restraint use by all occupants was lowest in the Eastern area.

## ACKNOWLEDGEMENTS

Appreciation is expressed to John Abbene, George Garrow, and Bob Woodson, who, along with the author, served as data collectors during the study. Thanks are expressed to Dale Sloan, who verified the field data sheets with the computer data, and to Delores Green, who did the keypunching and ran the program. Also the author appreciates the efforts of Toni Thompson, who typed the several drafts of the report, and to other members of the Safety staff for their editorial review, comments, and general assistance. Acknowledgement is made of the role of Harry Craft, the Council editor, and his staff in the preparation of the final report, and to Joyce Stevens, who typed the final manuscript for publication.



## Appendix Table A-1

## Time Period Data

<u>Time Periods</u>	<u>Number</u>	<u>% Total</u>
Morning	1,412	34.3
Midday	1,427	34.7
Afternoon	1,279	31.1

## Appendix Table A-2

## Vehicle Age Data

<u>Vehicle Ages</u>	<u>Number</u>	<u>% Total</u>
Pre-1963	55	1.3
63-67	485	11.8
68-71	1,026	24.9
72/73	927	22.5
74	438	10.6
75	338	8.2
76/77	849	20.6

## Appendix Table A-3

## Location Data

<u>Locations</u>	<u>Number</u>	<u>% Total</u>
Western	1,066	25.9
Northern	1,019	24.8
Central	1,102	26.8
Eastern	931	22.6

Appendix Table A-4  
Sex of Occupant Data

<u>Occupant Seat Position</u>	<u>Sex of Occupant</u>	<u>Number</u>	<u>%</u>
Drivers	Female	1,837	44.6
	Male	2,281	55.4
Right Front Passengers	Female	949	67.5
	Male	458	32.5
Remaining Passengers	Female	518	54.2
	Male	436	45.8

Appendix Table A-5  
Age of Occupant Data

<u>Occupant Seat Position</u>	<u>Age of Occupant</u>	<u>Number</u>	<u>%</u>
Drivers	Pre-Adult	10	0.2
	Young Adult	1,331	32.3
	Middle Adult	2,587	62.8
	Older Adult	190	4.6
Right Front Passengers	Infant	37	2.6
	Pre-Adult	286	20.3
	Young Adult	366	26.0
	Middle Adult	578	41.1
	Older Adult	140	10.0
Remaining Passengers	Infant	157	16.4
	Pre-Adult	551	57.8
	Young Adult	86	9.0
	Middle Adult	112	11.7
	Older Adult	48	5.0

## Appendix Table B-1

## Belt Use by Vehicle and Occupant Ages

Vehicle Age	Occupant Seat Position	Age of Occupant	Number		Percent Use
			Used	Not Used	
Pre-63	Drivers	Pre-Adult	0	0	—
		Young Adult	0	21	—
		Middle Adult	3	24	11.1
		Older Adult	2	5	28.6
	Right Front Passengers	Infant	0	0	—
		Pre-Adult	0	3	—
		Young Adult	0	10	—
		Middle Adult	1	4	20.0
		Older Adult	0	2	—
	Remaining Passengers	Infant	0	4	—
		Pre-Adult	0	8	—
		Young Adult	0	1	—
		Middle Adult	0	0	—
		Older Adult	0	1	—
	63-67	Drivers	Pre-Adult	1	1
Young Adult			14	149	8.6
Middle Adult			30	257	10.5
Older Adult			2	31	6.1
Right Front Passengers		Infant	1	4	20.0
		Pre-Adult	0	39	—
		Young Adult	2	42	4.6
		Middle Adult	4	66	5.7
		Older Adult	1	19	5.0
Remaining Passengers		Infant	0	16	—
		Pre-Adult	0	74	—
		Young Adult	1	17	5.6
		Middle Adult	0	20	—
		Older Adult	0	7	—

## Appendix Table B-1 (Continued)

## Belt Use by Vehicle and Occupant Ages

Vehicle Age	Occupant Seat Position	Age of Occupant	Number		Percent Use
			Used	Not Used	
68-71	Drivers	Pre-Adult	0	3	—
		Young Adult	50	289	14.8
		Middle Adult	81	554	12.8
		Older Adult	1	48	2.0
	Right Front Passengers	Infant	3	7	30.0
		Pre-Adult	4	76	5.0
		Young Adult	5	85	5.6
		Middle Adult	10	122	7.6
		Older Adult	3	40	7.0
	Remaining Passengers	Infant	5	44	11.1
		Pre-Adult	1	149	0.7
		Young Adult	0	24	—
		Middle Adult	0	26	—
		Older Adult	0	6	—
	72/73	Drivers	Pre-Adult	0	3
Young Adult			60	215	21.8
Middle Adult			143	471	23.3
Older Adult			6	29	17.1
Right Front Passengers		Infant	2	6	25.0
		Pre-Adult	8	62	11.4
		Young Adult	6	69	8.0
		Middle Adult	16	121	11.7
		Older Adult	5	23	17.7
Remaining Passengers		Infant	3	26	10.3
		Pre-Adult	5	145	3.3
		Young Adult	0	11	—
		Middle Adult	0	30	—
		Older Adult	0	14	—

Appendix Table B-1 (Continued)  
 Belt Use by Vehicle and Occupant Ages

Vehicle Age	Occupant Seat Position	Age of Occupant	Number		Percent Use
			Used	Not Used	
1974	Drivers	Pre-Adult	0	0	—
		Young Adult	26	114	18.6
		Middle Adult	55	227	19.5
		Older Adult	4	12	25.0
	Right Front Passengers	Infant	3	1	75.0
		Pre-Adult	4	32	11.1
		Young Adult	2	27	6.9
		Middle Adult	8	50	13.8
		Older Adult	2	10	16.7
	Remaining Passengers	Infant	0	12	—
		Pre-Adult	2	53	3.6
		Young Adult	0	11	—
		Middle Adult	0	6	—
		Older Adult	2	7	22.2
	1975	Drivers	Pre-Adult	1	0
Young Adult			21	96	18.0
Middle Adult			35	171	17.0
Older Adult			2	12	14.3
Right Front Passengers		Infant	2	4	33.3
		Pre-Adult	0	18	—
		Young Adult	8	31	20.5
		Middle Adult	8	42	16.0
		Older Adult	0	9	—
Remaining Passengers		Infant	0	19	—
		Pre-Adult	1	28	3.5
		Young Adult	0	13	—
		Middle Adult	3	10	23.1
		Older Adult	0	7	—

Appendix Table B-1 (Continued)  
 Belt Use by Vehicle and Occupant Ages

Vehicle Age	Occupant Seat Position	Age of Occupant	Number		Percent Use
			Used	Not Used	
1976/77	Drivers	Pre-Adult	0	1	—
		Young Adult	51	225	18.5
		Middle Adult	78	458	14.6
		Older Adult	6	30	16.7
	Right Front Passengers	Infant	0	4	—
		Pre-Adult	3	37	7.5
		Young Adult	10	69	12.7
		Middle Adult	14	112	11.1
	Remaining Passengers	Older Adult	3	23	11.5
		Infant	8	20	28.6
		Pre-Adult	1	84	1.2
		Young Adult	0	8	—
		Middle Adult	0	17	—
		Older Adult	0	4	—

Appendix Table B-2

## Belt Use by Vehicle Age and Area Surveyed

Vehicle Age	Occupant Seat Position	Survey Area	Number		Percent Use
			Used	Not Used	
Pre-63	Drivers	Western	2	17	10.5
		Northern	0	7	—
		Central	1	14	6.7
		Eastern	2	12	14.3
	Right Front Passengers	Western	1	5	16.7
		Northern	0	1	—
		Central	0	5	—
		Eastern	0	8	—
	Remaining Passengers	Western	0	3	—
		Northern	0	2	—
		Central	0	1	—
		Eastern	0	8	—
63-67	Drivers	Western	16	123	11.5
		Northern	14	95	12.8
		Central	11	121	8.3
		Eastern	6	99	5.7
	Right Front Passengers	Western	4	44	8.3
		Northern	4	44	8.3
		Central	0	33	—
		Eastern	0	49	—
	Remaining Passengers	Western	0	42	—
		Northern	1	32	3.0
		Central	0	15	—
		Eastern	0	45	—

Appendix Table B-2 (Continued)

## Belt Use by Vehicle Age and Area Surveyed

Vehicle Age	Occupant Seat Position	Survey Area	Number		Percent Use
			Used	Not Used	
68-71	Drivers	Western	30	257	10.5
		Northern	54	203	21.0
		Central	27	216	11.1
		Eastern	21	218	8.8
	Right Front Passengers	Western	6	97	5.8
		Northern	11	67	14.1
		Central	6	68	8.1
		Eastern	2	98	2.0
	Remaining Passengers	Western	2	70	2.8
		Northern	1	53	1.9
		Central	1	49	2.0
		Eastern	2	77	2.5
72/73	Drivers	Western	46	193	19.3
		Northern	69	152	31.2
		Central	50	209	19.3
		Eastern	44	164	21.2
	Right Front Passengers	Western	7	75	8.5
		Northern	11	68	13.9
		Central	8	66	10.8
		Eastern	11	72	13.3
	Remaining Passengers	Western	2	55	3.5
		Northern	1	45	2.2
		Central	2	49	3.9
		Eastern	3	77	3.8

Appendix Table B-2 (Continued)  
 Belt Use by Vehicle Age and Area Surveyed

Vehicle Age	Occupant Seat Position	Survey Area	Number		Percent Use
			Used	Not Used	
1974	Drivers	Western	24	82	22.6
		Northern	23	83	21.7
		Central	23	109	17.4
		Eastern	15	79	16.0
	Right Front Passengers	Western	6	32	15.8
		Northern	7	28	20.0
		Central	5	31	13.9
		Eastern	1	29	3.3
	Remaining Passengers	Western	3	19	13.6
		Northern	1	30	3.2
		Central	0	20	—
		Eastern	0	20	—
1975	Drivers	Western	12	68	15.0
		Northern	21	69	23.3
		Central	11	78	12.4
		Eastern	15	64	19.0
	Right Front Passengers	Western	3	24	11.1
		Northern	3	27	10.0
		Central	4	30	11.7
		Eastern	8	23	25.8
	Remaining Passengers	Western	3	16	15.8
		Northern	1	26	3.7
		Central	0	20	—
		Eastern	0	15	—

Appendix Table B-2 (Continued)

Belt Use by Vehicle Age and Area Surveyed

Vehicle Age	Occupant Seat Position	Survey Area	Number		Percent Use
			Used	Not Used	
76/77	Drivers	Western	25	171	12.8
		Northern	45	184	19.7
		Central	39	193	16.8
		Eastern	26	166	13.5
	Right Front Passengers	Western	6	57	9.5
		Northern	12	67	15.2
		Central	6	62	8.8
		Eastern	6	59	9.2
	Remaining Passengers	Western	0	30	—
		Northern	3	42	6.7
		Central	5	31	13.9
		Eastern	1	30	3.2