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PROJECT REPORT FOR GHSP PROJECT:
INCREASED SEAT BELT USE
THROUGH POLICE ACTIONS

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INTRODUCTION

The passage of mandatory seat belt laws has produced considerable activity, as states have been eager to follow the belt wearing rate and the resulting effect on motor vehicle injuries and fatalities. As one of the first states to pass a seat belt law, North Carolina has been no exception in undertaking numerous efforts to both promote and evaluate its belt law. Prior to this current project, a three-year evaluation of the seat belt law reported that increases in belt wearing, from about 25 percent just prior to the law to about 60 percent after enforcement of the $25 fine for failure to wear available belts, had resulted in an 11.6 percent decrease in fatalities and a 14.6 percent decrease in serious and fatal injuries (A+K) during the citation phase of the law. These reductions are determined based on what would have been expected without a belt law in place (Reinfurt, Campbell, Stewart, and Stutts, 1988).

To realize better fatality and injury reduction, the level of usage must be increased statewide, particularly among those that are most at risk of crashes. The key to increased usage is effective law enforcement. Campbell, Stewart and Campbell (1987) show clearly that belt usage is highly correlated with the level of enforcement. In their survey of 24 states plus the District of Columbia having seat belt laws, the states with the highest level of citations per 100,000 population also had the highest belt usage rates. Thus, a prime candidate area for improving statewide belt usage in North Carolina is through working with law enforcement agencies, both the Highway Patrol and the city police and sheriffs offices.

The current project has extended activities associated with the belt law, including: (1) continued tracking of the statewide belt use rate through the observational survey of front seat occupants at 72 sites across the state, (2) an examination of the use of automatic seat belts, (3) a further examination of motor vehicle injury and fatality trends, (4) a survey of local enforcement practices associated with the belt law, and (5) support for two other belt projects in North Carolina -- "Comprehensive Program for Increasing Use of Safety Seats and Seat Belts for Children and Young Adults" (funded by the N.C. Governor's Highway Safety Program) and "Safety Belt Law Demonstration Grant Program" (funded by the National Highway Traffic Safety Administration).

This report will summarize efforts associated with each of the tasks or activities noted above.

STATEWIDE BELT USE DATA

Background

Seat belt usage in North Carolina has been observed periodically over the past four years in conjunction with the evaluation done for the North Carolina legislature. Details on the survey design, observational procedures and results for the first three years of the law are documented in the report cited earlier entitled, "North Carolina's Occupant Restraint Law: A Three-Year Evaluation" (Reinfurt, et al., 1988).

As the identical survey design and observational procedures used in this initial study were followed in the two surveys carried out during the past year, these will not be repeated in detail here. In brief, during the past year, two rounds of surveys were conducted using the 72 permanent sampling sites selected for the earlier study. These surveys were carried out in January/February 1989 and in June/July 1989. As before, each site was observed for 90 minutes in each of the survey waves.

Site-specific data include month and year of observations as well as starting and finishing times, weather condition, pavement type, urban/rural area and a diagram of the intersection. For front seat positions of vehicles covered by the law, data were collected on vehicle type along with sex, race, and belt status of the occupants.

Results

The results of the two surveys are provided in Table 1 for driver usage rates and Table 2 for all front seat occupants. Included in these tables are results from previous surveys to enable long term comparisons. The last two columns in each table represent the results of the surveys conducted during the current project year.

As can be seen for the winter survey, 24,317 vehicles were observed with a total of 31,845 occupants. In the summer survey, there were 25,775 vehicles that were surveyed which included 34,424 occupants. The weighted driver belt usage rates were 59.7 percent and 61.3 percent for the winter versus summer surveys, respectively. The corresponding figures for all front seat occupants

Table 1. **Driver** belt usage rates in North Carolina.

	PRE-LAW	POST-LAW Warning Ticket Phase						
	Sept. 1985 (72 sites)	Nov. 1985 (12 sites)	Jan. 1986 (72 sites)	March 1986 (12 sites)	April 1986 (12 sites)	June 1986 (72 sites)	Aug. 1986 (12 sites)	Oct. 1986 (72 sites)
Overall Usage %:								
Observed	25.4	45.0	41.9	45.4	47.7	43.7	40.8	43.8
[Weighted]	[25.5]	[46.5]	[44.3]	[47.0]	[49.0]	[44.8]	[41.0]	[44.8]
(No. occupants)	(18,212)	(6734)	(19,927)	(3380)	(3339)	(19,159)	(4260)	(21,859)
Rural/Urban								
Rural	22.1	40.5	38.2	41.3	42.8	41.0	36.5	40.5
Urban	28.4	49.0	45.4	48.8	51.6	47.0	43.9	47.6
Region								
Mountains	23.5	40.8	43.7	40.5	42.2	41.9	34.5	41.9
Piedmont	27.6	48.5	44.2	47.6	50.4	46.5	45.2	46.6
Coast	25.1	49.2	37.9	50.8	51.3	42.5	44.0	43.4
Time of Day								
Commuting	27.2	47.3	43.2	42.6	47.3	46.3	42.1	47.0
Non-Commuting	24.0	44.0	41.1	46.7	47.9	41.8	40.1	41.6
Vehicle Type								
Car	26.6	45.8	45.1	48.1	50.4	46.5	43.3	47.4
Van	25.9	49.3	34.2	48.8	48.2	45.2	44.1	44.5
Pickup	18.5	39.0	30.1	33.3	36.8	31.3	28.8	30.5
Other	31.1	50.4	43.2	51.3	42.2	51.3	45.5	42.7
Sex of Occupant								
Male	23.7	43.0	37.2	41.8	45.9	39.9	38.8	38.8
Female	28.0	47.7	49.2	50.4	50.5	49.9	43.7	51.3
Race of Occupant								
White	26.5	45.1	43.0	45.3	47.9	44.5	41.3	44.7
Non-white	15.5	43.8	34.9	46.0	46.8	35.7	38.1	36.0

Table 1. Continued.

	Jan. 1987 (72 sites)	POST-LAW Citation Phase: March 1987 (12 sites)	April 1987 (12 sites)	June 1987 (72 sites)	Aug. 1987 (12 sites)	Oct. 1987 (72 sites)	Jan. 1988 (72 sites)	March 1988 (12 sites)
Overall Usage %:								
Observed	77.7	71.3	67.4	64.0	63.1	62.7	60.0	60.2
[Weighted]	[77.9]	[69.9]	[66.6]	[66.6]	[60.6]	[64.7]	[61.6]	[60.0]
(No. occupants)	(15,847)*	(3042)	(3150)	(17,971)	(3537)	(21,423)	(21,341)	(3802)
Rural/Urban								
Rural	75.7	69.7	61.8	59.3	61.6	58.7	54.6	57.8
Urban	80.1	72.4	71.5	69.2	64.7	67.4	65.0	62.3
Region								
Mountains	71.9	63.8	59.9	56.9	57.4	53.7	46.8	51.0
Piedmont	78.9	75.3	74.7	69.5	68.2	67.8	65.3	66.3
Coast	81.1	76.3	68.3	64.3	63.4	65.8	66.6	66.6
Time of Day								
Commuting	80.2	70.5	66.3	65.8	61.4	66.1	62.2	60.1
Non-Commuting	75.5	72.2	68.4	62.5	64.3	60.0	57.4	60.2
Vehicle Type								
Car	80.3	75.4	70.6	68.1	67.4	66.4	64.7	65.2
Van	72.9	63.7	69.4	55.7	51.9	51.7	52.3	41.4
Pickup	69.5	58.3	53.5	50.1	48.6	50.3	43.7	45.6
Other	76.7	70.3	64.8	66.6	53.8	64.9	59.8	56.6
Sex of Occupant								
Male	73.8	67.4	64.3	59.6	58.7	57.5	53.5	55.2
Female	84.4	77.3	72.0	71.0	69.9	70.3	69.9	68.2
Race of Occupant								
White	77.2	70.6	65.9	63.8	62.3	62.7	58.8	59.6
Non-white	80.4	74.0	73.6	65.7	66.4	62.8	65.4	62.9

*Survey methodology modified to collect only for vehicles completely stopped.

Table 1. Continued.

	POST-LAW Citation Phase				
	April 1988 (12 sites)	June 1988 (72 sites)	Aug. 1988 (12 sites)	**Jan. 1989 (72 sites)**	**June 1989 (72 sites)**
Overall Usage %: Observed [Weighted] (No. occupants)	59.8 [58.6] (4089)	62.4 [65.0] (24,183)	62.7 [63.6] (3768)	**55.6 [59.7] (24,317)**	**56.9 [61.3] (25,775)**
Rural/Urban					
Rural	55.1	58.5	60.6	**48.5**	**51.1**
Urban	63.7	66.5	65.1	**62.9**	**63.1**
Region					
Mountains	50.2	55.5	58.1	**48.7**	**49.8**
Piedmont	68.2	67.7	66.7	**61.8**	**62.7**
Coast	63.1	64.0	64.7	**55.2**	**57.7**
Time of Day					
Commuting	59.1	63.3	62.0	**57.9**	**57.7**
Non-Commuting	60.5	61.6	63.3	**53.8**	**56.2**
Vehicle Type					
Car	63.7	67.1	68.4	**60.3**	**61.9**
Van	54.9	47.6	49.3	**45.6**	**41.4**
Pickup	45.4	47.5	44.4	**38.7**	**39.8**
Other	64.4	64.0	63.7	**57.9**	**58.4**
Sex of Occupant					
Male	54.7	56.5	57.0	**49.5**	**51.3**
Female	67.3	70.9	71.5	**64.8**	**65.2**
Race of Occupant					
White	58.5	62.0	61.9	**55.4**	**56.4**
Non-white	66.5	65.1	67.1	**57.1**	**60.0**

Table 2. **Front seat occupant** belt usage rates in North Carolina.

	PRE-LAW	POST-LAW Warning Ticket Phase						
	Sept. 1985 (72 sites)	Nov. 1985 (12 sites)	Jan. 1986 (72 sites)	March 1986 (12 sites)	April 1986 (12 sites)	June 1986 (72 sites)	Aug. 1986 (12 sites)	Oct. 1986 (72 sites)
Overall Usage %:								
Observed	24.1	42.3	39.7	42.8	45.8	42.2	38.9	42.0
[Weighted]	[24.1]	[44.1]	[42.6]	[45.0]	[47.1]	[43.3]	[39.7]	[43.3]
(No. occupants)	(25,084)	(8858)	(26,722)	(4647)	(4549)	(26,546)	(5675)	(29,982)
Rural/Urban								
Rural	21.2	38.0	35.8	38.7	41.9	40.0	34.9	39.0
Urban	27.0	46.5	43.6	46.4	49.1	45.3	41.9	45.5
Region								
Mountains	22.5	38.4	41.8	38.2	41.2	41.2	33.4	40.4
Piedmont	26.2	46.8	42.3	44.5	48.7	44.6	42.6	44.3
Coast	23.8	45.4	35.2	48.5	47.9	40.6	42.3	41.5
Time of Day								
Commuting	25.8	44.1	40.7	39.5	45.4	44.4	39.5	45.3
Non-Commuting	22.9	41.6	39.1	44.5	45.9	40.7	38.6	39.8
Vehicle Type								
Car	25.5	43.3	42.9	45.3	48.5	45.1	41.6	45.5
Van	24.8	45.4	33.3	49.1	48.8	44.2	40.9	44.0
Pickup	16.3	35.8	27.4	31.1	33.5	29.5	26.3	28.3
Other	30.2	50.3	40.4	47.3	44.6	49.4	43.1	41.6
Sex of Occupant								
Male	22.3	40.3	34.9	39.9	43.5	38.3	36.7	36.8
Female	25.9	44.2	45.7	46.1	48.6	47.0	41.4	47.9
Race of Occupant								
White	25.2	42.7	41.1	42.9	46.3	43.2	39.5	43.1
Non-white	14.4	39.4	31.2	42.7	43.2	32.5	35.5	32.8

Table 2. Continued.

	POST-LAW Citation Phase							
	Jan. 1987 (72 sites)	March 1987 (12 sites)	April 1987 (12 sites)	June 1987 (72 sites)	Aug. 1987 (12 sites)	Oct. 1987 (72 sites)	Jan. 1988 (72 sites)	March 1988 (12 sites)
Overall Usage %: Observed	75.8	69.1	65.3	61.7	60.4	60.5	57.6	59.1
[Weighted]	[76.4]	[68.0]	[64.3]	[64.9]	[58.3]	[62.6]	[59.8]	[59.3]
(No. occupants)	(21,675)*	(4142)	(4273)	(25,033)	(4870)	(28,946)	(28,467)	(4945)
Rural/Urban								
Rural	74.0	67.6	60.5	57.1	58.7	56.8	52.9	57.5
Urban	78.2	70.3	69.0	67.0	62.1	65.1	62.7	60.7
Region								
Mountains	70.7	62.2	58.3	54.4	55.5	51.7	45.1	50.5
Piedmont	76.9	72.9	72.8	67.6	64.8	65.8	63.0	64.4
Coast	79.0	73.6	65.3	62.0	60.8	63.7	65.3	66.4
Time of Day								
Commuting	78.0	68.1	64.8	63.1	58.0	63.4	60.0	58.6
Non-Commuting	74.1	70.4	65.7	60.6	62.0	58.4	55.5	59.6
Vehicle Type								
Car	78.8	73.3	68.4	65.8	64.8	64.4	62.6	64.3
Van	70.3	61.4	64.8	53.0	45.5	49.1	49.9	39.0
Pickup	66.5	56.1	51.7	47.8	46.1	47.1	41.5	44.0
Other	78.0	68.9	66.2	63.8	50.7	63.4	58.3	58.3
Sex of Occupant								
Male	71.7	65.3	62.0	57.3	56.3	54.9	51.8	53.1
Female	81.3	74.1	69.2	67.1	65.6	67.0	65.0	67.3
Race of Occupant								
White	75.6	68.6	63.9	61.4	59.9	60.6	57.0	58.5
Non-white	77.5	71.1	70.6	63.5	62.7	60.2	61.6	62.1

*Survey methodology modified to collect only for vehicles completely stopped.

Table 2. Continued.

	POST-LAW Citation Phase				
	April 1988 (12 sites)	June 1988 (72 sites)	Aug. 1988 (12 sites)	**Jan. 1989 (72 sites)**	**June 1989 (72 sites)**
Overall Usage %:					
Observed	57.6	60.7	62.2	**53.5**	**54.8**
[Weighted]	[56.7]	[63.7]	[63.5]	**[57.8]**	**[59.3]**
(No. occupants)	(5448)	(32,590)	(5002)	**(31,845)**	**(34,424)**
Rural/Urban					
Rural	53.1	56.9	60.1	**46.5**	**49.6**
Urban	61.6	65.1	64.7	**60.9**	**60.9**
Region					
Mountains	48.4	53.7	58.5	**46.8**	**48.5**
Piedmont	65.5	66.2	65.4	**60.0**	**60.3**
Coast	61.2	62.9	63.9	**52.8**	**55.6**
Time of Day					
Commuting	56.6	61.1	61.2	**55.6**	**55.5**
Non-Commuting	58.6	60.4	62.9	**51.9**	**54.3**
Vehicle Type					
Car	61.5	65.6	68.2	**58.3**	**59.8**
Van	54.6	45.8	51.3	**42.7**	**38.7**
Pickup	42.6	44.9	41.6	**35.8**	**36.9**
Other	63.3	63.1	66.4	**56.4**	**57.3**
Sex of Occupant					
Male	52.2	54.3	55.4	**47.1**	**48.7**
Female	64.4	68.1	70.5	**61.4**	**62.3**
Race of Occupant					
White	56.5	60.3	61.7	**53.4**	**54.6**
Non-white	63.2	63.5	64.9	**54.6**	**56.2**

were 57.8 percent and 59.3 percent for the two surveys. For the driver, these rates are depicted in Figure 1 which also shows the results for the 19 previous belt surveys conducted in North Carolina. As can be seen from Figure 1, driver belt usage has leveled off at approximately 60 percent statewide.

The driver belt usage rates in both the winter and summer surveys are considerably higher in the urban areas than in the rural areas; in the piedmont and coastal areas as opposed to the mountainous area; during commuting hours as opposed to non-commuting and weekend hours (although not as large a difference); for cars as opposed to vans and pickups; for female drivers; and consistently higher for non-white drivers.

As can be seen from Table 2 which provides results for all front seat occupants, the trends are very similar to those seen for the driver except approximately 2 percentage points lower; namely, higher usage in urban areas; piedmont and coastal areas; commuting hours; in cars; for females; and for non-white occupants.

Seat Belt Misuse Data

As an added feature to the most recent survey, data collectors also noted improper usage of seat belts. The categories of misuse coded were:

Loose - shoulder belt properly routed and fastened, but excessively slack

Under arm - shoulder belt routed under the arm rather than across the shoulder

Behind back - lap belt properly fastened, but shoulder belt routed behind the back

Hanging - shoulder belt simply draped over shoulder, unfastened.

Misuse rates by driver sex and race are reported in Table 3. The most common form of misuse detected was the shoulder belt being worn too loosely across the shoulder -- approximately 2.5 percent of all drivers observed. The next most frequent category of misuse was the shoulder belt routed under the arm rather than across the shoulder -- 1.8 percent overall. Only small percentages of those observed routed the shoulder belt behind their back (0.1 percent) or hung it, unfastened, over their shoulder (0.3 percent).

Combining these categories of misuse, the overall misuse rate was 4.6 percent. However, the data in Table 3 show variations by sex and race. In

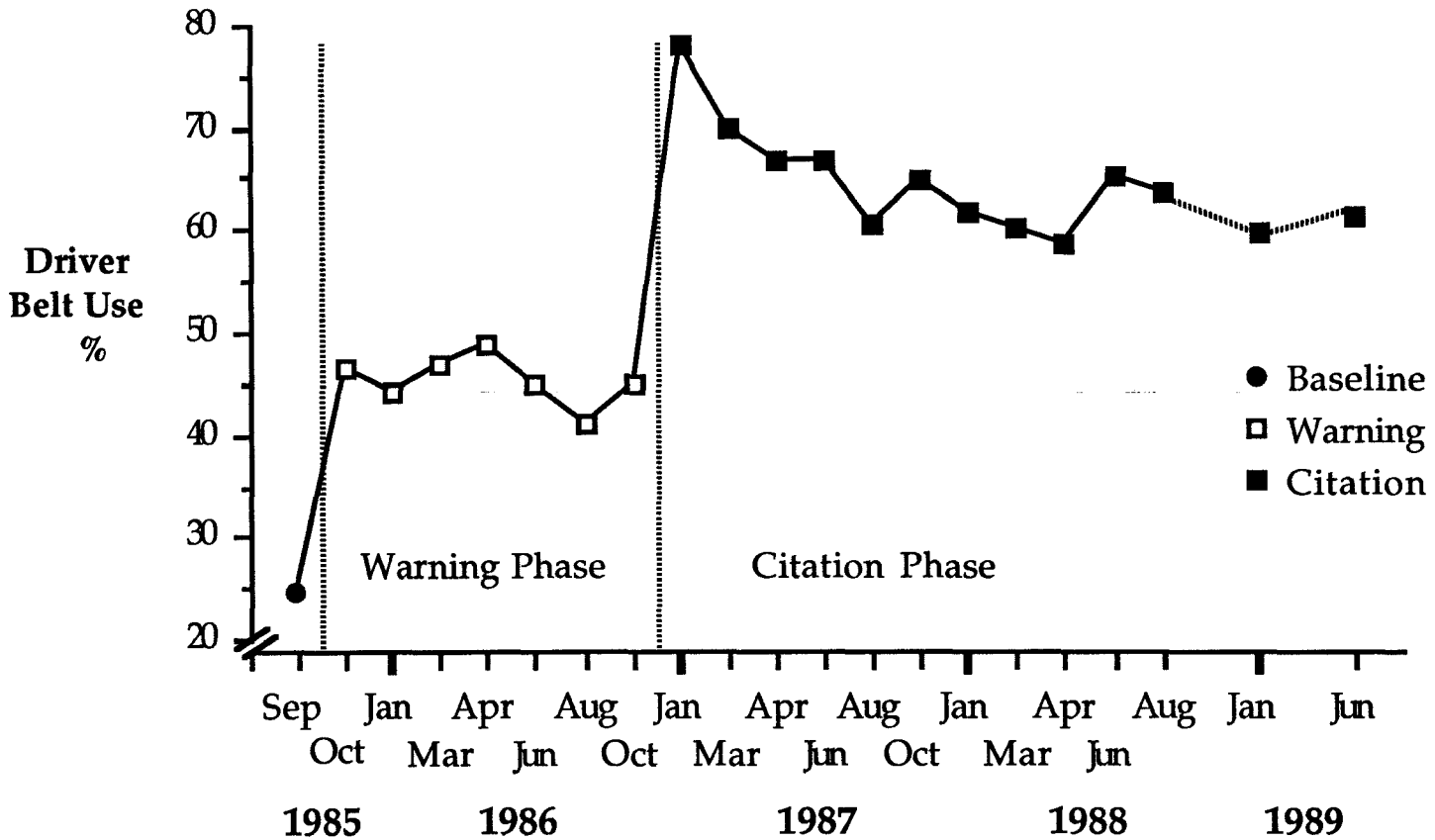

Figure 1. Weighted driver seat belt usage by phase.

Table 3. Seat belt misuse rates by driver sex and race.

Misuse Category	White Male	White Female	Nonwhite Male	Nonwhite Female	Total
Loose	1.66%	3.77%	1.43%	3.14%	2.46%
Under arm	1.07%	2.91%	.72%	2.99%	1.79%
Behind back	.07%	.09%	.22%	.37%	.10%
Hanging	.25%	.21%	.28%	.60%	.26%
Total	3.05%	6.98%	2.65%	7.10%	4.61%
(N)	(13,591)	(9,001)	(1,813)	(1,337)	(25,742)

particular, females were two to three times more likely to wear their belt too loosely or to route the shoulder portion of the belt under their arm. Nonwhites, on the other hand, were somewhat more likely to wear the shoulder belt behind their back or simply drape it unfastened over their shoulder. Overall, the white and nonwhite misuse rates were similar, whereas the female misuse rate was over twice the male misuse rate.

Misuse data will continue to be collected in subsequent surveys. As more data become available, it will be possible to examine misuse by additional variables including vehicle type, rural/urban location, and section of the State. This type of data is not available from statewide belt usage surveys conducted elsewhere and should provide information on areas where more public education and information would be useful.

Conclusions

On the basis of the two most recent semi-annual statewide surveys, there is both bad news and good news. The bad news is that the belt usage is not climbing over time. The good news obviously is that belt usage has remained very constant and relatively high over the last two years. North Carolina continues to have among the highest belt usage rates of any state in the United States. There is also good news that hopefully belt usage will improve with more automatic restraint vehicles coming into the fleet.

SURVEY OF AUTOMATIC SEAT BELT USAGE IN NORTH CAROLINA

Automatic restraints are becoming increasingly prevalent in the mix of vehicles on the roadway. In model year 1990, all passenger vehicles manufactured will be equipped with either air bags or automatic lap and/or shoulder belts. Since little is known about the use of these devices, it was decided that this project would try to learn about the use (and misuse) of automatic restraints in North Carolina.

To obtain information about the use of restraints in vehicles equipped with automatic restraints (air bags or lap/shoulder belts), supplemental data were collected as part of the statewide belt use survey for North Carolina in January - February, 1989. Observers were trained to spot late-model vehicles in the traffic stream (i.e., vehicles equipped with the center, high-mounted brake light). By visiting automobile dealer showrooms and studying their available literature, the data collectors were able to recognize various makes and models likely to be equipped with automatic restraints. As they visited the 72 sites across North Carolina that make up the survey wave, the data collectors set aside special time periods to collect the automatic restraint data. For this first (pilot) attempt at such data the observers selected (typically) high-volume sites in communities where one would expect a reasonable number of such vehicles in the traffic stream. Some vehicles with manual restraints were included in the data set to provide baseline belt use data for the newer model vehicles.

All total, data were collected for 565 drivers and their vehicles in various locations of North Carolina. The observer recorded the age, race, and sex of the driver as well as the type of restraint installed in the vehicle and whether or not the individual was wearing his/her shoulder and lap belts. In addition, a brief description of the vehicle was recorded along with the license plate number (see Figure 2). The latter information was used to obtain the vehicle identification number (VIN) which was then decoded to determine the year, make, and model of the vehicle and the specific type of restraint system (e.g., motorized automatic shoulder belt and manual lap belt). A total of 544 cases were decoded by this procedure.

Using the restraint type obtained from the VIN and documentation provided by the Insurance Institute for Highway Safety (IIHS), the restraint systems were coded into one of the following seven categories:

Page ___ of ___

Observer _____ Date ___ ___ ___ ___ ___ ___

Time: Start ___:___ Finish ___:___

___ ___ ___ ___
Site Number

Veh #	Driver Age	Driver Race/Sex	Obs. Belt Type	Belt Use S	Belt Use L	(NC) License Plate Number *	Vehicle Description	Comments
1								
						VIN:		
2								
						VIN:		
3								
						VIN:		
4								
						VIN:		
5								
						VIN:		
6								
						VIN:		
7								
						VIN:		
8								
						VIN:		
9								
						VIN:		
10								
						VIN:		

Race / Sex

- **WM** White Male
- **WF** White Female
- **W?** White Unknown
- **BM** Non-White Male
- **BF** Non-White Female
- **B?** Non-White Unknown
- **?** Unknown

Age

- **1** Under 25
- **2** 25 - 54
- **3** 55 or Older

* Use:
0 - zero
Z - letter

Belt System Type

- **1** Manual 3 pt. Lap/Shoulder
- **2** Passive Shoulder Belt Only
  (Ford Escort & Tempo, Mercury Topaz, Isuzu, Mazda 626, Nissan, Saab, Toyota, VW, Subaru, Eagle)
- **3** Passive Lap/Shoulder
  (GM, Honda)
- **4** Air Bag with 3 pt. Belt
  (Volvo, Ford Tempo, Mercury Topaz, Chrysler, Dodge, BMW, Mercedes, Porsche, Acura)
- **?** Unknown

Belt Use

- Y Yes
- N No
- ? Unknown
- - Not Apllicable

Figure 2. Automatic belt data collection form.

1. manual belt
2. air bag
3. motorized shoulder belt/manual lap belt
4. non-motorized (specific type unspecified)
5. non-motorized automatic shoulder belt/no lap belt
6. non-motorized automatic shoulder belt/manual lap belt
7. non-motorized automatic shoulder/lap belt combination

Of the 544 cases with decoded VIN's, the restraint system in 522 of the vehicles was able to be coded using the available documentation. Since vehicles with automatic restraints were of particular interest, the 183 manual restraint vehicles were generally not included in the tabulations.

Frequencies and percentages of seat belt usage were obtained by age, sex, race, manufacturer, region and restraint type for drivers in cars equipped with automatic restraints (i.e., air bags or lap/shoulder belts). Seventy-two percent of the sample was in the 25-54 age group. Approximately 84 percent were white and 56 percent were female (see Table 4). Concerning vehicle characteristics, 63 percent of the cars were manufactured by General Motors and

Table 4. Frequencies and percentages of drivers by age, sex, and race.

	Frequency	%
Age		
Under 25	33	9.7
25-54	244	72.0
55+	62	18.3
Sex		
Male	149	44.0
Female	190	56.0
Race		
White	284	83.8
Non-white	55	16.2

74 percent were American made. Consequently, the majority (64 percent) of the restraints were non-motorized automatic shoulder/lap belt combinations (see Tables 5 and 6). Some 20 percent of the vehicles had a motorized shoulder belt and a manual lap belt (the vast majority of these being Ford and Toyota products). About five percent of the vehicles were equipped with air bags.

Drivers in the 55 and over age group had the highest percentage (73%) of correct seat belt usage of the three age groups, as well as the highest

Table 6. Frequencies and percentages of restraint systems by manufacturer.

	Frequency	%
Air Bags	18	5.3[1]
BMW	5	27.8[2]
Chrysler	1	5.6
Honda	2	11.1
Mercedes	9	50.0
Volvo	1	5.6
Motorized Belt		
Auto Shoulder/Manual Lap	69	20.4
Chrysler	1	1.5
Ford	30	43.5
Mazda	4	5.8
Nissan	9	13.0
Sabaru	1	1.5
Toyota	24	34.8
Non-Motorized Belt		
Auto Shoulder/No Lap	19	5.6
Hyundai	9	47.4
Volkswagen	10	52.6
Auto Shoulder/Manual Lap	8	2.4
Chrysler	2	25.0
Hyundai	6	75.0
Auto Shoulder/Auto Lap	218	64.3
GM	213	97.7
Honda	5	2.3
Type Unknown	7	2.1
Chrysler	2	28.6
Honda	5	71.4

[1]Percent of total [2]Percent within restraint system type

Table 5. Frequencies and percentages of vehicles by region and manufacturer.

	Frequency	%
US	249	73.5[1]
Chrysler	6	1.8[2]
Ford	30	8.8
GM	213	62.8
Europe	25	7.4
BMW	5	1.5
Mercedes	9	2.7
Volkswagen	10	2.9
Volvo	1	0.3
Asia	65	19.2
Honda	12	3.5
Hyundai	15	4.4
Mazda	4	1.2
Nissan	9	2.7
Subaru	1	0.3
Toyota	24	7.1

[1]Percent of total [2]Manufacturer percentage

percentage of no belt use (19%) (see Table 7). The two younger age groups, under 25 and 25-54, were more likely to wear only their shoulder belt when a lap belt was a part of the restraint system. These percentages were 21 and 19,

Table 7. Frequencies (percentages) of seat belt usage by age, sex, and race.

	No Belt	Correct	Shoulder Only	Lap Only
Age				
Under 25	4 (12.1)[1]	22 (66.7)	7 (21.2)	0 (0.0)
25-54	42 (17.2)	145 (59.4)	47 (19.3)	10 (4.1)
55+	12 (19.4)	45 (72.6)	4 (6.5)	1 (1.6)
Sex				
Male	24 (16.1)	97 (65.1)	25 (16.8)	3 (2.0)
Female	34 (18.0)	115 (60.5)	33 (17.5)	8 (4.2)
Race				
White	49 (17.3)	181 (63.7)	45 (15.9)	9 (3.2)
Non-white	9 (16.4)	31 (56.4)	3 (23.6)	2 (3.6)

[1]Row percentage

respectively. Over the four categories of seat belt usage -- correct, shoulder only, lap only, and none -- differences between males and females were small.

In regard to race differences, white drivers had a slightly higher percentage of correct seat belt usage (64%) compared to non-white drivers (56%). The percentages are reversed for shoulder belt only usage.

In comparing manufacturers across the belt usage categories (with sample size of at least five), Ford, Nissan, and Toyota have noticeably lower percentages of correct seat belt use (less than 25%) compared to the other manufacturers (see Table 8). The belt systems of these three manufacturers are primarily automatic shoulder belts and manual lap belts. Table 9 shows that this type of system is associated with lower percentages of correct belt use.

Table 8. Frequencies (percentages) of seat belt usage by manufacturer.

No Belt	No Belt	Correct	Shoulder Lap Only	Lap Only
BMW	1 (20.0)[1]	4 (80.0)	0 (0.0)	0 (0.0)
Chrysler	1 (16.7)	3 (50.0)	2 (33.3)	0 (0.0)
Ford	1 (3.3)	7 (23.3)	22 (73.3)	0 (0.0)
GM	46 (21.6)	158 (74.2)	0 (0.0)	9 (4.2)
Honda	3 (25.0)	9 (75.0)	0 (0.0)	0 (0.0)
Hyundai	0 (0.0)	10 (66.7)	4 (26.7)	1 (6.7)
Mercedes	4 (44.4)	5 (55.6)	0 (0.0)	0 (0.0)
Nissan	0 (0.0)	2 (22.2)	7 (77.8)	0 (0.0)
Toyota	0 (0.0)	3 (12.5)	20 (83.3)	1 (4.2)
Volkswagen	2 (20.0)	8 (80.0)	0 (0.0)	0 (0.0)

[1]Row percentage

Table 9. Frequencies (percentages) of seat belt usage by restraint type.

	No Belt	Correct	Shoulder Only	Lap Only
Air Bags	6 (33.3)[1]	12 (66.7)	0 (0.0)	0 (0.0)
Motorized Belt				
Auto Shoulder/Manual Lap	1 (1.5)	15 (21.7)	52 (75.4)	1 (1.5)
Non-Motorized Belt				
Auto Shoulder/No Lap	2 (10.5)	17 (89.5)	0 (0.0)	0 (0.0)
Auto Shoulder/Manual Lap	1 (12.5)	1 (12.5)	5 (62.5)	1 (12.5)
Auto Shoulder/Auto Lap	47 (21.6)	162 (74.3)	0 (0.0)	9 (4.1)
Type Unknown	1 (14.3)	5 (71.4)	1 (14.3)	0 (0.0)

[1]Row percentage

As a further step, vehicles were categorized into American made, European or Asian (Japanese and Korean) (see Table 10). The former two groups were similar in respect to correct seat belt usage but the latter group, the Asian made cars, had a noticeably lower percentage of correct usage.

Table 10. Frequencies (percentages) of seat belt use by region.

	No Belt	Correct	Shoulder Only	Lap Only
American	48 (19.3)[1]	168 (67.5)	24 (9.6)	9 (3.6)
Asian	3 (4.6)	26 (40.0)	34 (52.3)	2 (3.1)
European	7 (28.0)	18 (72.0)	0 (0.0)	0 (0.0)

[1]Row percentage

Given these preliminary results, there are obvious differences in seat belt usage among the various restraint systems. In particular, drivers of vehicles with automatic shoulder and manual lap belts often neglect to use the lap portion of the restraint system. Since more data were collected in the June-August 1989 survey wave, the frequencies and percentages will be re-examined when these data are ready for analysis. In addition, further divisions of restraint systems by manufacturers will be included.

STATEWIDE ACCIDENT DATA

Background

This portion of the project dealt with injury reduction associated with the onset of the seat belt law. As detailed in Reinfurt, Campbell, Stewart and Stutts (1988), reportable crashes in North Carolina were examined for the period January 1981 through June 1988. Descriptive analyses were carried out to show changing trends over this period. These were followed by time series models analyses of the data.

Briefly the 15 month warning-ticket phase was contrasted with nearly five years of accident and injury data prior to the law. Secondly, analyses were

carried out which contrast the first 18 months with a $25 citation with the period prior to the citation phase (i.e., pre-January 1, 1987).

For purposes of analyses the following study groups were compared:

1. Covered Occupants: front seat occupants of vehicles targeted by the law, i.e., passenger cars, vans, utility vehicles, pickups and other small trucks;

2. Non-Covered Occupants: rear-seat occupants of vehicles targeted by the law; front seat occupants of other vehicles not covered by the law; and

3. Non-Occupants: pedestrians, riders of two-wheeled vehicles, etc.

Results

The descriptive analyses reported in Reinfurt, et al. (1988) were extended to cover data during the current project period, that is, accident and injury data for July 1988 through June 1989. Figure 3 shows the three to five percent of the distribution of covered occupants who sustained a serious or worse injury. The plot shows a clear break at the onset of the law (i.e., warning ticket) and a second break at the beginning of the citation phase, with a clear lowering of the serious or fatal injury rate on each occasion. Certainly there continues to be a seasonal variation with the percent seriously injured generally lower in winter and higher in summer.

The most recent data show an even further lowering in the rate of serious and fatal injury in North Carolina. This is consistent with a reasonably high overall statewide belt wearing rate that has remained fairly constant at about 60 percent. Clearly the plotting points at the beginning of the citation phase (i.e., January 1, 1987) are consistently lower than those in the pre-law period as well as in the warning phase. This is as should be expected if the seat belt law has been effective in reducing injuries.

Figures 4 and 5 show the corresponding plots of fatal and moderate or worse injuries for covered occupants. Here, again, there is clear evidence of the success of the seat belt law, especially in the enforcement phase.

By way of contrast, the data for Figure 6 come from a combination of rear-seat passengers in the same vehicles shown in Figure 3 plus the occupants of, for example, larger trucks, buses, and the like. Members of this combined group, referred to as Non-Covered Occupants, are not required by law to be restrained. Figure 6 shows as before a rather constant rate of serious and

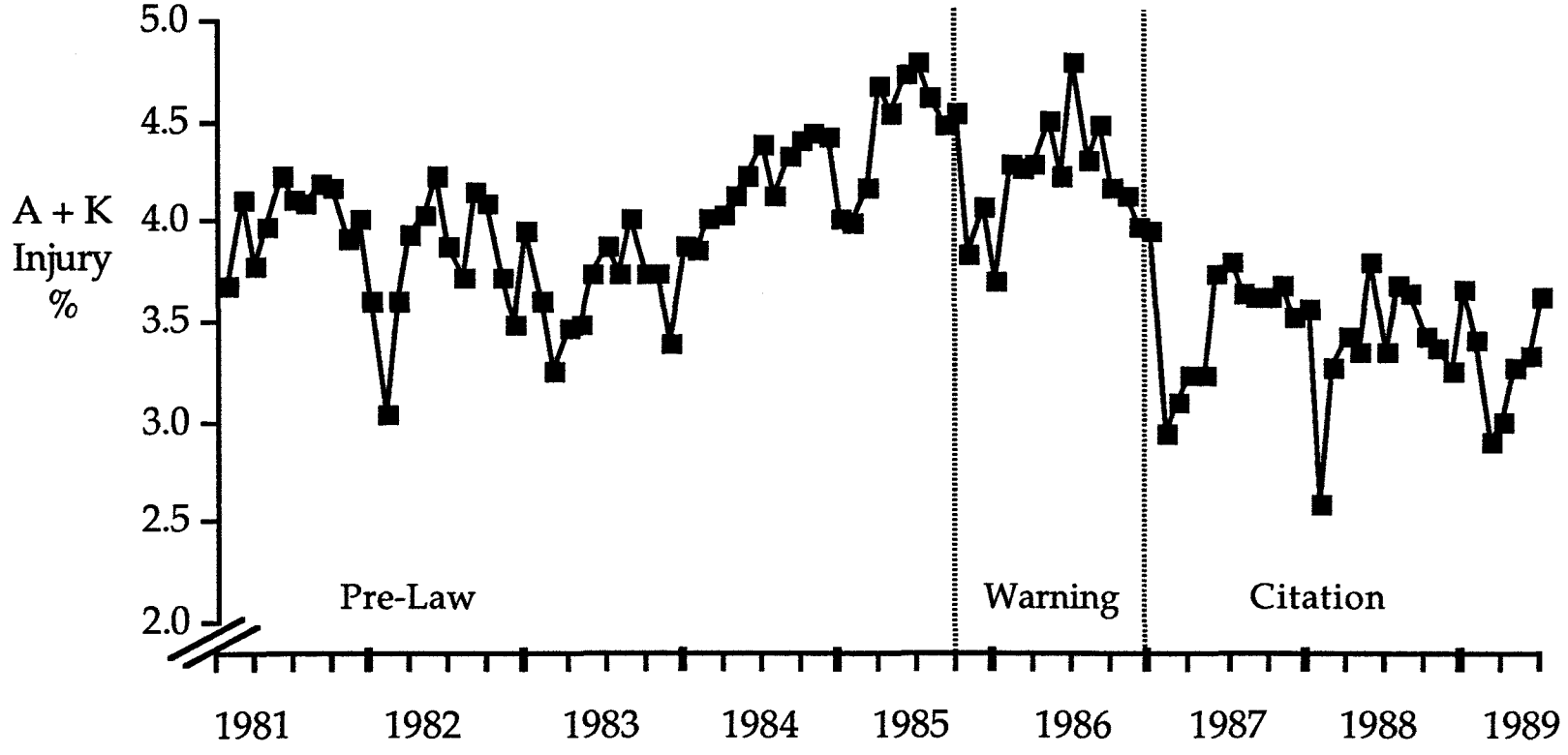

Figure 3. Injury distribution for Covered Occupants.

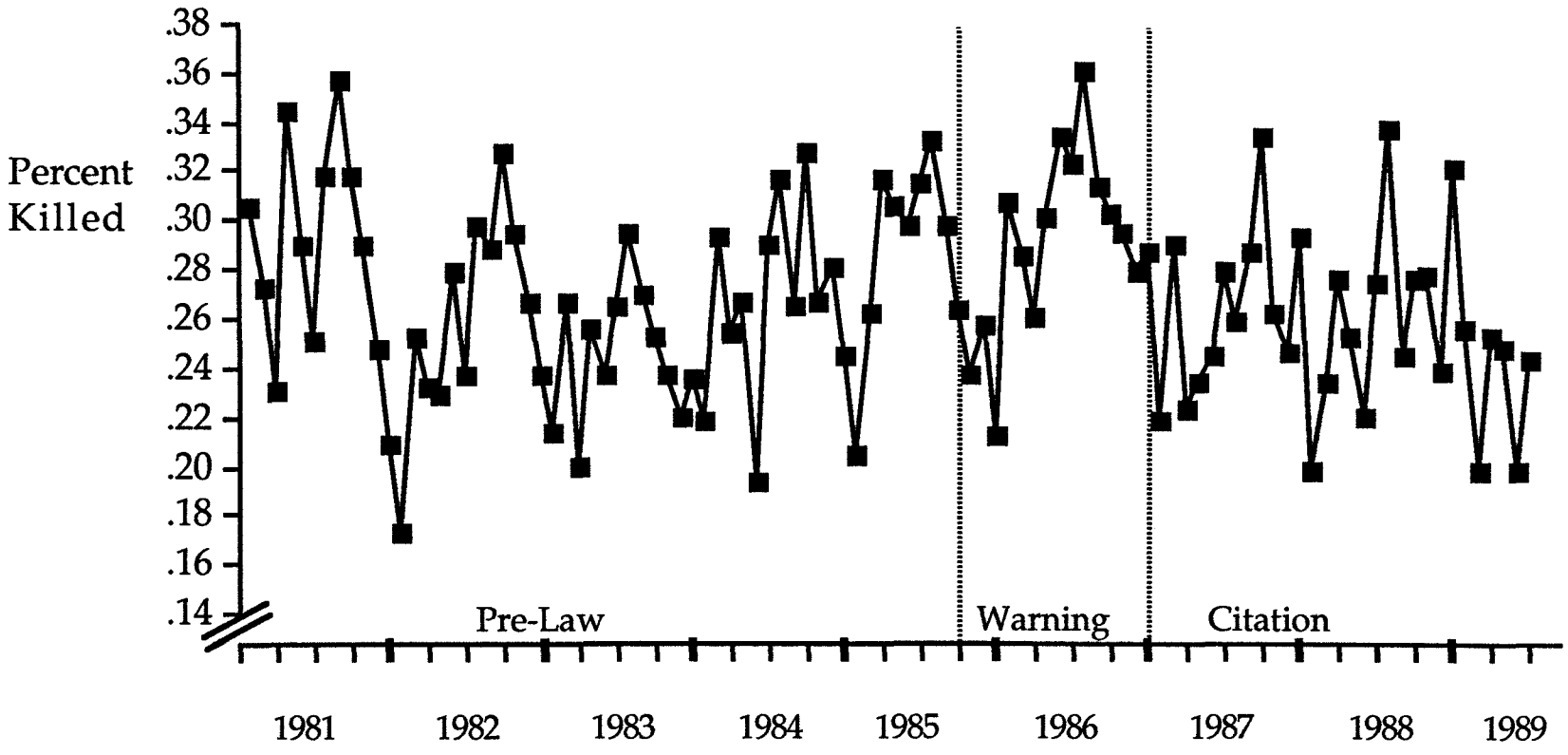

Figure 4. Percent of front seat covered occupants killed - through Enforcement Phase.

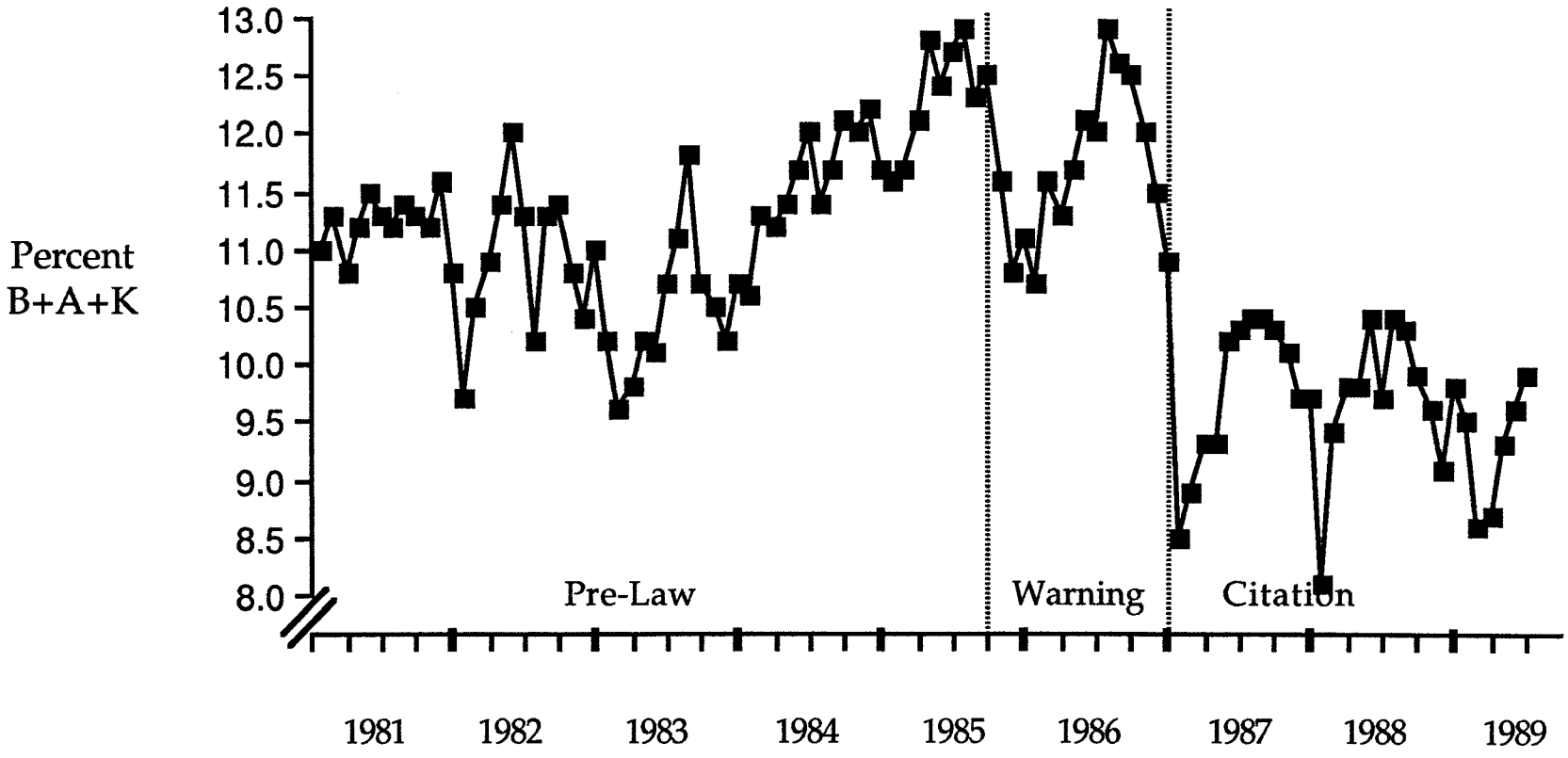

Figure 5. Percent of front seat covered occupants with moderate or worse injury.

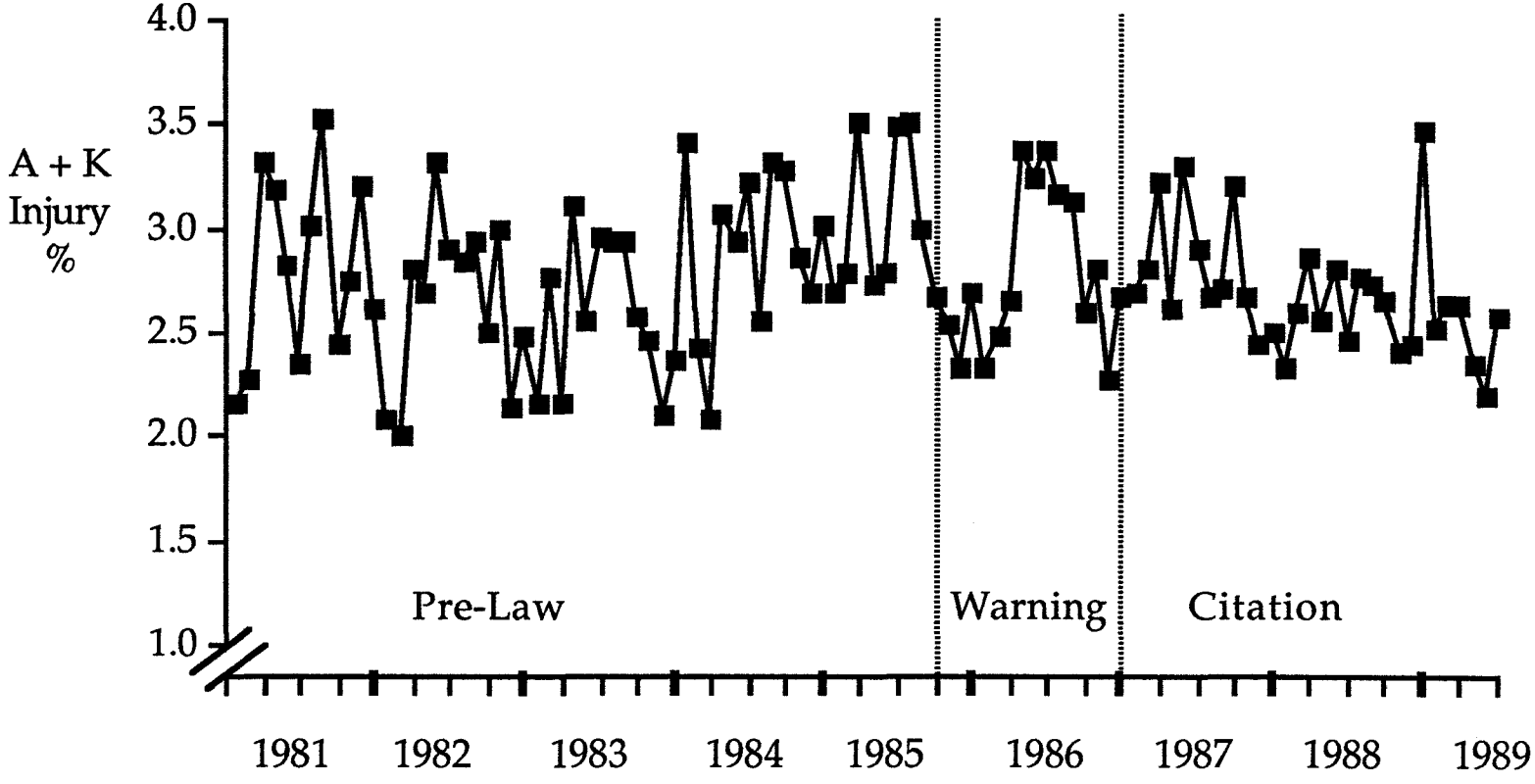

Figure 6. Injury distribution for Non-Covered Occupants.

fatal injury from well before the law (that is, 1981) throughout the warning-ticket and citation phases. The newest data again derive from July 1988 through June 1989. The rates throughout the period range from about two percent to three and a half percent with no significant downward trend (as should be expected for non-covered occupants).

Figure 7 depicts the serious and fatal injury distribution for the Non-Occupant Group. As this group consists of persons for whom seat belts are not available, one would expect no downward shift in injury rates. There is indeed no effect on serious or fatal injuries associated with the onset of the belt use law or with the enforcement phase of the law. Again, the data for the most recent period is shown for July 1988 through June 1989.

In the evaluation by Reinfurt, et al. 1988, time series analyses were carried out to answer an important question -- "How much of an injury reduction occurred compared to the level expected had no seat belt law been introduced?" The model building was carried out using the computer routine STAMP (Structural Time Series Analyzer, Modeller and Predictor). Here, each month of crash data is examined in relation to each other month. The computer routine allows the consideration of seasonal variation, cycles, slopes, etc.

The results of the time series analyses in the previous report showed sizable and significant changes in serious and fatal as well as moderate or worse injuries attributed to the seat belt law. During the $25 citation phase, the estimates of the percentage reductions were 11.6 percent for fatal injuries, 14.6 percent for serious and fatal, and 11.6 percent for moderate or worse injuries. No such similar reductions were seen in the time series analyses involving the Non-Covered groups as well as the Non-Occupants.

The ability of the time series models to project the expected percentage values decreases as the time since the intervention increases. No additional time series modeling was carried out in this study because: (1) nearly three years have passed since the citation period began (i.e., January 1987), (2) the descriptive analyses are so very consistent with those presented in the earlier evaluation, and (3) the belt wearing rate has remained quite constant at nearly 60 percent statewide throughout this period.

Conclusions

It is safe to say that the seat belt law has continued to have a positive effect in reducing injuries for occupants covered by the law. This would

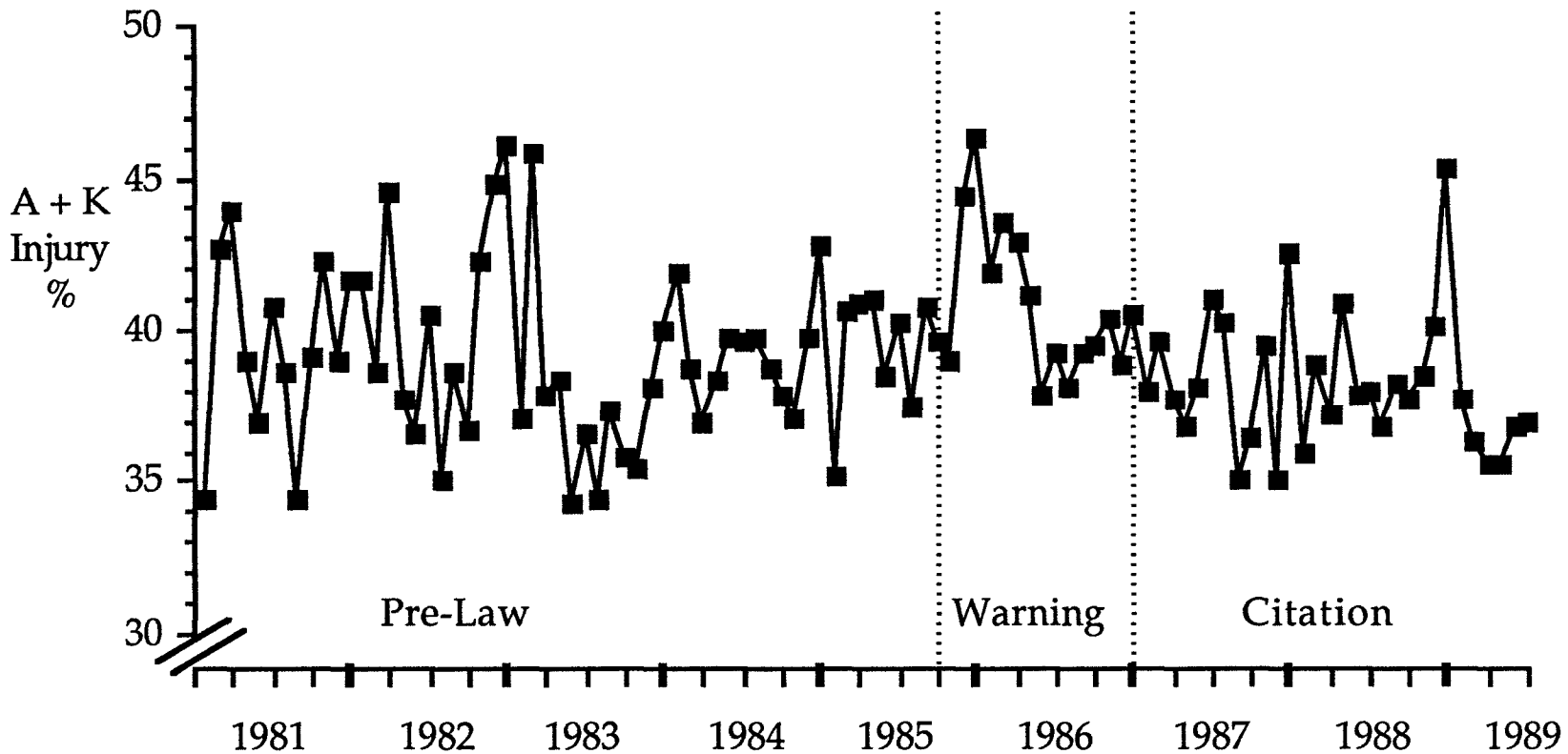

Figure 7. Injury distribution for Non-Occupants.

appear to be clear from Figures 3, 6, and 7 noting the similarities with the results in the three year evaluation, along with the constant statewide usage rates of approximately 60 percent. Evidence for this conclusion continues to be the generally abrupt downward changes at the beginnings of both the warning-ticket phase and citation phase only for those persons covered by the law. In addition, in the time that has elapsed since June of 1988, the basic trends shown in the earlier evaluation obtain.

ENFORCEMENT EVALUATION

HSRC has continued to monitor enforcement activity with respect to the North Carolina seat belt law. This has included obtaining data on the number of seat belt citations issued by the N.C. State Highway Patrol as well as surveying local police departments for information on their enforcement efforts.

Numbers of warnings issued by the N.C. State Highway Patrol were compiled during the period October 1, 1985 - December 31, 1986, while numbers of $25 citations issued have been compiled since January 1, 1987. The earlier evaluation (Reinfurt, et al., 1988) reported that nearly 10,000 warnings were issued each month during the warning ticket phase of the seat belt law and that over 3,100 $25 citations were issued each month during calendar year 1987.

Figure 8 shows the weekly number of seat belt citations issued by the Highway Patrol since the enforcement phase of the law began January 1, 1987. The graph includes all data presented previously, plus data obtained during the current project year (October 1988 - September 1989). The peaks in the data generally correspond to holidays -- Memorial Day, July 4th, and Labor Day, with the two highest points spanning Memorial Day weekends. (It should be noted that beginning June 1989 the Highway Patrol has only been compiling citation data on a monthly basis. For Figure 8, this monthly total was divided by 4.4 weeks/month to obtain an estimated average weekly value.)

The graph shows an overall increase in enforcement activity by the N.C. State Highway Patrol. During 1987 a total of approximately 37,620 seat belt citations were issued by the Patrol; for 1988, the total was 64,075 citations, and for the first nine months of 1989, 65,798 citations. The corresponding monthly averages are 3,135 citations per month for 1987, 5,340 for 1988, and

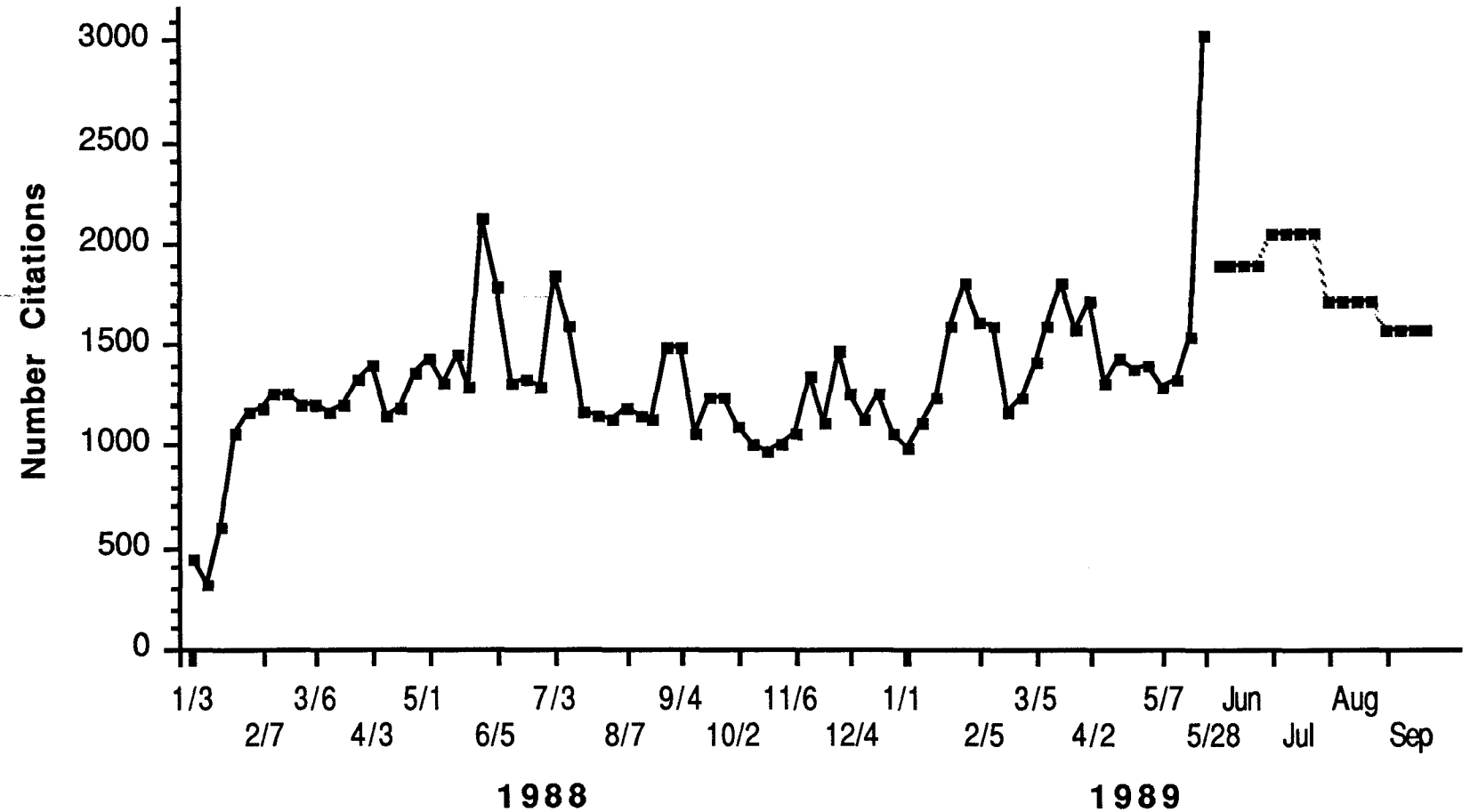

Figure 8. Weekly seat belt citations issued by the North Carolina State Highway Patrol, January 1, 1988 - September 30, 1989.

7,311 for 1989. These numbers demonstrate a strong level of commitment by the N.C. State Highway Patrol to enforcement of the seat belt law.

As in previous years, to obtain enforcement data at the local level a mail survey was sent to all police departments in the State (see the Appendix for a copy of the survey). The survey was sent out in July to a total of 378 police departments in the State. Returns were received from 225 departments for an overall response rate of 60 percent. Table 11 shows the number and percentage of returns by size of community. While there was nearly 100 percent

Table 11. Distribution of 1989 enforcement survey returns by population of community.

Population	Surveys Mailed	Surveys Returned	Percent Returned
<2,500	221	109	49.3%
2,500-9,999	106	75	70.8%
10,000-49,999	39	30	76.9%
50,000+	12[1]	11	91.7%
Overall	378	225	59.5%

[1]Includes two county police departments.

participation by the largest communities, the response rate decreased for the smaller communities, particularly those with populations less than 2500. Many of the police departments in the very smallest communities have only one or two officers (sometimes part-time) and do not engage in routine enforcement of traffic laws.

Table 12 presents information on the average number of seat belt citations issued each month by size of community, based on the total of 225 survey responses. (Totals less than 225 reflect unavailable or missing information. Thus, 52 of the departments were unable to provide information for 1987, 40 for 1988, and 24 for 1989.) As expected, number of citations increases with size of community: in 1989, 69 percent of communities with populations <2500 averaged less than one citation per month, compared with 44 percent of communities with populations of 2500-10,000 and only one community with a population over 10,000. Similarly, only one of the 97 smallest communities averaged 10 or more citations per month, compared with 43 percent for

Table 12. Average number of seat belt citations issued monthly by population of community.

1987 Seat Belt Citations

Ave. No. Citations per Month	Communities with Population < 2,500	2,500-9,999	10,000-49,999	50,000+	Total
< 1	74 (89.2)[1]	38 (66.7)	1 (4.0)	1 (12.5)	114 (65.9)
1-4	8 (9.6)	15 (26.3)	7 (28.0)	0 (0.0)	30 (17.3)
5-9	1 (1.2)	1 (1.8)	7 (28.0)	1 (12.5)	10 (5.8)
10+	0 (0.0)	3 (5.3)	10 (40.0)	6 (75.0)	19 (11.0)
Total	83	57	25	8	173[2]

1988 Seat Belt Citations

Ave. No. Citations per Month	Communities with Population < 2,500	2,500-9,999	10,000-49,999	50,000+	Total
< 1	68 (77.3)	37 (59.7)	3 (11.1)	0 (0.0)	108 (58.4)
1-4	16 (18.2)	18 (29.0)	9 (33.3)	0 (0.0)	43 (23.2)
5-9	4 (4.6)	3 (4.8)	4 (14.8)	3 (37.5)	14 (7.6)
10+	0 (0.0)	4 (6.5)	11 (40.7)	5 (62.5)	20 (10.8)
Total	88	62	27	8	185[2]

Jan.-June, 1989 Seat Belt Citations

Ave. No. Citations per Month	Communities with Population < 2,500	2,500-9,999	10,000-49,999	50,000+	Total
< 1	67 (69.1)	29 (43.9)	1 (3.6)	0 (0.0)	97 (48.3)
1-4	23 (23.7)	26 (39.4)	7 (25.0)	1 (10.0)	57 (28.4)
5-9	6 (6.2)	6 (9.1)	8 (28.6)	3 (30.0)	23 (11.4)
10+	1 (1.0)	5 (7.6)	12 (42.9)	6 (60.0)	24 (11.9)
Total	97	66	28	10	201[2]

[1]Column percent.
[2]Totals less than 225 reflect unavailable or missing information.

communities with populations from 10,000-49,999 and 60 percent for those with populations over 50,000.

These numbers clearly show enforcement activity, at least in terms of citations issued, to be related to size of community. It should be noted, however, that on a per capita basis, the smaller sized communities are not necessarily any "less active" than the larger communities. Indeed, the level of enforcement is quite variable, even among the largest cities. Table 13 presents information on the average number of citations issued monthly by North Carolina cities with populations of 20,000 or greater. (All but two of these cities responded to the survey.) As is clearly evident from the table, larger population size does not always correspond to higher monthly average seat belt citations. Also, there is considerable variability from one year to the next.

A final table in this series presents the average number of total citations issued by size of community (see Table 14). Adjusting for the fact that 1989 only includes data for half a year, this table clearly shows increased enforcement activity over time within each of the four community population categories.

Table 14. Average number of total seat belt citations issued by population of community.

Population of Community	1987	1988	1989 (Jan-June)
<2,500	4.4	8.8	6.4
2,500-9,999	18.4	28.3	19.0
10,000-49,999	117.0	113.5	80.2
50,000+	463.9	522.3	311.1

In addition to information on citations issued, departments were asked whether they had engaged in other seat belt enforcement or education activities since January 1989. Table 15 lists these activities, along with the percentage of police departments responding positively to each. Departments were most likely to report that they had conducted seat belt checks at roadblocks, etc. (56% "yes") and that they had given seat belt presentations to school, civic, business or church groups (53% "yes"). Nearly 40 percent had issued press releases, news stories, etc. about seat belts, and a fourth had sponsored

Table 13. Average number of seat belt citations issued each month for N.C. communities with populations greater than 20,000.

	Population (June 1987 estimate)	Average No. Citations Per Month 1987	1988	1989
Charlotte	388,995	94.2	36.1	16.5
Raleigh	213,879	139.0[1]	137.0[1]	100.5
Greensboro	184,098	--[2]	--	200.0[1]
Winston-Salem	150,246	19.3[1]	44.9	99.2
Durham	121,111	--	--	--
Fayetteville	73,043	26.7	92.4	63.5
High Point	67,060	0.0	94.4	7.0
Asheville	60,429	--	--	8.3[1]
Wilmington	55,458	12.7	8.5	3.8
Gastonia	54,606	5.0[1]	5.4[1]	5.8[1]
Rocky Mount	49,191	13.4	5.6	1.0
Greenville	43,130	21.3	3.3	10.3
Cary	39,094	20.0[1]	30.0[1]	40.0[1]
Burlington	38,798	30.2	8.9	38.8
Wilson	37,750	--	--	--
Chapel Hill	37,688	8.6	4.2	2.0
Goldsboro	34,722	6.8	10.2	8.0
Kannapolis	32,431	16.8	18.8	31.3
Jacksonville	29,547	10.4[1]	20.8[1]	16.7[1]
Concord	28,408	8.1	4.3	5.3
Hickory	27,840	--	--	--
Kinston	27,400	--	3.0	4.1
Salisbury	23,966	11.2	3.6	23.3
Havelock	23,417	--	--	--
Lumberton	20,087	1.4	1.8	3.7
Statesville	19,755	7.9	9.7	7.0

[1]Numbers reported as "approximate".
[2]--Indicates information not available or unknown.

Table 15. Participation by local police departments in other seat belt enforcement or education activities since January 1989.

Seat Belt Enforcement/Education Activity	% Responding "Yes"
Conducted "seat belt checks" at roadblocks, etc.	56.1%
Issued press releases, news stories, etc. about seat belts.	39.3%
Mode presentations about seat belts to school, civic, businesses, or church groups.	52.5%
Sponsored special events or activities in conjunction with Child Passenger Safety Awareness Week, February 12-18, 1989.	24.7%
Sponsored special events or activities in conjunction with Buckle Up America Week or Lifesavers Month, May 1989.	24.8%
Conducted public education programs concerning airbags or automatic belt systems.	3.1%

special events or activities in connection with Child Passenger Safety Awareness Week, Buckle Up America Week, or Lifesavers Month.

One question that was new to this year's survey concerned whether the department had conducted any public education programs concerning airbags or automatic belt systems. Only three percent responded that they had. Related to this, only seven percent reported having received questions from the public concerning automatic restraints. Whether public interest in automatic belts could be stimulated by increased police activity in the area (or vice versa!) is worth considering.

A final enforcement-related question on the survey was an open-ended question that asked, "If you wanted to increase the seat belt use rate in your community, what do you think would be the most effective approach to take?" The approach most often cited was stricter enforcement of the law itself, i.e., increased ticketing. Nearly a third of the police departments indicated that they thought this would be the most effective way of increasing their community's belt wearing rate. Next most often cited was increased education and public awareness ("PI&E"), advocated by 24 percent of the respondents. Fifteen percent of the departments felt that increased use of seat belt checks

and roadblocks would be the most effective approach to increase belt use, while an additional 12 percent noted increased media attention to seat belts. A remaining "other" category included reminders, efforts directed towards children (and vicariously to their parents), and issuing more warnings. More than one department noted that they would like to devote more attention to increasing seat belt use but needed additional manpower to do so.

In summary, the results of the June 1989 law enforcement survey indicate continued widespread variability in the level of enforcement of the N.C. seat belt law by local police departments. At the same time, there is evidence that the overall level of enforcement is increasing. The N.C. State Highway Patrol has continued to vigorously enforce the N.C. seat belt law, and again in 1989 the level of enforcement has increased over time. Both trends are encouraging, since the effectiveness of seat belt laws are closely tied to the level of enforcement accompanying them (Campbell, et al, 1987). At the same time, the need continues to exist for working with local police departments to help them identify the "best" combination of seat belt enforcement, education, and public information activities to promote a positive attitude towards seat belts and a high wearing rate in their own unique community.

AN OVERVIEW OF ACTIVITIES ASSOCIATED WITH THE PROJECT ENTITLED "SAFETY BELT LAW DEMONSTRATION GRANT PROGRAM"

In September of 1988 the Highway Safety Research Center was officially awarded a demonstration grant sponsored by the National Highway Traffic Safety Administration. This two-year effort is focused on seat belt law enforcement in local communities. The goal is to use "soft" enforcement strategies to increase the local belt use rate. The main elements of the enforcement strategies include: (1) the widespread use of seat belt "salutes," where a police officer grabs the shoulder belt and gives a "thumbs up" reminder sign to an unbelted motorist, (2) a modified incentive program whereby properly restrained motor vehicle drivers and their passengers can win prizes when observed by local police, and (3) a comprehensive public information and education (PI&E) campaign to keep the community informed about the program. Belt use data will be collected in experimental and comparison communities to determine if the strategies have been successful.

Because of the labor intensive nature of this demonstration program, this GHSP project has provided support for the demonstration. This has provided an interlocking program arrangement with the goal of increasing the seat belt use rate in North Carolina. The remainder of this section will describe the activities and progress of the demonstration program from September 30, 1988 through September 30, 1989.

Planning and Site Selection

A significant amount of early project activity concerned the identification of candidate communities, certainly one of the most important steps in the entire project. A first step involved reviewing all of the surveys that had been sent in by local police in towns from 10,000-100,000 populations for the previous HSRC/GHSP project that was evaluating the effect of the NC Seat Belt law. We focused on questions pertaining to the use of seat belt salutes and their willingness to use this technique, their overall experience in enforcing the seat belt law, and their past seat belt/child restraint activities. Based on these results, a number of communities in the 15,000-50,000 population range were selected for closer scrutiny. Two teams were used to make visits to the following locations:

Albemarle	Lexington
Asheboro	Monroe
Burlington	Morganton
Concord	Rocky Mount
Gastonia	Salisbury
Goldsboro	Sanford
Graham	Shelby
Hickory	Statesville
Kannapolis	Tarboro
Kinston	Wilson
Lenoir	

Maps were obtained for each community, and local Chamber of Commerce personnel were able to give the teams a quick overview of the layout of the community. Shoulder belt use data were then collected at 4-5 locations in the community, including a downtown site, a middle class/upper middle class neighborhood, a poorer neighborhood, and perhaps 1-2 other representative locations. We felt an estimate of the shoulder belt use rate was necessary to determine if the implementation of the law enforcement demonstration project would have any "room" for the belt use rate to increase. As might be expected, we found

communities with belt use rates both above and below the most recent statewide average of 62 percent.

Following the visits, an assessment was made of each community and whether further exploration was needed. Then in December 1988, a letter was sent to the chief of police in the communities of

Albemarle	Monroe
Burlington	Morganton
Gastonia	Rocky Mount
Kannapolis	Salisbury
Lenoir	Statesville
Lexington	Wilson

The letter briefly explained the project and the benefits to the community and asked for an indication of their interest. Follow-up telephone conversations were held with almost all of these towns' police chiefs (or another police department representative) to assess their overall ability and interest in conducting this project. This produced some excellent possibilities.

The two leading candidates were Gastonia, NC and Albemarle, NC. Visits were made to both places to meet with the chief and selected personnel who might be involved in the project. Many aspects of the project were discussed, and the visit was concluded with a tour of the community.

We were quite impressed with both departments and decided to work with the two. Both chiefs are young and enthusiastic; the departments have an interest in promoting use of seat belts, and there seems to be a sense of pride in the community that should translate into good commitment for the project. Gastonia has prior GHSP involvement with a DWI program that offers good background experience for a project of this nature, and Albemarle has a special enforcement unit created out of a prior GHSP grant. With a population of 57,000 in Gastonia and 15,000 in Albemarle, the selection offers a good contrast in size of community.

Data Collection

Having selected the treatment locations, we followed this process with subsequent visits to identify seat belt data collection locations. Trial data were collected in about ten locations in each community. The use rate in Gastonia was 51 percent for passenger cars and minivans and 34 percent for pickups, vans, and utility vehicles. This amounted to an overall use rate of 47 percent. The preliminary data for Albemarle were similar. Thus, both

locations were slightly below the statewide average of 60 percent as of the January-February 1989 survey.

During a subsequent visit, the HSRC data collectors for the statewide seat belt survey accompanied the principal investigator to both Gastonia and Albemarle to become familiar with proposed data collection sites and collect more belt use data at both peak and off-peak times. These data matched well with previous observations, with both communities having belt use rates of around 50 percent. At this point, we felt comfortable with the data collection sites selected. Another sample of data will be collected prior to program kick-off.

Selecting a Comparison Site

In early June of 1989, the data collectors and principal investigator evaluated the community of Statesville as a comparison site. We had some earlier knowledge of Statesville when it was considered as a treatment site in the fall of 1988. Data were collected from eight locations around the community, and the overall use rate was approximately 50 percent (similar to both Gastonia and Albemarle). Since Statesville seemed like a very good match for both Gastonia and Albemarle, a meeting was held with the Chief of Police and the Assistant Chief to formalize their participation. Statesville is similar to both Gastonia and Albemarle in regard to local businesses and employers, has a mid-range population of around 24,000, and has no plans for any major seat belt law enforcement activity during the project period. The ongoing statewide seat belt collection by HSRC will also offer good comparison usage data.

Preparation of Local GHSP 402 Grants

Having selected Gastonia and Albemarle as treatment sites, a significant amount of time was spent helping each community prepare its project application grant for the North Carolina GHSP 402 program. The final grant applications were carried to the NC Lifesaver's meeting in mid-May, 1989. The applications were then critiqued and changes made. Following review by the North Carolina GHSP and the NHTSA Region IV office in Atlanta, final modifications were made to the applications. Both projects were formally approved in October, 1989.

Local Police Training

In the last week of June, 1989, project staff went to Albemarle to present the plans of the formal program to the shift captains on the police force, as requested by program coordinator Captain Matt Cagle. The plans and schedule for the project were outlined, followed by a question and answer period. The HSRC video prepared especially for police entitled "The Need For Seat Belts" was also presented. Shortly after this session, Captain Cagle held the first meeting of his police advisory committee.

Just prior to the mid-November, 1989 kick-offs, HSRC staff will train the patrol officers of both the Gastonia and Albemarle police departments about the plans for the project. These are the individuals who will be giving the seat belt "salutes" and interacting with the public for the on-street or in-traffic activities. The importance of their participation in the project will be conveyed.

Project Themes and Other Promotional Considerations

In May, 1989 the HSRC media specialist visited both experimental communities to become acquainted with the local personnel, the community layout, and local resources, especially the PI&E outlets.

A planning meeting was held in each experimental community in early August. Discussions centered on theme possibilities, prizes from the local community, desired artwork, kick-off dates, etc. Both meetings were helpful in regard to getting some focus to the tasks at hand.

Subsequent to the meetings, each community selected a theme:

Location	Theme
Gastonia	Protect The Best - Gastonia Buckles Up!
Albemarle	Albemarle Clicks - Buckle Up and Survive the Drive!

Theme selection allowed the HSRC media specialist to proceed with artwork for brochures, banners, logos, etc. The layout and text for brochures were also prepared by HSRC staff. These have been approved by both communities.

Advisory boards have been selected in both locations. The Albemarle board is comprised of police department representatives, while the Gastonia group has a cross-section of community representatives, such as safety directors from various companies, a high school principal, the local newspaper editor, the mayor, etc. Both approaches should work well for the different locations.

Prize possibilities are still being examined. Promotional items are being purchased through grant funds, and we expect that cash and other prizes will be donated from local merchants, businesses, etc. Both police departments plan to hand out either prizes, promotional items, or drawing slips at places like license/seat belt checkpoints.

Banners across the roadway will be used for both campaigns. These are currently being developed and should provide good exposure for the projects.

A good deal of planning has taken place concerning the official kick-offs. Proposed dates are November 15 for Albemarle and November 20 for Gastonia. Albemarle plans to use NASCAR driver Kyle Petty as a celebrity participant, and Gastonia is finalizing plans with Mike McKay, a popular Charlotte television weatherman who has been a seat belt spokesperson on a number of prior occasions, as well as Hugo the Hornet, the mascot for the Charlotte Hornets professional basketball team.

Sites for the kick-off have been selected, and final details are now being handled. For example, the local police departments are working on the logistics of a seat belt checkpoint that can be filmed or photographed by the media, while HSRC staff are finalizing press kits. The project has been explained to local media outlets and their cooperation sought.

Project Implementation

The projects will be officially started around the middle of November and continue for six months. Local data collectors have been hired and trained (by HSRC) to collect the belt data once the project begins. HSRC staff will collect the belt use data in the comparison community of Statesville. These data will be closely monitored to allow feedback on the belt use rate. If successful in increasing the belt use rate in the experimental communities, these programs will likely become models for other state and national enforcement efforts.

AN OVERVIEW OF ACTIVITIES ASSOCIATED WITH THE PROJECT ENTITLED, "COMPREHENSIVE PROGRAM FOR INCREASING USE OF SAFETY SEATS AND BELTS FOR CHILDREN AND YOUNG ADULTS"

Both the "Police Actions" project and the GHSP project dealing with children and young adults are complimentary and have benefited from coordinated efforts. These efforts have been concentrated in three areas.

The first area of coordination has been in the development of seat belt training materials for law enforcement agencies. Two twelve-minute segments of a training videotape were produced and distributed to law enforcement agencies in 1988. These programs concentrated on convincing police officers to wear their own belts and encouraged them to actively enforce North Carolina's restraint laws. Evaluation forms were sent out with these tapes and asked what types of information would be beneficial to them if additional segments were produced. Responders were asked to prioritize a list of potential additional topics and this served as a guide for constructing the new programs. New videotape segments will be produced that concern tips for enforcing the seat belt law, the dynamics of a crash, and child safety seats.

As with the first segments, an advisory committee was formed consisting of representatives from local police departments, sheriffs' offices, the Highway Patrol and other law-enforcement related professions. The committee met in Chapel Hill and commented on content, draft scripts, appropriate spokespersons and potential testimonials.

The enforcement tips tape includes examples of public information and enforcement programs being conducted across North Carolina along with research findings about what affects belt wearing rates. The tape also discusses the reasons some officers are reluctant to enforce belt laws and the excuses some motorists give for not obeying the law. Officers are given the information to help sell people on the need to buckle up and dispel the myths about belt use often expressed by non-wearers. The crash dynamics tape explains the forces in a crash and how the safety belts work to prevent injuries and death by keeping the occupants in place.

HSRC contracted with the company that produced the first segments, Take One Productions in Raleigh, to produce the rest of the series. The final product will be a videotape that contains all five segments (the first two, the two produced this year and the one to be produced on child safety seats) and will be distributed as part of a police promotion in the spring of 1990.

The second area of support was for this project to provide assistance in the collection of restraint usage data for children through observational surveys. Observational surveys focusing on children were last conducted in 1986 and current information was needed to recalculate usage rates for children and to assess the accuracy of restraint information provided through police

accident report forms. The "Police Actions" project helped to provide data collectors and travel funds to support this data collection.

Observational surveys were conducted at shopping centers and day care centers for two days each in Wilmington, Greenville, Fayetteville, Charlotte, Greensboro, Winston-Salem, North Wilkesboro, and Asheville. In addition to the observational surveys, mail-back questionnaires were given out to drivers who stopped for the surveys. These mail-backs were distributed in order to obtain information that was not possible to obtain during the limited time available for the observational surveys. A full analysis of these surveys can be found in the final report for the GHSP sponsored "Children and Young Adults" project.

The third area of cooperative effort was to continue to provide occupant protection information through the HSRC toll-free telephone service. Initiated in October 1981, this service was dedicated to providing information on child safety seats. During the years HSRC began receiving more and more calls on this line related to belt use for adults and other highway safety related topics. With the implementation of the Seat Belt Law in 1985, the level of calls pertaining to adults and the Seat Belt Law increased to a level comparable to that related to children. Due to this change, HSRC staff in addition to the "child restraint" staff began answering and responding to these calls; thus, it was decided to support this service through seat belt projects. During this project year, 246 hours were spent by HSRC staff answering public inquiries through this service. For the majority of these calls, HSRC staff follow up by sending out some type of printed information by mail.

SUMMARY

This has been an ambitious yet rewarding project year. The statewide seat belt use data was gathered twice, and seems to have stabilized at the 60 percent level. Obviously, injury benefits would be increased if the usage rate were higher, but the good news is that the fall-off from the original high value of 78 percent upon the start of the $25 citation phase has apparently ended. The overall use rate of 60 percent for the State continues to be one of the highest in the nation. We have also become one of the first U.S. collectors of automatic restraint use data by piggybacking this activity onto the regular statewide survey wave. Concerning motor vehicle trauma in North Carolina, serious and fatal injuries among occupants covered by seat belt law

continue to hold at the reduced level coinciding with the onset of the law. The injury pattern has remained unchanged for the groups not covered by the law.

In regard to enforcement of the seat belt law, the State Highway Patrol continues to be a strong force. The Patrol has actually increased the level of their citation activity over the last year. There is some indication that the local citation activity has also increased, but there remains widespread variability.

This project has also supported two other seat belt activities. The first year of the NHTSA demonstration grant for a local seat belt law has produced two splendid treatment communities, Gastonia and Albemarle, who are now ready to kick off their six-month campaigns in mid-November. Statesville will serve as a comparison site. All currently have seat belt use rates around 50 percent. The other HSRC project, "Comprehensive Program for Increasing the Use of Safety Seats and Belts for Children and Young Adults," has carried out a variety of activities. A new child restraint use survey was completed, and several new videotape segments of seat belt training materials for law enforcement agencies are close to completion.

The Highway Safety Research Center looks forward to continued activities in all of these areas as well as others in the year ahead.

REFERENCES

Campbell, B.J., Stewart, J.R. and Campbell, F.A. (1987). 1985-1986 experience with belt laws in the United States. Chapel Hill: University of North Carolina Highway Safety Research Center.

Reinfurt, D.W., Campbell, B.J., Stewart, J.R. and Stutts, J.C. (1988). North Carolina's occupant restraint law: A three year evaluation. Chapel Hill: University of North Carolina Highway Safety Research Center.

APPENDIX

N.C. SEAT BELT LAW ENFORCEMENT SURVEY FORM

N.C. Seat Belt Law Enforcement Survey
July 1989

1. Name of Department: _____

2. Please tell us the total number of **$25 citations** issued by your department for non-compliance with the N.C. Seat Belt Law (G.S. 20-135.2A) and Child Passenger Protection Law (G.S. 20-137.1):

	1987	1988	Jan. - June 1989
Total Number of $25 Seat Belt Citations	☐	☐	☐
Total Number of $25 Child Restraint Citations	☐	☐	☐

(Put a check ( ) in small box if numbers are approximate)

3. Below are listed some seat belt enforcement/education activities. Please indicate whether your Department has engaged in any of these **since January 1989:**

	Yes	No
Conducted "seat belt checks" at roadblocks, etc.	___	___
Issued press releases, news stories, etc. about seat belts.	___	___
Made presentations about seat belts to school, civic, business, or church groups.	___	___
Sponsored special events or activities in conjunction with Child Passenger Safety Awareness Week, February 12-18. 1989	___	___
Sponsored special events or activities in conjunction with Buckle Up America Week or Lifesavers Month, May 1989.	___	___
Conducted public education programs concerning airbags or automatic belt systems (Please describe) _____	___	___

_____

4. Has your department participated in any **other** special activities promoting seat belts/ child restraints? If so, please describe.

_____

_____

5. In addition to the activities already mentioned, are any **other** seat belt promotion or enforcement activities planned for the coming year? Please describe.

_____

_____

6. Has your department received questions from the public concerning automatic restraints? Please describe the nature and extent of these inquiries.

_____

_____

7. Last year the N.C. Governor's Highway Safety Program and the UNC Highway Safety Research Center distributed a video training tape with "The Need for Seat Belts" and "North Carolina's Seat Belt Laws," to all N.C. law enforcement agencies. Please tell us:

   a. Is this tape currently being used by your department?

   ___ Yes Please describe: _____

   _____

   ___ No Any reasons for not using? _____

   _____

   b. Any suggestions for future program materials that would be useful to your department?

   _____

   _____

8. a. What do you think the belt use rate is in your community? ____ %

   b. Is this percentage based on (check one):

   ___ Actual observations (counts) of buckled and unbuckled drivers in traffic.

   ___ More casual observations without actual counts.

   ___ Other (describe) _____

   _____

9. If you wanted to increase the seat belt use rate in your community, what do you think would be the most effective approach to take?

   _____

   _____

   _____

Name and address of person completing this survey, or person we may contact for additional information if necessary:

_____

_____

_____

Telephone: _____
Area Code Number

THANK YOU! Please use back of form for any additional comments or suggestions. Return in the enclosed stamped envelope or mail to:

Don Reinfurt, Associate Director
UNC Highway Safety Research Center
134 1/2 E. Franklin Street
Chapel Hill, N.C. 27599-3430