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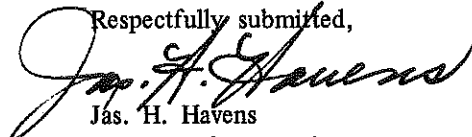
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MEMORANDUM TO: G. F. Kemper
State Highway Engineer
Chairman, Research Committee

SUBJECT: Research Report 487; "Seatbelt Usage in Kentucky;" KYP-75-71; HPR-PL-1(13),
Part III-B

Study number KYP-75-71 is broadly titled "Characteristics of High-Risk Drivers." A more comprehensive report titled "Characteristics of Kentucky Drivers," giving special emphasis to characteristics of high-risk drivers, will be forthcoming in the near future. The report at hand addresses the role of strap-type harnesses in reducing bodily injuries during collision or other violent excursions of a vehicle. The incidence of nonusage by drivers and passengers is disappointing.

Respectfully submitted,


Jas. H. Havens
Director of Research

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Enclosure

cc's: Research Committee

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Research Report
487

**SEATBELT USAGE IN KENTUCKY
KYP-75-71; HPR-PL-1(13), Part III-B**

by

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and

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The contents of this report reflect the views of the authors who are responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the Bureau of Highways. The report does not represent a standard, specification, or regulation.

January 1978

INTRODUCTION

Many studies have been made of automotive, safety restraint systems. Lapbelt and shoulder-belt systems have received much attention. This report deals with seatbelt utilization by Kentucky motorists. The incidence and effectiveness of usage of seatbelts among Kentucky motorists are examined, and factors affecting usage are identified. The feasibility of legislating mandatory usage of seatbelt is also examined.

REVIEW OF LITERATURE

Studies have shown that lapbelt and shoulder-belt usage is relatively low. The Insurance Institute for Highway Safety (1) found that belt usage among Texas drivers in 1970 was 23 percent for 1968-1971-model cars in metropolitan areas and 10 percent in small cities. In a 1975 study involving only 1975-model cars, 27 percent of drivers used a combination of lap-type and shoulder-type belts and an additional one percent used only lap-type belts (2). That study listed an estimate made by the National Highway Traffic Safety Administration (NHTSA) of a 15-percent usage of a lap-and-shoulder combination and an additional five percent usage of lapbelts in 1975 cars. Their opinion was that this was a well based estimate when apportioned over the lifetime of the car.

Inspection teams of the Ohio Department of Highway Safety found that 28 percent of the drivers observed during 1973 vehicle inspections were wearing seatbelts (3). Of the 28 percent, 26.2 percent were wearing a lapbelt only and 1.8 percent were wearing both a lap-and-shoulder harness. Excluding those drivers without seatbelts in the car, the percentage of drivers using some type of restraint rose to 31 percent.

Surveys in Virginia, spanning 3 years (1974-1976) (4, 5), showed 24 percent of the drivers and 15.7 percent of the passengers were wearing seatbelts in 1974. Among drivers, 19.4 percent wore only the lapbelt and 4.6 percent wore the lap-and-shoulder harness. Only 13.3 percent of the front-seat passengers wore the lapbelt, and only 4.9 percent wore the lap-and-shoulder harness. During 1975, driver usage of seatbelts increased to 27.5 percent; and usage by front-seat passengers increased to 22.3 percent. The 1976 survey indicated that restraint usage decreased to 18.2 percent for drivers, 12.4 percent by right, front-seat passengers, and 5.5 percent by the remaining passengers. Of the drivers, 11.2 percent wore only the lapbelt and 7.0 percent wore the lap-and-shoulder harness. For right, front-seat passengers, 7.4 percent wore the lapbelt only and 4.5 percent wore the lap-and-shoulder harness.

A North Carolina study showed that shoulder-belt usage among drivers on North Carolina roads in 1971 was only 4.8 percent (6). In another report, it was noted that in 1971 the shoulder belt was used by 10.0 percent of rural drivers and 6.4 percent of urban drivers (7).

The effectiveness of seatbelt usage has been established. In 1974, a study conducted by the Kentucky Bureau of Highways found that a person not wearing a seatbelt had approximately twice the probability of being injured and four times the probability of being killed compared to a person who did wear a seatbelt (8).

A report published by the University of Michigan's Highway Safety Research Institute (HSRI) in 1975 evaluated crashes of 1973 and 1974 domestic cars (9). Those who wore lapbelts alone suffered severe or fatal injuries one-third less frequently than those who were not strapped. The use of both lap-and-shoulder harness reduced the frequency of severe or fatal injuries by one-half.

A study of crashes, occurring between March 1974 and August 1975 and involving 1973-, 1974-, and 1975-model, American passenger cars which required towing from the scene of the accident, was conducted by the University of Michigan HSRI, Calspan Corporation, and the Southwest Research Institute Corporation (10). Non-use of seatbelts was found in about 60 percent of the crashes. Analysis of serious injuries in the crashes showed that use of lap-and-shoulder harnesses prevented injuries in 42 percent of the cases and the use of lapbelts only prevented 27 percent. Of the 70 fatalities in the sample, 56 were not strapped and 14 were wearing either a lapbelt alone or a lap-and-shoulder-belt combination. It was estimated that the restraint devices reduced fatalities by 62 percent.

A 1976 publication identified seatbelt usage patterns among drivers killed in Virginia crashes (11). In 1973, 91.8 percent of drivers involved in fatal accidents were nonusers of seatbelts. The 1974 figure was 87.6 percent. A significant difference was noted between these rates and the 76-percent nonusage rate for the general population of Virginia.

A study in North Carolina yielded benefits from a restraint system based on lapbelt and shoulder-belt usage and showed reductions in injuries for all seating positions (12). Accident data were collected by the North Carolina State Highway Patrol during the summer of 1970 and detailed analyses were conducted then. The researchers concluded that:

1. For single vehicle crashes (with unspecified points of impact), lapbelted drivers experienced 66 percent fewer serious and fatal injuries than expected in medium-speed collisions and 53 percent fewer serious and fatal injuries in high-speed collisions.

2. When all accident types and speeds were combined, lapbelted drivers experienced 43 percent fewer serious and fatal injuries than their unbelted counterparts in frontal impacts.

3. When all accident types and speed were combined, lapbelted, front-seat passengers also experienced a 37-percent reduction in serious and fatal injuries in frontal collisions.

4. Of 252 frontal impacts studied, none of the 29 drivers and front-seat passengers wearing a shoulder strap experienced a serious or fatal injury. This injury rate is significantly lower than it is in the lapbelted and unbelted groups.

The relationship of restraint system usage to other factors has been studied. A study of drivers in 1975 cars showed that only one-third of the drivers were using shoulder belts a few months after purchasing the car (2). The study determined that use of seatbelts tends to decline by two to four percent each year of car life. Passengers were found to be less likely to use seatbelts than drivers, and children even less so. Seatbelts were used considerably less in small towns than in large cities.

A 1971 study in North Carolina yielded several factors which influenced shoulder-belt usage (6). Shoulder belts were used much more often in foreign cars than in American-made cars. This difference was attributed to a more convenient shoulder-belt configuration in foreign cars. It was also found that usage was higher by males than by females, decreased with increased age, increased as the road became wider, was higher by whites than blacks, and was higher for out-of-state cars. The overall usage was 4.8 percent -- males 5.4 percent and females 3.2 percent. A usage rate of 51.1 percent was reported for passengers where drivers were wearing shoulder belts.

In another study in North Carolina, it was found that seatbelts were more likely to be used by men than by women, by older persons rather than by middle-aged or young persons, by whites than by blacks, and more by persons who drive new cars than by people who drive older cars (13).

Use of seatbelts by drivers involved in accidents in Missouri was investigated and reported in 1972 (14). Seatbelt use was found to be 21.6 percent, 16.8 percent, and 11.8 percent for drivers involved in property-damage, injury, and fatal accidents, respectively. Seatbelts were used approximately 10 percent less than the average by drivers involved in accidents at night.

In another study, an attempt was made to identify attitudinal and cognitive variables related to seatbelt usage (15). Five factors affecting a person's seatbelt usage were identified: discomfort, worry, risk, effect, and inconvenience. The discomfort factor was related

to feelings of comfort or discomfort when wearing a seatbelt. Some people have a deep-rooted aversion to being constrained while others feel more secure wearing a seatbelt. The worry factor was related to disposition toward worrying or not worrying about being involved or being injured in a car crash. The risk factor was related to the amount of risk of being in an accident that an individual felt when driving. The effect factor was related to the individual's feelings of effectiveness of seatbelts. The inconvenience factor was related to the amount of inconvenience the individual felt when fastening or unfastening seatbelts. Discomfort was found to be the best, single predictor of belt usage. Inconvenience rated second, but the addition of the inconvenience factor to the discomfort factor did not improve the prediction -- this was due to a high intercorrelation between those two factors. Worry and risk both had very weak relations to usage, but the effect factor and usage had a somewhat higher correlation.

Legislation to require the use of seatbelts has been suggested as a method to induce motorists to use safety harnesses. Nineteen foreign countries now have laws which require the use of seatbelts (16): Great Britain, France, Australia, Canada (Ontario, Quebec), Switzerland, Belgium, The Netherlands, Czechoslovakia, Sweden, Spain, Finland, Norway, Denmark, Yugoslavia, New Zealand, Israel, Luxemburg, West Germany, and the Soviet Union.

The Ontario law, which went into effect January 1, 1976, states that if a vehicle is equipped with seatbelts or shoulder belts, or was equipped at the time of manufacture, then that assembly must be used by the driver at all times and by passengers who are seated in spaces so equipped (17). The harness must be securely fastened and properly adjusted. Drivers and passengers over the age of 16 are held responsible for fastening their own belts, but the driver is held responsible for the use of safety straps by passengers under 16. Drivers are not required to wear seatbelts while driving in reverse or driving a delivery truck where the driver must alight at frequent intervals. Also, drivers may obtain an exemption to the law by obtaining a medical certificate from a doctor stating they may not wear seatbelts for psychological or physical reasons. Children under the age of five or weighing less than 50 pounds are exempted.

First-quarter accident statistics after the enactment of Ontario's law showed dramatic reductions in highway fatalities and injuries. The number of drivers and passengers killed in accidents during the first 3 months of 1973 was down 33.6 percent and the number of drivers and passengers injured was down 18.6 percent from the same period of the previous year (17). Seatbelt usage increased from 23 percent in December 1975 to

75 percent in February 1976. By June, however, only 51 percent of the drivers were wearing lap-type belts. Shoulder-harness usage dropped from 65 percent in February to 36 percent in June (18).

The most detailed information concerning the effectiveness of mandatory use of seatbelts comes from Australia. In December 1970, the Australian state of Victoria enacted a law requiring motorists to wear seatbelts (19). After 9 months, it was found that automobile fatalities in the metropolitan areas dropped by 24 percent when compared with the corresponding 9 months of the previous year. Fatalities in the rural areas were reduced by 13 percent. Deaths in the rest of the country, where seatbelt use was not required by law, declined by three percent in metropolitan areas and increased by one percent in rural areas.

In Great Britain, an attempt has been made to achieve a high level of compliance by utilizing publicity campaigns. Also, British courts have awarded lesser damages to victims of automobile crashes if they were not wearing seatbelts -- this was on the grounds of contributory negligence (20).

French drivers and their front-seat passengers face a fine of \$10 to \$20 for noncompliance with their law. The penalty in New Zealand is much stricter. Those convicted are subject to revocation of licenses and fines up to \$296. Since the enactment of a Swiss law in January 1976, seatbelt usage rose to 87 to 95 percent despite a fine for noncompliance of only \$8 (21).

Surveys in Finland showed that most people there buckled up when a seatbelt law went into effect in the summer of 1975. But when motorists found there was no fine for violating the law, usage began to slip dramatically. The country now is considering levying a fine for nonusage.

Puerto Rico was the first, major political unit of the United States to adopt a seatbelt law (28). The law became effective January 1, 1974, and applies to almost everyone who rides in a vehicle equipped with seatbelts. Persons exempted include those with medical or physical problems, those with "occupational reasons", children for whom the use of a seatbelt would constitute a risk to their person, and delivery men when the speed "of the vehicle between stops does not exceed 15 miles per hour." The law carries a fine of \$5 to \$25 for each violation.

A roadside survey by the Ohio Department of Highway Safety in conjunction with the Ohio State Highway Patrol (3) evaluated the reactions of drivers to a law requiring the use of seatbelts. Of the drivers asked, 61.8 percent were in favor and 38.2 percent were against such a law. Of those asked if they would use seatbelts if such a law were enacted, 93.7 percent of those interviewed said they would.

The federal government has taken an active role in promoting seatbelt legislation. The Department of Transportation, in a report to Congress in 1976, published *The National Highway Safety Needs Report* (23). Major highway safety countermeasures were identified, and the cost effectiveness of each was evaluated. Adoption of seatbelt usage laws was identified as the most cost-effective measure to forestall highway fatalities. The cost per fatality averted would be \$506. This compares to a cost of \$20,000 per fatality forestalled for enforcement of the nationwide 55-mph speed limit.

A major incentive to the enactment of seatbelt legislation by the states was the Federal-Aid Highway Act of 1973. By this act, Congress authorized payments of up to 94.5 million dollars over the following 3 years to states which adopted such laws (24). Under the incentive grants, states could have increased their federal highway safety money by 10, 15, or 25 percent, respectively, if they enacted legislation that would require

- (a) lapbelts to be used by all front-seat occupants,
- (b) either all front-seat occupants to use all available seatbelts, or all front- and rear-seat occupants to use lapbelts, or
- (c) all occupants to use all belts available.

Although there are considerable data to support the enactment of a seatbelt law, the principal argument which must be settled is whether or not it infringes on an individual's rights. According to a report prepared by the Virginia Highway Research Council, a seatbelt law may face constitutional challenges under the concepts of "due process", "equal protection", and "right to privacy" (25). The constitutional "due process" question is answered by the precedent of laws requiring motorcyclists to wear helmets. In support of the supposition that every driver is a potential threat of death or injury to himself and to others, Virginia reported that seatbelts keep the driver behind the wheel after the first impact and aid him in retaining control of the vehicle while avoiding secondary impacts with other vehicles. The challenge of "equal protection" was found to be defensible only in the case where the statute applied to occupants of vehicles which have been equipped with seatbelts as standard equipment. The third argument of "right of privacy" was answered in the Virginia report by stating that the use of the highways would hardly appear to be a matter within the constitutionally protected zone of privacy.

PROCEDURE

Data were obtained from three sources. Accident data came from a computer tape of all accidents reported in Kentucky in 1976. The safety restraints used was coded for each occupant involved in a reported accident. The coding form indicated if an occupant used a lapbelt only or also used a shoulder belt. Most of the analysis refers to use of seatbelts which was defined as wearing a lapbelt with or without a shoulder-type strap.

A survey of seatbelt usage was conducted. Data were collected in both urban and rural areas. Observers positioned themselves so they could observe seatbelt usage of all occupants while a vehicle was stopped. The data form used is shown in APPENDIX A. Observations of over 7,000 occupants were recorded. More detailed information is given in APPENDIX A.

A questionnaire was sent to a randomly selected set of licensed drivers and given to drivers attending driver-improvement clinics. The questionnaire was part of a study dealing with general characteristics of Kentucky drivers, but a number of the questions related specifically to seatbelt usage. Of 3,000 questionnaires mailed, 1,465 (49 percent) were returned. The sample was representative of the driving population. The driving population consists of 56 percent males compared to 57 percent males in the questionnaire sample. Also, the age distribution was very similar. The driving population consists of 24 percent below the age of 25 years, 48 percent between the ages of 25 and 49, and 28 percent 50 years of age or older. This compares to 21, 49, and 30 percent for the same categories of respondents. A copy of the questionnaire is shown in APPENDIX B. Also, 931 of the questionnaires were completed at the driver-improvement clinics. Most of the analyses pertaining to the questionnaires used only the randomly selected set of drivers. However, summaries from the driver-improvement clinics were used for comparison in some instances.

RESULTS

SEATBELT USAGE

Seatbelt usage was determined from three sources: field observations, accident data, and questionnaires. As expected, rates obtained from the questionnaire was higher than from the other sources since people tend to overestimate their use of seatbelts. In general, the data showed that Kentucky motor vehicle drivers and passengers use seatbelts less than people in other states. The accident data showed that nine percent of the drivers and seven percent of all occupants used seatbelts (Table 1). The field observations revealed that drivers' use of seatbelts ranged from 13 percent on interstates

and parkways to five percent on rural, two-lane roads (Table 2). For all occupants, the field-observation rates ranged from 12 percent on interstates and parkways to four percent on rural, two-lane roads. Usage rates of over 20 percent have been reported by others (1, 2, 3, 4, 5). Seatbelt usage rates determined from accident data and field observations were in close agreement. It was found that 9.0 percent of drivers and 7.4 percent of all occupants involved in accidents were wearing seatbelts.

Field observations were made at different types of locations, and seatbelt usage varied according to location. By obtaining the percentage of vehicle miles of travel for each type of highway compared to the total vehicle miles traveled in the state, a single usage rate was obtained. Using this procedure, overall seatbelt usage rates from field observations was 8.7 percent for drivers and 7.3 percent for all occupants. These percentages are very close to the corresponding usage rates found from the accident data.

Several factors affecting usage rates could be seen when both accident and observations were considered. Usage was highest on interstate and parkways and lowest on rural, two-lane roads. Usage in urban areas was between the two extremes. Usage was higher in newer-model and out-of-state cars. Drivers used seatbelts much more than passengers and very few rear-seat passengers used seatbelts. There was not a significant difference between the usage rates by males and females. Usage rates were very low for children. For adults, the rates tended to increase for both drivers and all occupants above 25 years of age and then decrease for people over 70 years old.

In the questionnaire, drivers were asked to indicate how often they used seatbelts. They were given four choices of answers: always, most of the time, occasionally, and never. For comparison purposes, a single percentage was needed so it was decided to use the percent of respondents who answered either "always" or "most of the time" to approximate the reported seatbelt usage. A comparison of the results from the random selection of the driving population and the high-risk drivers (drivers attending driver improvement clinics) is given in Table 3. The reported seatbelt usage of high-risk drivers was less than for the population at large.

TABLE 1. USE OF SEATBELTS (ACCIDENT DATA)

AGE	PERCENT USING SEATBELT ^a			
	ALL OCCUPANTS		DRIVERS	
	MALE	FEMALE	MALE	FEMALE
1 - 2	6.1	6.1		
3 - 5	3.4	3.2		
6 - 12	3.1	2.9		
13 - 15	2.5	2.4		
16 - 19	4.6	5.0	5.7	6.6
20 - 24	7.1	7.4	7.8	8.6
25 - 29	10.4	8.7	11.3	9.5
30 - 39	10.3	8.1	11.0	8.6
40 - 49	9.6	8.4	10.1	9.6
50 - 59	10.2	10.0	10.7	11.9
60 - 69	8.8	8.8	9.3	10.4
70 or older	7.2	7.6	7.5	9.5
Total	7.7	7.0	9.0	9.0

^aWearing lapbelt with or without a shoulder belt.

TABLE 2. OBSERVED SEATBELT USAGE

VARIABLE	CATEGORY	PERCENT WEARING LABELT OR SHOULDER BELT	
		ALL OCCUPANTS	DRIVERS
Location	Urban (large)	10	12
	Urban (small)	8	11
	Rural (interstate and parkway)	12	13
	Rural (two-lane)	4	5
Vehicle Age	Pre-1966	3	4
	1966 - 1971	7	8
	1972 to present	10	13
License	Kentucky	8	10
	Out-of-state	14	16
Occupant Position	Driver	11	Does Not Apply
	Passenger (front seat)	6	
	Passenger (rear seat)	1	
	Total -- all positions	9	
Sex	Male	9	10
	Female	9	13
Age	Child	3	Does Not Apply
	Pre-adult	4	
	Young adult	9	11
	Middle adult	9	10
	Older adult	8	12

TABLE 3. REPORTED SEATBELT USAGE (QUESTIONNAIRE)

QUESTION	PERCENT ANSWERING "ALWAYS" OR "MOST OF THE TIME"	
	TOTAL POPULATION	HIGH-RISK DRIVERS
Use of Seatbelt when Driving	25	18
Use of Seatbelt when a Passenger	20	16
Use of Seatbelt and Shoulder Belt	16	12

During field observations, the use of a lapbelt only versus a lap-and-shoulder combination was recorded. A summary of the results is given in Table 4. Considering all occupants, use of lap-and-shoulder harnesses was greater than the use of lapbelts only. The difference was particularly pronounced among out-of-state cars. Usage varied with vehicle age. Occupants in newer cars used both lapbelts and shoulder belts more often. This, of course, is related to older cars not being equipped with shoulder belts.

Usage rates for passengers were found to relate strongly with whether the driver was using a seatbelt. Passenger rates were very low but increased dramatically if the driver was using a seatbelt. From field observations, it was found that only two percent of the passengers fastened their seatbelts when the driver had not fastened his seatbelt. This percentage increased to 47 percent in cases where the driver was using a seatbelt. This leads to the conclusion that, if the driver could be induced to use a seatbelt, the usage rates of passengers would be increased significantly. The highest incidence in any category was 22 percent among drivers of out-of-state vehicles in new cars (1973 to present) on interstate and parkways.

ACCIDENT SEVERITY

Accident severity was related to seatbelt usage. In addition to pedestrians, motorcycles, farm equipment, and bicycles were excluded from the analysis. This resulted in a reduced number of fatalities compared to the total number of traffic-related fatalities.

The percentage of occupants wearing a seatbelt for each injury classification was calculated (Table 5). This was related to the total percentage of occupants who wore seatbelts (7.4 percent). If seatbelts had no effect on minimizing injuries, the usage rate would be 7.4 percent for each type of injury. However, the percentage of occupants who were killed while wearing a seatbelt was only 1.2 percent; and the percentage of serious injuries (A-type) sustained was only 3.9 percent. The difference between usage and what would be expected if seatbelts did not affect severity was a factor of six for fatal accidents and two for serious injuries.

The percent of occupants sustaining a given type of injury was also determined as a function of seatbelt usage (Table 6). This table also illustrates the larger percentage of occupants either killed or severely injured when not wearing a seatbelt. The most impressive statistic was that, of 653 fatalities, only eight involved occupants who were wearing seatbelts. The obvious conclusion is that the chances of being killed or severely injured in an accident is greatly reduced by wearing a seatbelt.

A significant benefit can be obtained by wearing a seatbelt regardless of where the occupant sits (Table 7). Passengers in the front seat received more severe injuries than those in the rear seat, but wearing a seatbelt did reduce severity of their injuries also. The largest reduction in severity was for rear-seat passengers. While the severe injuries were reduced substantially, the "possible injury" type (C-type) increased for occupants who wore seatbelts. This was due to the reduction in severity of injuries from an A- or B-type to a C-type. Therefore, if only the total percentage of injuries were cited, there would not be a large difference between wearing and not wearing seatbelts. The most important difference, of course, is the severity of injuries.

The effectiveness of seatbelts for different types of accidents was also investigated (Tables 8 and 9). Seatbelts reduced severity in all types of accidents. Reductions were greatest for fixed-object and single-vehicle accidents. The change in severity obtained by using seatbelts was better demonstrated by relating severity to the part of the vehicle damaged (Table 9). Damage to the top of the vehicle (rollover) resulted in far more fatalities and severe injuries than any other type of accident when the occupants were not wearing seatbelts. However, there were no fatalities in rollover-type accidents when occupants were wearing seatbelts. Otherwise, there were eight fatalities involving occupants who were wearing seatbelts. Seven involved a frontal impact which, if severe enough, would not be survived. All of the fatalities involving an occupant who was wearing lap-and-shoulder harness were frontal impacts.

Accident severity on various types of highways was also related to seatbelt usage (Table 10). When seatbelts were used, the largest reduction in severity occurred on interstate routes and parkways, and the least reduction was found on urban streets. The speeds on these highways and the types of accidents peculiar to these highways were the primary distinguishing factors. However, severity was reduced on all highway types studied.

Seatbelt usage reduced accident severity for all the vehicle makes (Table 11). The data were coded in detail on the accident report forms, and it could be determined if an occupant used a lapbelt only or a lapbelt in combination with a shoulder belt. However, computer summaries indicated that most of the data on occupants wearing seatbelts were coded as wearing lapbelts only.

TABLE 4. COMPARISON OF USE OF LAPBELT AND LAPBELT-SHOULDER BELT COMBINATION (OBSERVED DATA) (ALL OCCUPANTS)

VARIABLE	CATEGORY	PERCENT USING LAPBELT ONLY	PERCENT USING LAPBELT AND SHOULDER BELT
Location	Urban (large)	5	5
	Urban (small)	4	4
	Rural (interstate and parkway)	5	7
	Rural (two-lane)	1	3
Vehicle Age	Pre-1966	3	0
	1966 - 1971	5	2
	1972 to present	4	6
Residence	Kentucky	4	4
	Out-of-state	3	11
Occupant Position	Driver	5	6
	Passenger (front seat)	2	4
	Passenger (rear seat)	1	0
	All occupants	4	5
Sex	Male	4	5
	Female	4	5
Occupant Age	Child		
	Pre-adult	1	3
	Young adult	4	5
	Middle adult	4	5
	Young child	4	4

TABLE 5. TYPE OF INJURY ASSOCIATED WITH USE OF SEATBELTS

TYPE OF INJURY	PERCENT USING SEATBELT ^a	RATIO OF SAFETY-BELT USAGE ^b
Fatal	1.2	6.2
Incapacitating (A-type)	3.9	1.9
Non-Incapacitating (B-type)	5.7	1.3
Possible Injury (C-type)	7.4	1.0
None Detected	7.6	1.0
All Occupants	7.4	NA

^aWearing lapbelt with or without shoulder harness.

^bRatio of percent of all occupants wearing seatbelts to percent usage in each injury classification.

TABLE 6. ACCIDENT SEVERITY AND SEATBELT USAGE

TYPE OF INJURY	PERCENT OF OCCUPANTS SUSTAINING A GIVEN INJURY	
	NOT WEARING SEATBELTS	WEARING SEATBELT ^a
Fatal	.23	.04
Incapacitating (A-type)	2.25	1.15
Non-incapacitating (B-type)	4.89	3.71
Possible Injury (C-type)	5.42	5.41
A-type + B-type Injuries	7.14	4.86

^aWearing lapbelt with or without shoulder belt.

TABLE 7. ACCIDENT SEVERITY ASSOCIATED WITH OCCUPANT POSITION AND USAGE OF SEATBELT

TYPE OF INJURY	PERCENT OF OCCUPANTS IN GIVEN POSITION WITH GIVEN INJURY					
	DRIVER		PASSENGER (FRONT SEAT)		PASSENGER (REAR SEAT)	
	NOT WEARING SEATBELT	WEARING SEATBELT ^a	NOT WEARING SEATBELT	WEARING SEATBELT	NOT WEARING SEATBELT	WEARING SEATBELT
Fatal	.24	.02	.24	.14	.21	0
Incapacitating (A-type)	1.95	1.06	3.23	1.89	2.40	0.84
Non-incapacitating (B-type)	4.27	3.48	6.78	5.21	5.59	4.41
Possible Injury (C-type)	4.59	4.75	7.88	9.37	6.19	7.13
A-type + B-type Injuries	6.22	4.54	10.01	7.10	7.99	5.25

^aWearing lapbelt with or without shoulder belt.

TABLE 8. SEATBELT USAGE BY THE DRIVER AND SEVERITY OF VARIOUS TYPES OF ACCIDENTS

	ANGLE		HEAD-ON		REAR-END		FIXED OBJECT		SINGLE VEHICLE	
	PERCENT SEVERELY INJURED ^a	PERCENT KILLED	PERCENT SEVERELY INJURED	PERCENT KILLED	PERCENT SEVERELY INJURED	PERCENT KILLED	PERCENT SEVERELY INJURED	PERCENT KILLED	PERCENT SEVERELY INJURED	PERCENT KILLED
Not Wearing Seatbelt	1.5	.09	3.3	.48	.52	.03	4.0	.58	8.1	.37
Wearing Seatbelt ^c	1.1	0	1.8	.21	.33	.01 ^b	2.3	0	6.6	0

^aIncapacitating injury (A-type).

^bResulted from one fatality.

^cWearing lapbelt with or without shoulder belt.

TABLE 9. SEVERITY OF INJURY ASSOCIATED WITH PART OF VEHICLE DAMAGED AND USE OF SEATBELT

PART OF CAR DAMAGED	NOT USING SEATBELT				USING SEATBELT ^a			
	PERCENT KILLED	PERCENT INJURED			PERCENT KILLED	PERCENT INJURED		
		A-TYPE	B-TYPE	C-TYPE		A-TYPE	B-TYPE	C-TYPE
Front	.31	3.14	6.68	6.23	.06	1.51	4.71	5.64
Rear	.04	.75	2.15	5.85	.02	.43	2.04	5.87
Side	.33	2.15	4.61	4.87	0	1.38	3.37	3.97
Top	1.74	7.59	20.00	13.30	0	5.38	16.20	9.23

^aWearing lapbelt with or without shoulder belt.

TABLE 10. SEVERITY OF INJURY ASSOCIATED WITH VARIOUS TYPES OF HIGHWAYS AND SEATBELT USAGE BY DRIVER

TYPE OF INJURY	PERCENT OF DRIVERS WITH GIVEN INJURY					
	RURAL		INTERSTATE AND PARKWAY		URBAN	
	NOT WEARING SEATBELT	WEARING SEATBELT ^a	NOT WEARING SEATBELT	WEARING SEATBELT	NOT WEARING SEATBELT	WEARING SEATBELT
Fatal	.37	.04	.48	.05	.05	0
Incapacitating (A-type)	2.78	1.56	2.85	.99	.83	.66
Non-incapacitating (B-type)	5.71	5.24	5.17	2.98	2.32	2.15
Possible Injury (C-type)	5.67	6.00	5.59	4.45	3.05	3.81
A-type + B-type Injuries	8.49	6.80	8.02	3.97	3.15	2.81

^aWearing lapbelt with or without shoulder belt.

TABLE 11. ACCIDENT SEVERITY ASSOCIATED WITH SEATBELT USAGE IN VARIOUS MAKES OF CARS

VEHICLE MAKE	PERCENT OF DRIVERS KILLED OR SEVERELY INJURED (A-TYPE)			
	HEAD-ON ACCIDENT		REAR-END ACCIDENT	
	WEARING SEATBELT ^a	NOT WEARING SEATBELT	WEARING SEATBELT	NOT WEARING SEATBELT
Buick	0	4.8	0	0.4
Cadillac	0	3.7	0	0.2
Chevrolet	3.0	3.9	0.2	0.5
Chrysler	0	3.7	0	0.9
Ford	1.4	3.4	0.4	0.6
Plymouth	0	4.0	0.7	0.7
Pontiac	1.9	3.3	0.9	1.4
Volkswagen	2.8	6.2	0.3	1.1

^aWearing lapbelt with or without shoulder belt.

Only 11 percent of occupants wearing a seatbelt were recorded as also wearing a shoulder belt; however, field observations indicated this percentage should be much higher (slightly over 50 percent). This small number of occupants recorded as wearing a shoulder belt did not allow conclusive comparisons. Therefore, a comparison based on vehicle model year was made. A summary of the percentages of drivers wearing seatbelts who also were wearing a shoulder belt is given in Table 12 by vehicle model year. It was not surprising that very few drivers in older model cars used shoulder belts. But in new cars, the lap-and-shoulder harness is a single device. If the driver fastens any of the straps, both the lapbelt and shoulder belt engage. Therefore, the percentages of shoulder-belt use from 1974 to the present should be much higher. It was obvious that a radical change occurred in 1974 when shoulder-belt usage increased from six to 28 percent. Therefore, accident severity associated with the type of seatbelt used was compared for two categories of vehicles. Drivers in 1973 or older cars were assumed to be wearing lapbelts only. Drivers in 1974 or newer cars were assumed to be wearing both

lapbelts and shoulder belts. The results show that use of seatbelts reduced accident severity substantially in both instances (Table 13). Differences in vehicle populations in the two categories make comparisons inconclusive. Vehicles in the 1974- through 1977-model years consist of smaller cars which would tend to increase severity but also have added safety features which would tend to decrease severity.

An intended function of seatbelts is to prevent ejection of the occupant from the vehicle during crashes and rollovers. The percent of occupants ejected from the vehicle who were wearing seatbelts is given in Table 14. Use of seatbelts reduced the percentage of occupants ejected. The lap-and-shoulder harness was more effective than the lapbelt alone. The highest probability of ejection from a vehicle occurs in a rollover-type accident. The data in Table 14 show that seatbelts eliminated this problem. Over one-half of the driver fatalities in rollover accidents involved ejection from the vehicle, but no fatalities resulted when seatbelts were used. There is a large potential for a reduction in fatalities in this type of accident.

**TABLE 12. USAGE OF SHOULDER BELT
BY MODEL YEAR OF CAR**

MODEL YEAR	PERCENT OF DRIVERS WEARING SEATBELTS WHO WERE WEARING A SHOULDER BELT (ACCIDENT DATA)
1965 or older	4
1966 - 1971	3
1972	6
1973	6
1974	28
1975	22
1976	25
1977	31

TABLE 13. ACCIDENT SEVERITY FOR VARIOUS MODEL CARS (TYPE OF SEATBELT PRIMARILY USED)

TYPE OF INJURY	PERCENT OF DRIVERS WITH GIVEN INJURY			
	1973 OR OLDER CARS		1974 to 1977 CARS	
	NOT USING SEATBELT	USING SEATBELT (PRIMARILY LAPBELT ONLY)	NOT USING SEATBELT	USING SEATBELT (PRIMARILY LAPBELT AND SHOULDER BELT)
Fatal	.24	.02	.19	.03
Incapacitating (A-type)	2.02	.95	1.61	1.22
Non-incapacitating (B-type)	4.28	3.32	3.89	3.70
Possible Injury (C-type)	4.57	4.80	4.33	4.66

TABLE 14. SEATBELT USED AND EJECTION FROM CAR

SEATBELT USED	PERCENT OF OCCUPANTS EJECTED FROM VEHICLE ^a (ALL ACCIDENTS)	PERCENT OF DRIVERS EJECTED FROM VEHICLE	
		ALL ACCIDENTS	ROLLOVER ACCIDENTS
None	0.81	0.71	7.6
Lapbelt only	0.54	0.53	0
Lapbelt and Shoulder Belt	0.40	0.29	0

^aIncludes occupants partially ejected from the vehicle.

A comparison of the bodily location of the injuries to drivers not wearing a seatbelt compared to drivers who were wearing a seatbelt was investigated (Table 15). The model year of the vehicle was also considered to illustrate differences between injuries sustained while wearing a lapbelt versus a lap-and-shoulder harness. A major difference was the reduction in head and face injuries; this was particularly so in regard to shoulder belts. Multiple injuries were also reduced by seatbelts. The percentages of some types of injuries were higher for some users of seatbelts. For example, there was a higher percentage of neck injuries associated with users of seatbelts.

Use of child restraints was also coded as a part of the accident data. There were 197 of these incidents. One child in a restraint system was killed in a head-on collision. There were also five severe (A-type) injuries,

ten B-type, and nine C-type injuries to children in restraint systems. Although the amount of data is limited, it does not show the reduction in injuries which would be expected when using a child restraint. The type of accidents could have been a factor. Also, there are a number of child restraints on the market, some of which may not be adequate. Evaluations have been conducted to determine the effectiveness of various child restraints (26).

FACTORS AFFECTING SEATBELT USAGE

Analysis of the accidents, field observations, and questionnaire data yielded relationships between seatbelt usage and several variables. The data are summarized in Tables 16 through 18. Following is a summary of the variables which were studied and their relationship, if any, to seatbelt usage.

VARIABLE	RELATIONSHIP
1. Sex	There was no consistent difference in usage by males and females.
2. Age	Usage increased for adults over 25 years of age. Seatbelt usage for children was the lowest of any age group.
3. Seating Position	Drivers had a much higher usage rate than passengers. Rear-seat passengers had a very low rate of usage.
4. Residence	Occupants in out-of-state vehicles used seatbelts more often than occupants of in-state vehicles.
5. Type of Highway	Usage was highest on interstates and parkways and lowest on other rural highways. Usage on urban streets fell between the two extremes.
6. Vehicle Age	Seatbelts were used more often in newer cars.
7. Population	Usage increased in higher population areas.
8. Time of Day	There was not a significant difference in usage between daylight and darkness. However, the lowest usage rates were from midnight to 6:00 a.m.
9. Day of Week	There was not a large difference in usage among days of the week. However, usage on weekdays was higher than on the weekend.
10. Month	Although there was not a large variation, usage was highest during the winter months of January through March.
11. Road Surface Condition	Usage increased when road conditions were hazardous.
12. Weather Condition	Usage increased during inclement weather.
13. Type of Vehicle	There was a large variation in usage among drivers in various types of vehicles. Drivers in emergency vehicles had a much higher usage rate than drivers in any other type of vehicle. Drivers of school buses, buses, and truck combinations also had higher usage rates. Usage was lowest among drivers of single-unit trucks and taxis.
14. Occupation	Professionals had the highest usage rate.
15. Education	Usage was higher among drivers with a college education.
16. Marital Status	Usage was lowest among divorced and separated individuals and highest among widowed individuals.
17. Annual Family Income	Usage increased as family income increased.
18. Number of Dependents (other than self)	There was not a definite relationship.
19. Driving Experience (Years)	There was a very slight increase among drivers with over 20 years of driving experience.

20. Average Number of Miles Driven	Usage did not increase with miles driven. Usage by drivers with an annual mileage of less than 15,000 was slightly more than by drivers with higher mileage rates.
21. Method Learned to Drive	Usage was highest among drivers who had attended driving schools. High-school driver training did not improve seatbelt usage.
22. Self-Testing Attitude	Usage was highest among low self-testers.
23. Percent of Driving at Night	Usage was highest among drivers who did more than 50 percent of their driving at night.
24. Road Type with Largest Amount of Driving	Usage was highest by drivers who did most of their driving on interstate and toll roads.
25. Trip Purpose with Largest Amount of Driving	Usage was highest by drivers who did most of their driving on long non-work-related trips.
26. Vehicle Style	Drivers of compact and midsize cars had slightly higher usage rates.
27. Engine Size	Drivers of four-cylinder cars had slightly higher usage rates.
28. Points Currently on Driving Record	Usage was higher among drivers who had no points on their driving record.
29. Accidents in Past 2 Years	Usage was higher among drivers who had not been involved in an accident.
30. Number of Vehicles Involved	Usage was lower in single-vehicle than in multiple-vehicle accidents.
31. Roadway Character	Usage was lower in accidents occurring on curves compared to straight sections of roadway. Usage was highest in accidents on straight and level roadway sections.
32. Type of Accident	Usage was highest in angle and rear-end accidents. Single-vehicle and fixed-object accidents had lower rates, while head-on accidents had the lowest rate.
33. Car Make	Usage tended to be higher in foreign cars than American-made vehicles. Also, usage tended to be higher in the more expensive vehicles.
34. Contributing Circumstance	Drivers with alcohol or drug involvement had very low usage rates. Drivers with a physical disability had a high usage rate. Usage rates were higher among drivers with no driver error listed compared to those with an error listed on the accident form.

**TABLE 15. BODILY LOCATION OF INJURY TO DRIVERS OF VARIOUS MODEL VEHICLES
(TYPE OF SEATBELT PRIMARILY USED)**

BODILY LOCATION OF INJURY	PERCENT OF TOTAL INJURIES			
	1973 OR OLDER VEHICLES		1974 TO 1977 VEHICLES	
	NOT USING SEATBELT	USING SEATBELT (PRIMARILY LAPBELT ONLY)	NOT USING SEATBELT	USING SEATBELT (PRIMARILY LAPBELT AND SHOULDER BELT)
Head and Face	46.7	40.5	47.2	36.0
Neck	8.8	14.1	9.6	13.9
Chest	6.4	5.7	5.8	5.6
Back	7.9	8.4	7.0	11.2
Abdomen and Pelvis	2.4	2.9	2.0	2.5
Arms and Hands	9.7	10.4	9.7	11.0
Legs and Feet	10.9	13.8	12.3	14.0
Multiple -- Entire Body	7.2	4.2	6.4	5.8

**TABLE 16. SEATBELT USAGE BY ALL OCCUPANTS AND SEVERAL VARIABLES
(BASED ON ACCIDENT DATA)**

VARIABLE	CATEGORY	PERCENT OF OCCUPANTS USING SEATBELTS ^a
Sex	Male	7.7
	Female	7.0
Age (Years)	Under 6	4.6
	6 - 12	2.9
	13 - 15	2.4
	16 - 24	5.6
	25 - 49	8.7
	50 or older	8.4
Position in Vehicle	Driver	9.1
	Passenger (front seat)	4.4
	Passenger (rear seat)	2.5
Highway Type	State or Federal	5.8
	County or Local	4.7
	Interstate or Parkway	18.7
	Local Street	8.7
Vehicle Age	Pre-1966	6.5
	1966 - 1971	6.1
	1972 - Present	11.6
Population of City of Accident Occurrence	2,500 and under (Rural)	6.1
	2,500 - 10,000	3.4
	10,000 - 25,000	5.1
	25,000 - 50,000	3.3
	50,000 - 100,000	5.1
	100,000 - 250,000	14.5
Land Use or Locality	250,000 and over	15.4
	Rural	5.5
	Business	7.0
	Industrial	7.9
	Residential	7.2
	School	6.6
	Park	5.3
Private Property	6.8	

TABLE 16. (CONTINUED)

VARIABLE	CATEGORY	PERCENT OF OCCUPANTS USING SEATBELTS ^a
Sex	Male	7.7
	Female	7.0
Time of Day	Midnight - 3 a.m.	6.6
	3 a.m. - 6 a.m.	6.7
	6 a.m. - 9 a.m.	8.3
	9 a.m. - Noon	7.0
	Noon - 3 p.m.	7.1
	3 p.m. - 6 p.m.	8.0
	6 p.m. - 9 p.m.	7.5
	9 p.m. - Midnight	7.1
Day of Week	Sunday	6.3
	Monday	7.5
	Tuesday	8.1
	Wednesday	8.0
	Thursday	7.5
	Friday	7.5
	Saturday	6.7
Month	January	8.4
	February	7.7
	March	8.7
	April	8.0
	May	7.5
	June	7.4
	July	6.9
	August	6.5
	September	7.0
	October	7.1
	November	7.5
	December	6.1

^aWearing lapbelt with or without a shoulder belt.

**TABLE 17. SEATBELT USAGE BY DRIVER AND SEVERAL VARIABLES
(BASED ON ACCIDENT DATA)**

VARIABLE	CATEGORY	PERCENT OF DRIVERS USING SEATBELT ^a
Sex	Male	9.0
	Female	9.0
Age (Years)	Below 25	7.0
	25 - 49	10.3
	50 or Above	10.1
Driver Residence	Local	8.8
	Elsewhere in State	9.9
	Out-of-state	12.7
Type of Vehicle	Passenger Car	9.0
	Passenger Car with Trailer	10.5
	Single-unit Truck	6.6
	Truck Combination	12.1
	Taxi	4.3
	Bus	12.0
	School Bus	15.6
Emergency	36.3	
Road Surface Condition	Dry	8.8
	Wet	9.6
	Snow or Ice	10.7
Weather Condition	Clear	8.5
	Raining	9.8
	Snowing	10.2
	Sleet or Hail	12.7
Light Condition	Daylight	9.0
	Dawn or Dusk	9.5
	Darkness (Lighted)	9.0
	Darkness (Not Lighted)	9.2
Number of Vehicle Occupants (Including Driver)	1	9.6
	2 - 3	8.8
	4 - 6	8.3
	Over 6	11.4
Type of Accident	Angle	9.9
	Head-on	6.2
	Rear-end	9.9
	Fixed-object	7.6
	Single Vehicle	8.4

TABLE 17. (CONTINUED)

VARIABLE	CATEGORY	PERCENT OF DRIVERS USING SEATBELT ^a
Roadway Character	Straight	9.2
	Curve	8.1
	Straight and Level	9.5
	Straight and Grade	8.0
	Straight and Hillcrest	7.9
	Curve and Level	8.2
	Curve and Grade	8.2
	Curve and Hillcrest	7.5
Number of Vehicles Involved	Single Vehicle	8.4
	Multiple Vehicle	9.0
Contributing Circumstance	Alcohol Involvement	3.9
	Drug Involvement	4.3
	Physical Disability	9.6
	Driver Error Listed	8.4
	No Driver Error Listed	9.4
Vehicle Make	Buick	8.7
	Cadillac	11.5
	Chevrolet	8.0
	Chrysler	9.9
	Datsun	13.0
	Ford	9.3
	Plymouth	9.4
	Pontiac	9.5
	Toyota	14.4
	Triumph	14.7
	Volkswagen	8.9
	Volvo	19.8
Model Year	1965 or Older	4.2
	1966 - 1971	6.6
	1972	10.2
	1973	12.1
	1974	12.6
	1975	13.2
	1976	13.3
	1977	17.5

^aWearing lapbelt with or without shoulder belt.

**TABLE 18. SEATBELT USAGE AND DRIVER CHARACTERISTICS
(QUESTIONNAIRE RESPONSES OF GENERAL POPULATION OF DRIVERS)**

DRIVER CHARACTERISTIC	CATEGORY	PERCENT OF DRIVERS USING SEATBELTS
Age	Under 25	23.9
	25 - 49	23.4
	50 or older	29.8
Sex	Male	25.1
	Female	25.9
Occupation	Unskilled	21.2
	Semi-skilled	20.6
	Skilled	21.8
	Professional	40.4
	Student	34.4
	Sales	25.0
	Housewife	23.6
	Unemployed	29.2
Education	Did Not Complete High School	20.0
	Completed High School	21.7
	More Than High School	24.4
	Completed College	41.9
Population of City of Residence	over 60,000	29.1
	15,000 - 60,000	29.1
	2,500 - 15,000	21.9
	Less than 2,500	20.9
Marital Status	Married	24.8
	Single	30.9
	Divorced-Separated	14.1
	Widowed	35.7
Annual Family Income	Less than \$6,500	23.2
	\$6,500 - \$12,000	24.5
	\$12,000 - \$18,000	24.2
	Over \$18,000	28.8
Number of Dependents (Other than Self)	0	30.4
	1	25.7
	2	26.9
	3	22.3
	4	18.6
	Over 4	28.8
Driving Experience (Years)	1	24.4
	2 - 5	24.4
	6 - 10	24.5
	11 - 20	24.4
	Over 20	26.6

TABLE 18. (CONTINUED)

DRIVER CHARACTERISTIC	CATEGORY	PERCENT OF DRIVERS USING SEATBELTS
Average Miles Driven per Year (Thousands of Miles)	less than 5	27.0
	5 - 10	24.2
	10 - 15	28.9
	15 - 20	20.1
	20 - 30	23.3
	30 - 50	23.7
Method Learned to Drive	Family and(or) Friend	23.8
	High School Driver Training	25.3
	Driving School	41.2
Nighttime Driving (Percent of Driving at Night)	0 - 10	25.9
	11 - 20	30.0
	21 - 30	21.9
	31 - 40	26.5
	41 - 50	22.2
	51 - 100	35.7
Type of Driving (Road Type with Largest Amount of Driving)	Interstate and Toll Roads	31.1
	Other Four-lane Roads	27.6
	Two-lane Roads	23.4
Type of Driving (Trip Purpose with Largest Amount of Driving)	Work Related	24.8
	Short Non-work Related	25.8
	Long Non-work Related	30.4
Model Year of Vehicle	Pre-1966	28.0
	1966 - 1971	23.5
	1972 - Present	26.3
Vehicle Style	Compact	28.0
	Midsized	30.1
	Fullsize	24.1
	Sports	21.2
	Trucks	20.9
Engine Size	4-cylinder	27.0
	6-cylinder	23.0
	8-cylinder	25.4
Points Currently on Driving Record	0	25.8
	3	19.4
	4 - 6	18.2
Accident in Past 2 Years	No	25.4
	Yes	21.4
Self-Testing Attitude (27)	High	20.1
	Intermediate	21.4
	Low	28.3

Usage rates increased markedly as follows: drivers compared to passengers, drivers over 25 years of age, in newer cars, on interstates and parkways, in large cities, in out-of-state cars, for certain vehicle types and makes, drivers with professional occupations, drivers with a college education, and graduates of driving schools.

DRIVING RECORD AND SEATBELT USAGE

The data on points accumulated from traffic violations and accidents were used as a measure of driver performance. A printout of the driving record of each driver was also obtained from the master drivers-license file. The point accumulation and number of accidents for 1975 through 1976 was obtained for each driver. This information was compared with responses from drivers. The correlation was not high. The data from the driver file was used for point accumulation, but the driver response data was used to obtain the number of accidents. A summary of the results is given in Table 19. The driving record of the drivers who indicated they used seatbelts always or most of the time was better than those who used them occasionally or never. The difference in driving records was most pronounced when point accumulation rather than number of accidents was considered. These results lead to the conclusion that better drivers are more likely to use seatbelts. This was supported by the results which showed the general driving population used seatbelts more often than high-risk drivers (drivers attending driver-improvement clinics).

MANDATORY USAGE OF SEATBELTS

An item on the questionnaire concerned the driver's opinion of a law which would require use of seatbelts. A summary of the response from the general driving population as well as the high-risk drivers is given in Table 20. In both groups, approximately the same percentage of drivers were in favor and against such a law. Considering only the general driving population, approximately one-third of drivers were in favor, one-third were neutral, and one-third were against a law requiring the use of seatbelts.

An analysis was made to determine if there were any major differences in drivers who were in favor or against such a law. Several of the driver characteristics were compared to the answer given by the drivers. Factors considered were age, sex, education, residence, marital status, income, driving record, seatbelt usage, amount of driving, and the method of learning to drive. As expected, the main difference between the two groups of drivers corresponded to reported seatbelt usage. Twice as many drivers who wore seatbelts were in favor of such a law compared to drivers who did not wear them. The other differences were probably related to this single fact inasmuch as the differences

noted were for characteristics which also related to seatbelt usage. For example, the percentage of drivers with a college education who were in favor of such a law was higher than drivers with less than high school education. College graduates were also found to have a higher seatbelt usage rate.

SUMMARY AND CONCLUSIONS

1. Kentucky drivers and passengers have lower seatbelt usage rates (slightly under ten percent) than that reported in other states.
2. Usage rates from accident data and field observations were in agreement. However, respondents to a questionnaire indicated higher seatbelt usage than was obtained from accident data and field observations.
3. Usage rates by passenger were very low but increased dramatically if the driver was using a seatbelt.
4. Accident severity was significantly less for occupants wearing seatbelts. The chances of being killed was reduced by a factor of six by wearing seatbelts; and the chances of being severely injured was reduced by a factor of two.
5. Of the 653 fatalities, only eight involved occupants wearing a seatbelt; seven of these fatalities involved a frontal impact.
6. Seatbelts reduced severity for all occupants regardless of the seating location in the vehicle.
7. Seatbelts reduced accident severity for all types of accidents. Benefits were greatest for fixed-object and single-vehicle accidents and for rollover-type accidents in particular.
8. The use of a shoulder belt reduced the chances of being ejected from the vehicle compared to using the lapbelt only.
9. Usage rates were markedly higher for the following: drivers compare to passengers, drivers over 25 years of age, people in newer cars, travelers on interstates and parkways, those in large cities, those in out-of-state cars, those in certain vehicle types and makes, drivers with professional occupations, drivers with a college education, and graduates of driving schools.
10. Better drivers are more likely to use a seatbelt. Driving records of those who wear a seatbelt were found to be better than for those who do not wear a seatbelt.
11. Drivers were asked to express their opinion of a law which would require use of seatbelts at all times. Responses from the sample showed that approximately one-third of drivers were in favor, one-third were neutral, and one-third were against a mandatory seatbelt usage law.

TABLE 19. DRIVING RECORD AND SEATBELT USAGE^a

QUESTION	ANSWER	DRIVING RECORD OF DRIVERS			
		POINTS PER YEAR	POINTS PER 10,000 MILES	ACCIDENTS PER YEAR	ACCIDENTS PER 10,000 MILES
Use of Lapbelt when Driving	Always or Most of the Time	0.13	0.10	0.073	5.82
	Occasionally or Never	0.20	0.15	0.076	5.65
Use of Lapbelt when a Passenger	Always or Most of the Time	0.13	0.11	0.075	6.40
	Occasionally or Never	0.20	0.15	0.075	5.46
Use of Lapbelt and Shoulder Belt	Always or Most of the Time	0.14	0.11	0.062	4.86
	Occasionally or Never	0.20	0.15	0.078	5.59

^aResults from response from general driving population.

TABLE 20. ANSWERS TO QUESTIONS ON MANDATORY USE OF SEATBELTS

OPINION	PERCENT OF DRIVERS	
	GENERAL DRIVING POPULATION	HIGH-RISK DRIVERS
Strongly in Favor	10	8
In Favor	22	19
Neutral	35	42
Against	23	24
Strongly Against	10	7

RECOMMENDATIONS

The effectiveness of seatbelts as a safety device has been clearly demonstrated. Increased seatbelt usage can be the single, most cost-effective means of reducing accident severity. However, less than ten percent of the vehicle occupants were found to be wearing seatbelts in Kentucky. A means of increasing seatbelt usage is warranted. Nationwide publicity campaigns have met with very limited success. Passengers were found to be much more likely to wear a seatbelt if the driver was wearing a belt. Therefore, an attempt should be made to increase usage by the driver and, thereby, to increase usage by passengers. Use of seatbelts should be emphasized whenever possible. High school driver education classes and driver improvement clinics are good opportunities for education. Also, consideration should be given to a law requiring the use of seatbelts, if only for drivers. At the very least, drivers of certain types of vehicles such as school buses and emergency vehicles should be required to wear a seatbelt.

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APPENDIX A
FIELD SURVEY DATA FORM
AND SUMMARY

SAFETY BELT USAGE SURVEY FORM

DATE _____ LOCATION _____

TIME _____ REMARKS _____

VEH. AGE			RES.		OCC. POS.			BELT			SEX		AGE					
I	2	3	S	OS	D	PF	PR	L	S	N	M	F	C	P	Y	M	O	

**CODES FOR
SAFETY-BELT USAGE SURVEY FORM**

VEHICLE AGE

- 1 Pre-1966
- 2 1966-1971
- 3 1972 to Present

OCCUPATION POSITION

- D = Driver
- PF = Passenger in Front Seat
- PR = Passenger in Rear Seat

SEX

- M = Male
- F = Female

RESIDENCE

- S = Kentucky License Plate
- OS = Out-of-state License Plate

BELT

- L = Lapbelt Only
- S = Shoulder Harness
- N = Not Used

AGE

- C = Child (1 - 9 years)
- P = Pre-adult (10 - 15 years)
- Y = Young Adult (16 - 30 years)
- M = Middle Adult (31 - 60 years)
- O = Older Adult (61 years and over)

NUMBER OF FIELD OBSERVATIONS

LOCATION	ALL OCCUPANTS	DRIVERS
Urban (large)	3,205	2,215
Urban (small)	1,431	970
Rural (interstate and parkway)	1,531	823
Rural (two-lane)	1,151	693
Total	7,318	4,701

APPENDIX B
QUESTIONNAIRE

DRIVER OPINION QUESTIONNAIRE

PERSONAL INFORMATION

1. Age _____
2. Sex _____
3. Occupation _____

4. Education
 Did not complete High School
 Completed High School
 More than High School
 Completed College
5. Population of City of Residence
 Greater than 60,000
 15,000 - 60,000
 2,500 - 15,000
 Less than 2,500
6. Marital Status
 Married
 Single
 Divorced or Separated
 Widowed
7. Annual Family Income
 Less than \$6,500
 \$6,500 - \$12,000
 \$12,000 - \$18,000
 Over \$18,000
8. Number of Dependents (other than self)

DRIVING INFORMATION

1. How many years have you been driving? _____
2. Estimate the average number of miles you drive per year. _____
3. How did you learn to drive? Please check as many as apply.
 Family
 Friend
 High School driver-training class
 Driving School
4. How often do you use seatbelts? (Skip to question 6 if car does not have seatbelts.)
a. when driving Always Most of the time Occasionally Never
(Please check one)
b. When a passenger Always Most of the time Occasionally Never
(Please check one)
5. How often do you use both your seatbelt and shoulder harness? (Skip to question 6 if car does not have shoulder harness.)
 Always Most of the time Occasionally Never
6. What percentage of your driving time is at night? _____%
7. Divide your driving time among the following types of roads.
(percentages should total 100 percent)
 % Interstate and Toll Roads
 % Other four-lane roads
 % Two-lane roads
8. Divide your driving trips into the following purposes.
(percentages should total 100 percent)
 % Work-related trips (home to work and business trips)
 % Short non-work-related trips (errands, shopping, etc.)
 % Long non-work-related trips (vacations, etc.)

OVER

