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Restraint System Usage in the Traffic Population 1988 Annual Report

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16. Abstract

This study continued to monitor the use of occupant restraint systems and motorcycle/moped helmet usage in 19 U.S. cities during 1988. A total of 296,711 observations of automobile drivers indicated an overall driver safety belt usage rate of 46.3 percent. The driver safety belt usage rate in areas that have mandatory use laws was 50.8 percent compared to a 34.3 percent usage in areas with no use laws.

Observations of 106,157 passengers indicated that 39.3 percent of the subteens, 24.0 percent of the teens and 44.3 percent of the adults were restrained. Child safety seats were observed being used for 81.3 percent of the infant and 83.4 percent of the toddler passengers. Correct infant seat usage was 75.4 percent while 86.9 percent of toddlers, observed in toddler seats, were properly harnessed and/or shielded. In areas with motorcycle helmet use laws 93.9 percent of the drivers and 76.1 percent of the passengers used helmets. Helmet use in areas with no helmet use laws was 46.1 for drivers and 36.1 for passengers.

Automobiles equipped with automatic belt systems had an overall driver belt use rate of 88.1 percent. The motorized shoulder belt system that could not be disconnected displayed the highest use rate of 98.3 percent. The lowest automatic system use rate of 76.6 percent was observed from the combination lap and shoulder belt combination with disconnect.

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SUMMARY

Four observational studies for various segments of the traffic population were continued in 19 cities throughout the nation. Data obtained through daytime observations at approximately 30 traffic intersections and 3 major shopping centers in each city were used to: (1) determine the extent to which drivers and front-outboard passengers of automobiles used safety belts and incorrectly used (misused) shoulder belts; (2) determine the use of safety belts and child safety seats by passengers of automobiles; (3) determine correctness of safety seat installation; (4) determine the extent to which helmets are used by operators and passengers of motorcycles and mopeds; and 5) determine the effectiveness of automatic seat belt systems in increasing restraint usage.

This report documents the procedures used to conduct the observational studies and the study findings for 1988.

Driver Observation Findings: Safety Belt Use

The following major findings, associated with driver safety belt usage, are based on a total of 296,711 observations of drivers stopped for traffic signals

- Driver safety belt usage increased to 46.3 percent during 1988 (Figure 1).
- Female driver safety belt usage was consistently higher than male driver safety belt usage (53.2 percent versus 41.7 percent).
- Drivers of imported vehicles were observed to have a higher safety belt usage rate than drivers of domestic vehicles (57.5 percent versus 42.7 percent) for verified observations.
- Driver safety belt usage was observed to be highest among the 25 to 49 year age group (48.1 percent).
- Driver safety belt usage was observed to be higher in the smaller sized vehicles.

Driver Observation Findings: Shoulder Belt Misuse*

The following major findings are based on a total of 37,043 verified observations of drivers utilizing shoulder belts in 1988.

- Approximately 3.2 percent of drivers utilizing shoulder belts misused them.
- Female driver shoulder belt misuse was higher than male driver shoulder belt misuse (4.0 percent versus 2.5 percent). This was mainly due to more female drivers wearing the shoulder belt under the arm than male drivers.

* Under the arm, behind the back, or loose.

- More drivers of domestic vehicles wore their shoulder belts with excessive slack (i.e., too loose) than drivers of imported vehicles (1.7 percent for domestic versus 0.1 percent for imports).

Passenger Observation Findings

A total of 106,157 passengers were observed at shopping mall entrances/exits during 1988. Figure 1 presents the upward trend for use of child safety seats. During 1988, 81.3 percent of infants and 83.4 percent of toddlers were observed travelling in a child safety seat for a combined total of 83.2 percent. Figure 2 displays the upward trend in proper use of safety seats. For example, in 1988 75.4 percent of infants were harnessed, facing toward the rear and the car belt was securing the child seat. Also, in 1988, 86.9 percent of toddlers observed in safety seats were correctly secured. Passenger safety belt use during 1988 was observed to be 3.9 percent for toddlers, 36.9 percent for subteens, 24.0 percent for teens, and 44.3 percent for adults.

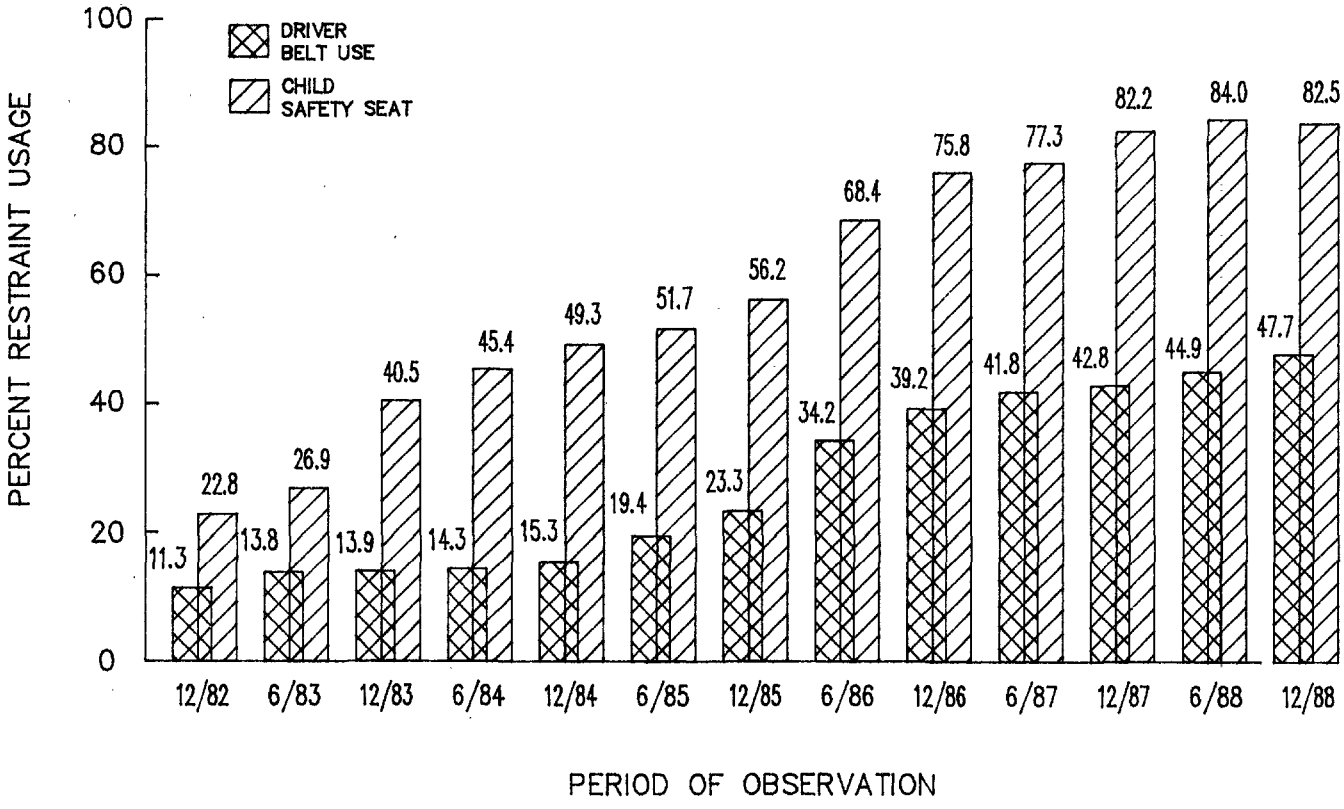


Figure 1. Driver safety belt and child safety seat use.

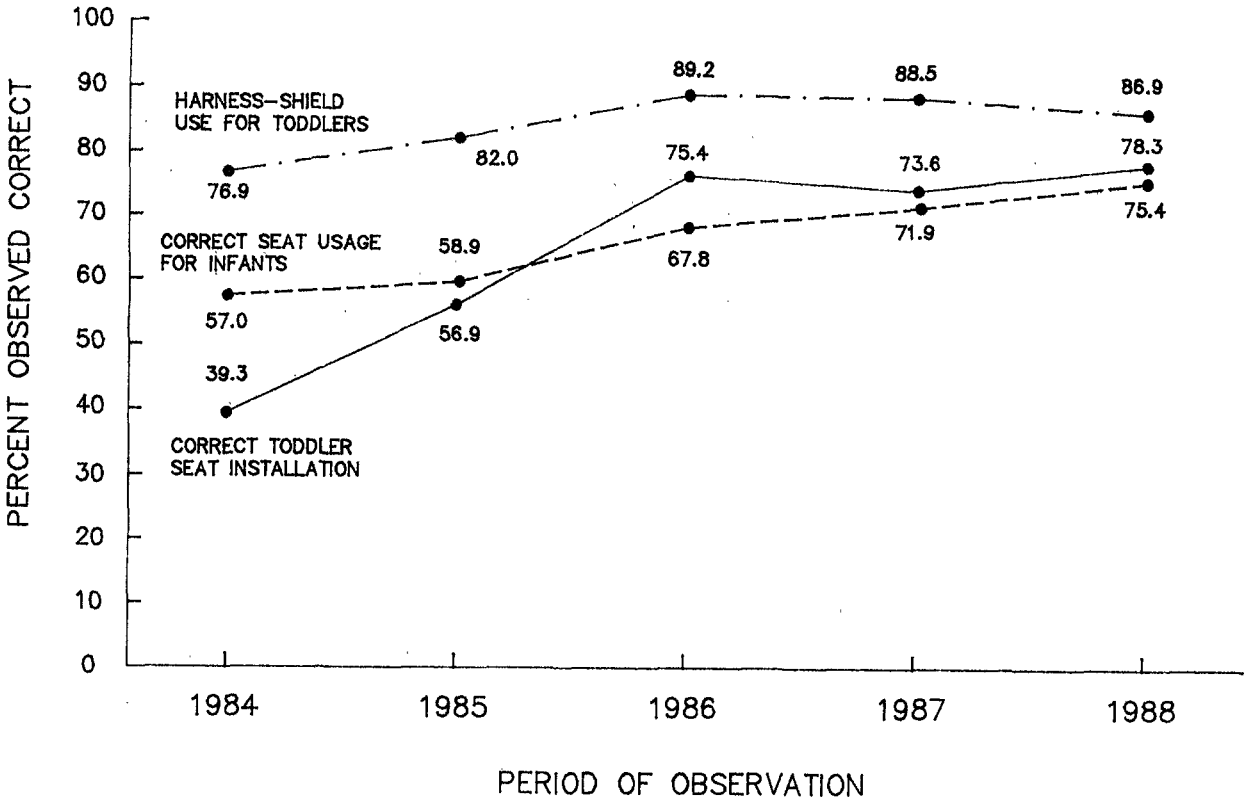


Figure 2. Correct use and installation of safety seats by year.

Safety Seat Installation Findings

A total of 4,344 safety seats were observed in vehicles parked at shopping malls. Seats installed in the infant mode were observed in 372 of the observations while 3,683 seats were observed in the toddler mode. The remaining 289 observations involved booster seats. For toddler seats that require installation using only the vehicle safety belt, 84.8 percent appeared to be installed properly and seat belts were used incorrectly in 12.3 percent of the observations. For toddler seats that require belting and tethering, only 8.3 percent were observed to be correctly installed. Tethers were not used or used incorrectly in 91.4 percent of the observations, while incorrect belting was observed for 22.2 percent of the seats. Figure 2 displays correct toddler seat installation increasing over time, and becoming relatively steady at approximately 75 percent.

Helmet Study Findings

Of the 18,234 motorcycle observations, driver and passenger helmet use were observed to be 59.8 and 50.2 percent, respectively. In cities with mandatory helmet use laws, helmet use was observed to be 93.9 percent for drivers and 76.1 percent for passengers. Helmet use in cities with no or limited helmet use laws was observed to be 46.1 percent for drivers and 36.1 percent for passengers. Helmet use for drivers and passengers of 1,707 moped observations was observed to be 27.5 and 11.3 percent, respectively.

Observations on Automatic Seat Belts

Over 16,769 vehicles with automatic seat belts were observed in 1988. Automatic seat belt systems for the 1987-1989 model years resulted in 88.1 percent of the drivers being restrained as opposed to 56.1 percent for 1987-1989 model cars equipped with manual systems. The usage rate for motorized systems with no disconnect was the highest of the automatic designs with a 98.3 percent use rate. The lowest automatic system design use rate was 76.6 percent for the nonmotorized, combination lap and shoulder belt system.

INTRODUCTION

This report documents the 1988 results of a project sponsored by the National Highway Traffic Safety Administration on vehicle restraint and motorcycle helmet usage. The results are based on field observations conducted in 19 cities across the nation. Included in the data base are observations on drivers and passengers of 296,711 passenger vehicles and helmet usage for the operators and passengers of over 19,941 motorcycles and mopeds.

Project Objective

The objective of this study was to observe, record, and report the use of occupant restraints and motorcycle helmets in 19 cities throughout the country.

Project Description

The project consists of a two-year data collection effort that has been formulated into two separate studies. Study 1 consists of collecting data on; 1) driver and front outboard passenger safety belt use and shoulder belt misuse; 2) passenger safety belt and child safety seat use; 3) correct installation of child safety seats; and 4) helmet use by operators and passengers of motorcycles and mopeds. Study 2 concentrated on obtaining driver safety belt use from those vehicles that were equipped with automatic belt systems. Study 2 also obtained data on motorcycle and moped helmet use. Each study is described below.

Traffic Population Observations

The purpose of this study aspect was to monitor the use of safety belts by drivers and front outboard passengers of privately-owned passenger cars at designated intersections and freeway exit locations. Study 2 vehicle selection required the observers to identify cars equipped with automatic belt systems and to prioritize those vehicles for observation. The data collected for each vehicle and driver were:

- The presence of automatic safety belts
- License plate number
- Make/model of car
- Estimated age of driver and passengers
- Driver gender
- Observed driver safety belt usage
- Observed driver shoulder belt misuse
- Seating position of passengers
- Safety belt use of front outboard passengers.

Shopping Center Observations

The purpose of this study aspect was to monitor the use of occupant restraint systems by passengers of private passenger cars at exits/entrances of selected shopping malls. The passenger observations were a component of only study 1 and were not, therefore, conducted during study 2. Special emphasis was placed on observing child safety seat use by infants (less than 1 year of age) and toddlers (ages 1 to 4). The data collected for each passenger were:

- Estimated age.
- Seating position.
- Occupant restraint system used by each passenger.
- Safety seat usage characteristics for infants and toddlers.

Parking Lot Observations

The parking lot observations were only a component of study 1. Observation requirements consisted of observing infant, toddler and booster safety seats in parked cars located in the same shopping centers as above to obtain detailed information on the installation of child safety seats in automobiles. The data collected on child safety seat installation were:

- Position of safety seat in vehicle.
- Tether usage (for toddler seats that require the use of tethers).
- Belt usage (for toddler seats that require that the lap belt be attached to the undercarriage of the toddler seat).
- Shield requirement on toddler seats (if the seat is a shield-type toddler seat).
- Identification of model.
- Type of safety seat (infant, toddler or booster).

Motorcycle/Moped Helmet Observations

The purpose of this study aspect was to monitor the use of helmets by operators and passengers of motorcycles and mopeds observed on the roadways. Helmet observations were conducted as a part of both study 1 and study 2.

Project Methodology

This project is a continuation of studies sponsored by the National Highway Traffic Safety Administration (NHTSA) to determine restraint system use in the traffic population. The current project differs from the previous projects in that an increased level of effort was made to observe cars equipped with automatic safety belt systems.

The major elements of the study methodology are listed below and described in the following sections.

- Develop observation and training procedures.
- Train observers and supervisors.
- Collect data.
- Analyze data.

Data Collection Sites

The cities, data collection sites and data collection procedures that were used in the previous projects were adopted for use in the current project. This served to provide the maximum possible consistency between the results of the current and prior projects. Any changes in data collection sites necessitated by construction, or other uncontrollable events, were accomplished by obtaining data in the same immediate area. The 19 cities selected for this project are from each geographical region of the country and provide a variety of climate and driving conditions. They were purposely selected to provide long term, cost-effective trend data. The same cities and sites within each city have been used since 1974 in successive observations.

The cities and corresponding data collection regions are listed below and presented geographically in Figure 3.

New England Region

Boston, MA
Providence, RI

Mid-Atlantic Region

New York, NY
Baltimore, MD
Pittsburgh, PA

Southeast Region

Atlanta, GA
Miami, FL
Birmingham, AL
New Orleans, LA

Southwest Region

Houston, TX
Dallas, TX

Northcentral Region

Minneapolis-St. Paul, MN
Chicago, IL
Fargo, ND-Moorhead, MN

West Region

Seattle, WA
San Francisco, CA
San Diego, CA
Phoenix, AZ
Los Angeles, CA

Data Collection Scenario

The sites used for data collection in the driver study were primary road intersections and freeway exits. The sites were selected to be representative of the land use and socio-economic compositive of the city; within self-imposed constraints. The sites were originally selected in an earlier study by a process that involved subdividing each city area (the corporate city, along with the contiguous suburban area) into a series of grids.[1] The grids were classified as being one of three groups: 1) grids in open country areas containing few or no primary road intersections; 2) grids containing one or more freeway exits; and 3) grids containing primary roads but no freeway exit.

Those squares in group 1 were not selected for sampling purposes. The squares in groups 2 and 3 were used to randomly select 22 primary road squares and 11 freeway squares. This stratification process was used to

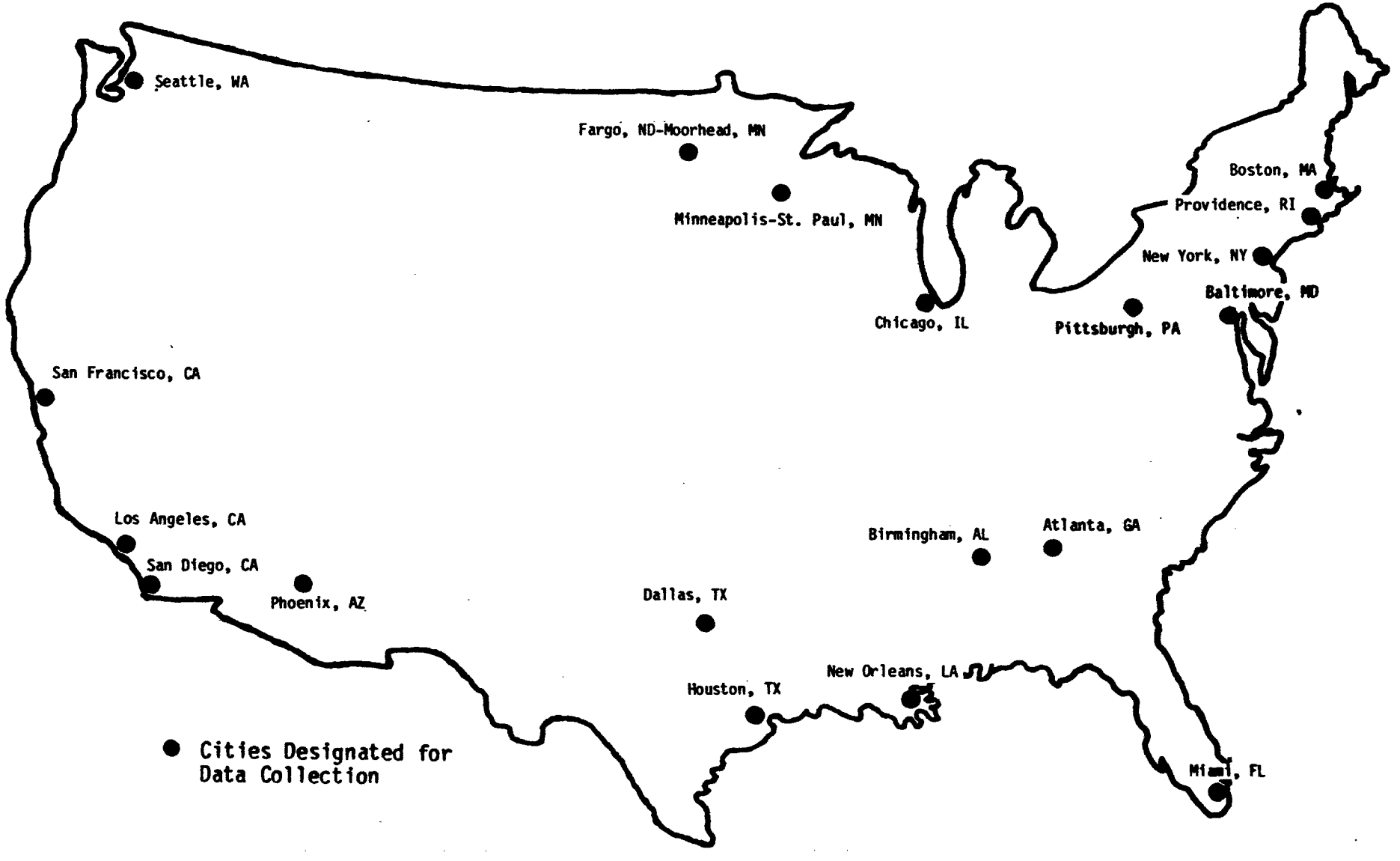


Figure 3 Location of the 19 cities for restraint usage observation.

ensure that two different types of traffic would be sampled (i.e., high speed freeway traffic and slower speed arterial traffic).

A list of 10 randomly selected, controlled intersection sites for each of the selected 22 primary and 11 freeway grids were given to an observer. On the first trip to the city, the observer visited the first site listed within his pre-assigned grid. If the site was suitable for safety belt observation (i.e., roadway curbs, sufficient traffic, observer safety, no construction, etc.) then the site was selected to represent the grid. If the first site was not acceptable then the observer inspected the next site on the list and repeated the process until an acceptable site was found.

Study 1 and study 2 required 30 sites for the driver study (70 percent arterial and 30 percent freeway exit) in each city. In addition, study 1 required 3 passenger study locations (shopping malls) within each city. The malls for the passenger study were selected so as to simultaneously provide a mix of socio-economic levels, sufficient traffic flow and good vantage points for conducting observations.

Study 1 required 13.5 days of data collection, for each city, consisting of approximately 7.5 days for the driver study and 6 days of passenger study. Helmet study observations were recorded throughout the data collection stay as motorcycles and mopeds were observed. Study 2 required 15 days of driver observation with the observer recording motorcyle and moped data when they occurred in the traffic stream.

A typical observation day consisted of a minimum of six hours of data collection. The driver observations of study 1 required 1.5 hours at each of 4 sites per day. Passenger observations required 6 hours per day at a single shopping center during hours of operation. The driver observation was usually conducted on Monday through Thursday and the passenger observation on Friday through Sunday. The driver observation of study 2 required 3 hours at two sites per day.

Data Forms and Procedures

The data collection forms and instructions for their completion are provided in Appendix C.

Whenever possible, data collectors were deployed to a given site on the same day and during the same time period each time the city was visited. Only privately-owned passenger cars and station wagons with in-state license plates were eligible for the driver observation. Trucks, taxi cabs, and marked company-owned cars (i.e., those used for commercial purposes) were not eligible.

The target observation at signalized intersections of study 1 was the second car that stopped at the traffic signal in the near lane (curb lane). If time permited, additional observations were made (i.e., the third and fourth stopped cars). However, if only one car stopped then

that vehicle was observed. Any vehicle that stopped at a stop sign controlled location was eligible for observation. The target observations for study 2 consisted of vehicles that were equipped with automatic restraint systems as the priority observation. If no automatic restraint vehicles were present then the driver observation procedures of study 1 were followed. Observers did not go on the roadway and were only responsible for observing the cars in the curb lane.

Passenger observation procedures required six hours per data collection day. Data were collected on Fridays, Saturdays and Sundays during the peak hours of traffic movement in and out of the shopping mall. This maximized the chance of obtaining observations on infants and toddlers. A total of six passenger observation days were conducted in each city for study 1.

Only non-commercial passenger cars and station wagons were eligible for the passenger study. The primary target observations were vehicles with infants and toddlers. When primary target vehicles were not available for observation, safety belt usage for all passengers in the order of vehicles stopped was recorded. Data collectors were positioned at curbside, at a stop sign or signal controlled exit from the shopping center with the greatest flow of traffic. Observers did not go on the roadway and were only responsible for observing the cars in the curb lane.

Procedures for observations of child safety seat installation required inspection of parked vehicles containing one or more safety seats (i.e., infant, toddler or booster safety seats) in all of the shopping center parking lots. The observations were conducted for approximately two hours per week during the days scheduled for the passenger restraint observations. Data were obtained during peak parking demand.

Helmet observations were obtained as a "second priority" activity during all other observations. Target vehicles were any motorcycle, moped or motorized bike observed on the highway or freeway during data collection periods. Observations regarding helmet use were recorded for both drivers and passengers.

Training Procedures

Training procedures were developed during the initial phases of the study and approved by NHTSA prior to conducting training activities. All procedures were developed around those used in the previous projects to maximize consistency between the project efforts. Training included the study of an observer's manual, class room instruction and in-field training. Prior to deployment, observers received 3 to 5 days of training either in Detroit or at field locations. Additional training of up to a week was conducted by the supervisor in the region assigned to a particular observer. All observer training was conducted by the supervisor and/or senior staff members. Follow-up supervisor field visits were made at least twice per year and more frequently when the need arose.

Quality Control

The supervisor was stationed in Detroit and was responsible for scheduling observer activities, supervising data entry and conducting data quality control activities at field locations. Supervisory visits to each region were made on a routine basis or when the data collector or supervisor believed such a visit was warranted. During 1988, 10 days of supervisor visits were conducted. During these visits, field activities and observation techniques were monitored, procedural questions were answered, and observer accuracy and productivity were reviewed. Accuracy checks consisted of the supervisor and observer collecting data independently on the same vehicles for both the driver and passenger study. Discrepancies were identified and discussed during the accuracy review.

At the end of each week, data forms were submitted by the observers for review and analysis. Data summaries were generated on a monthly basis and submitted to NHTSA. Additional information and analyses were also provided to NHTSA upon request.

Analysis of 1988 Results

The data contained in the remainder of this annual report incorporates the 1988 results with the results obtained from the prior projects. The 1988 data was obtained by conducting two cycles of data collection for both study 1 and study 2. The first cycle of data was obtained from each city during the first half of 1988. Cronologically the data collection scheme consisted of completing study 1 in all of the 19 cities followed by the completion of study 2 in the same cities. The completed sequence of study 1 and study 2 was followed by another sequence of studies 1 and 2 in the latter half of 1988. Any exhibited differences between the appropriate first and second half data bases represent variations due to the time of the year in which collection activities occurred. The data collection procedures and locations at which the data were obtained were identical for the first and second half.

Data summaries which refer to a "base" represent the total number of observations. The "percent restrained" refers to the percentage of the total base observations that were recorded as using the appropriate safety restraint device. For the driver observations use of either the lap and shoulder belt or lap belt only were recorded as "restrained". The percent restrained figures represent usage rates for the combined 19-city base, with each observation receiving equal weight. This procedure was employed in previous NHTSA studies and thus allows for consistency in the comparison of results.

SUMMARY OF 1988 DRIVER OBSERVATION FINDINGS

Safety Belt Usage Trends

Annual driver safety belt usage rates from previous NHTSA projects show an annual increase since 1982 (see figure 1, page 2). This increase continued during 1988 which exhibited the highest combined driver usage rate (46.3 percent) of any year. The shoulder only category increased progressively each quarter do largely to an increase of vehicles equipped with automatic restraint system.

Safety Belt Use by City and Observation Period

Driver safety belt usage rates by city and observation period, during 1988, are presented in table 1. Annual usage rates ranged from a high of 65.9 percent in Dallas to a low of 18.6 percent in Providence. Table 1 also indicates the surveyed jurisdictions that had a MUL (mandatory safety belt use laws) in effect during the 1988 data collection period. The majority of jurisdictions with effective 1988 belt use laws also had the belt use laws effective during 1987. In September 1988, Atlanta became a MUL city and that change is reflected by the substantial usage rate increase for the 4th quarter belt usage period.

Safety belt usage was also recorded for front-outboard passengers during the driver observation (presented in table 2, page 14) by city and observation period. The annual usage rate for front-outboard passengers over one year of age (i.e., excluding infants) was 40.7 percent, which is 5.6 percent lower than the annual driver usage rate. Safety belt usage rates for front-outboard passengers continues to be lower in 18 out of the 19 cities studied than for drivers in the same city (table 2 versus table 1).

Safety Belt Use by Existence of a Safety Belt Use Law

Driver safety belt usage rates, based on whether or not a mandatory safety belt use law was in effect at the time of data collection, are presented in table 3. This table indicates that driver usage rates in jurisdictions with usage laws were much higher than those jurisdictions without a law (50.8 percent versus 34.3 percent for the entire year).

Table 1. Driver safety belt usage by city and observation period for 1988.

	First Half				Second Half				Total 1988	
	Study 1		Study 2		Study 1		Study 2			
	Base	Percent Restrained	Base	Percent Restrained	Base	Percent Restrained	Base	Percent Restrained	Base	Percent Restrained
Atlanta**	2,874	36.4	5,633	36.5	2,945	31.7	5,699	44.8	17,151	38.5
Baltimore*	2,258	46.7	4,738	50.2	2,186	50.6	4,589	52.2	13,771	50.4
Birmingham	1,834	39.5	4,177	35.1	2,875	35.2	5,148	31.0	14,034	34.2
Boston	2,175	31.2	4,535	23.9	2,366	37.8	4,538	33.0	13,614	30.5
Chicago*	3,041	31.7	4,939	34.5	2,985	29.8	5,450	27.7	16,415	30.9
Dallas*	2,264	71.4	5,785	60.0	2,384	67.7	5,274	69.2	15,707	65.9
Fargo/Moorhead	2,240	21.7	3,718	32.9	2,414	35.7	3,241	39.2	11,613	33.1
Houston*	2,221	65.5	3,448	67.8	2,366	61.4	4,849	63.1	12,884	64.5
Los Angeles*	2,898	47.3	5,921	49.2	3,073	52.7	5,429	50.8	17,321	50.0
Miami*	2,649	51.9	5,904	47.1	2,983	51.6	6,051	50.4	17,587	49.7
Minn./St. Paul*	2,925	47.8	5,633	59.7	3,143	61.5	6,176	65.0	17,877	59.9
New Orleans*	2,846	43.3	5,476	38.3	2,983	40.7	4,725	39.6	16,030	40.0
New York*	2,267	24.6	4,453	28.9	2,277	28.4	3,742	27.4	12,739	27.6
Phoenix	2,916	40.6	5,760	44.1	3,188	52.7	6,240	54.4	18,104	48.6
Pittsburgh	2,823	28.1	5,556	46.1	2,874	43.9	5,664	46.5	16,917	42.9
Providence	2,129	15.4	4,257	17.6	2,242	19.9	4,025	20.5	12,653	18.6
San Diego*	2,912	59.4	5,811	58.9	3,111	59.1	5,916	56.3	17,750	58.2
San Francisco*	2,888	53.4	5,856	58.4	2,309	55.0	5,639	59.3	16,692	57.4
Seattle*	2,915	60.3	6,015	61.4	3,005	61.4	5,917	62.7	17,852	61.7
Total	49,075	43.4	97,615	45.6	51,709	46.5	98,312	48.3	296,711	46.3

* Denotes mandatory safety belt usage law (MUL) in effect.

** Mandatory safety belt usage law adopted and in effect for the second study 2.

Table 2. Front-outboard passenger safety belt usage by city and observation period for 1988.

	First Half				Second Half				Total 1988	
	Study 1		Study 2		Study 1		Study 2			
	Base	Percent Restrained	Base	Percent Restrained	Base	Percent Restrained	Base	Percent Restrained	Base	Percent Restrained
Atlanta**	494	26.7	1,196	31.1	467	25.3	1,354	39.5	3,511	33.0
Baltimore*	499	43.1	973	44.6	496	46.4	886	48.2	2,854	45.8
Birmingham	615	35.3	1,123	32.3	531	26.4	1,349	23.8	3,618	28.8
Boston	262	26.0	1,032	19.6	427	33.3	827	26.7	2,548	24.8
Chicago*	605	25.8	866	30.3	491	25.9	847	20.3	2,809	25.5
Dallas*	599	70.1	506	69.8	436	57.6	1,267	57.7	2,808	62.5
Fargo/Moorhead	549	20.6	1,098	32.6	--	--	829	44.5	2,476	33.9
Houston*	642	60.4	1,035	60.4	594	49.0	1,307	52.4	3,578	55.6
Los Angeles*	478	36.4	1,215	41.2	531	43.3	1,157	46.8	3,381	42.8
Miami*	492	44.9	1,159	42.4	659	44.9	1,563	44.6	3,873	44.0
Minn./St. Paul*	664	43.8	1,436	57.6	--	--	--	--	2,100	53.2
New Orleans*	491	38.7	1,004	33.7	552	28.8	1,536	40.4	3,583	36.4
New York*	556	24.3	1,006	26.4	593	22.8	1,172	25.0	3,327	24.9
Phoenix	701	33.8	1,444	38.1	50	66.0	--	--	2,213	37.4
Pittsburgh	677	20.4	1,616	41.6	720	39.9	1,416	41.9	4,429	38.2
Providence	507	11.8	897	13.4	464	12.3	825	16.7	2,693	13.9
San Diego*	602	60.5	1,047	56.1	680	52.5	1,221	52.5	3,550	54.9
San Francisco*	582	47.9	1,354	54.4	465	50.5	1,505	58.4	3,906	54.5
Seattle*	503	52.3	1,441	56.8	477	52.6	1,078	56.8	3,499	55.6
Total	10,518	38.6	21,448	41.4	8,633	38.7	20,139	42.1	60,756	40.7

*Denotes mandatory safety belt usage law (MUL) in effect.
**(MUL) in effect for second half of study 2.

Table 3. Driver safety belt usage by existence of a safety belt use law.

Belt Law Existence	First Half		Second Half		Total	
	Base	Percent Restrained	Base	Percent Restrained	Base	Percent Restrained
Study 1						
Yes	34,907	48.3	35,679	51.1	70,586	49.7
No	14,168	31.4	16,030	36.3	30,198	34.0
Study 2						
Yes	69,535	51.0	75,120	51.8	144,655	51.4
No	28,080	32.5	23,192	37.0	51,272	34.5
Combined						
Yes	104,442	50.1	110,799	51.6	215,241	50.8
No	42,248	32.1	39,222	36.7	81,470	34.3
Total	146,690	44.9	150,021	47.7	296,711	46.3

Safety Belt Use by Vehicle Model Year

License plate numbers, recorded as part of the driver observations for the first half of 1988 of both study 1 and 2, were submitted to the various State departments of motor vehicles (DMV's) for the purpose of obtaining vehicle information. A total of 123,270 license plate numbers were submitted to 15 states DMV's. The DMV's returned 107,380 vehicle records which were processed with the "Vindicator" program by the Highway Loss Data Institute of Washington, D.C.[6]. Valid vehicle information for 78,195 vehicles (including vehicle make, model, model year, and size) were obtained for the model years 1967-1989 (pre-1967 vehicles were observed but could not be processed by the Vindicator program).

Table 4 presents driver safety belt usage rates for the 1988 data on vehicles verified by the State DMV's. Overall, 47.6 percent of drivers in this data subset were observed using safety belts. The data indicates that drivers of newer model cars, beginning in 1979, are more likely to wear safety belts than their counterparts in older model cars. Driver safety belt usage by manufacturer's division for model years 1980-1989 is presented in Appendix A.

Table 4. Driver safety belt usage by verified vehicle model year.

Model Year	Base	Percent Restrained
1967	170	10.0
1968	226	15.5
1969	264	18.6
1970	355	21.4
1971	449	22.7
1972	633	20.4
1973	838	20.9
1974	923	29.1
1975	1,137	28.6
1976	1,949	28.5
1977	3,043	29.5
1978	3,828	34.1
1979	4,628	36.3
1980	4,236	39.7
1981	4,421	44.4
1982	4,510	47.1
1983	5,030	47.6
1984	7,443	52.1
1985	8,519	53.7
1986	9,449	55.7
1987	10,338	58.9
1988/89	5,806	62.1
Total	78,195	47.6

Safety Belt Use by Driver Gender

Observed safety belt use stratified by driver gender are presented in table 5. This table indicates that female drivers wear belts more than males, both with and without mandatory use laws in effect. The 1987 results also indicated that females wear belts more than males.

Table 5. Driver safety belt usage by driver gender.

Driver Gender	Without MUL		With MUL		Total	
	Base	Percent Restrained	Base	Percent Restrained	Base	Percent Restrained
Male	46,462	30.3	131,287	45.7	177,749	41.7
Female	35,008	39.6	83,954	58.9	118,962	53.2
Total	81,470	34.3	215,241	50.8	296,711	46.3

Safety Belt Use by Driver Age

Table 6 indicates that overall safety belt usage was highest among the 25 to 49, and lowest for the under 20, age groups. Belt usage in areas with belt use laws was highest for the 50 and over age group while the 25 to 49 age group displayed the highest usage rate in areas without the laws. The younger drivers are more than 9 percent lower in overall belt usage than any of the other age groups. The relative rankings between age groups are similar to those obtained from the 1986 and 1987 studies.

Table 6. Driver safety belt usage by age group.

	Without MUL		With MUL		Total	
Age Group	Base	Percent Restrained	Base	Percent Restrained	Base	Percent Restrained
Under 20	1,925	20.2	3,531	35.4	5,456	30.0
20-24	8,933	25.7	21,968	44.8	30,901	39.3
25-49	53,841	37.7	142,494	52.0	196,335	48.1
50 or over	16,771	29.8	47,248	51.3	64,019	45.7
Total	81,470	34.3	215,241	50.8	296,711	46.3

Safety Belt Use by Vehicle Make (Domestic Versus Import) and Vehicle Size

The Vindicator program permitted stratification of driver safety belt usage by vehicle size as presented in tables 7 and 8. The four vehicle size categories presented in these tables correspond to the following wheelbase measurements:

Subcompact - wheelbase less than 101 inches
Compact - wheelbase 101-111 inches
Intermediate - wheelbase 112-120 inches
Full size - wheelbase greater than 120 inches

Table 7 presents the relationship between safety belt usage, vehicle make and vehicle size for all verified vehicle model years. This table indicates that drivers of smaller size vehicles (i.e., subcompacts and compacts) wear safety belts more than drivers in larger vehicles. In addition, drivers of imported vehicles were observed to wear safety belts more than their domestic vehicle counterparts. Further investigation of table 7 reveals that 77.1 percent of the imported vehicles observed were subcompacts, while 44.5 percent of domestic vehicles were compacts. Table 8 indicates that, when only newer model cars (1980-1989) were considered, similar but slightly higher usage rates than the all model year results were observed.

Table 7. Driver safety belt usage by verified vehicle make and size for all model years.

Vehicle Size	Vehicle Make		
	Domestic	Import	Total
Subcompact	48.1% (13,971)	55.1% (19,909)	52.2% (33,880)
Compact	46.0% (23,295)	66.7% (5,494)	50.0% (28,789)
Intermediate	34.1% (11,720)	48.9% (348)	34.5% (12,068)
Full Size	27.3% (3,386)	51.4% (72)	27.8% (3,458)
Total	42.7% (52,372)	57.5% (25,823)	47.6% (78,195)

Note: Percentages indicate the safety belt usage rates of the base number of observations shown parenthetically.

Table 8. Driver safety belt usage by verified vehicle make and size for 1980-1989 model years.

Vehicle Size	Vehicle Make		
	Domestic	Import	Total
Subcompact	49.7% (12,757)	57.5% (16,441)	54.1% (29,198)
Compact	51.0% (18,362)	68.9% (4,911)	54.8% (23,273)
Intermediate	41.6% (6,062)	50.5% (281)	42.0% (6,343)
Full Size	37.3% (866)	51.4% (72)	38.4% (938)
Total	48.8% (38,047)	60.0% (21,705)	52.8% (59,752)

Note: Percentages indicate the safety belt usage rates of the base number of observations shown parenthetically.

Safety Belt Use by Vehicle Manufacturer

Driver safety belt use by vehicle manufacturer for all model years (based on data from the Vindicator program) is presented in table 9. Drivers of Honda vehicles were observed wearing safety belts in 62.8 percent of the observations; the highest of any manufacturer. Drivers of vehicles by the domestic manufacturers experienced usage rates, ranging from 26.6 to 50.0 percent.

Table 9. Driver safety belt usage by verified vehicle manufacturer for all model years.

Vehicle Manufacturer	Base	Percent Restrained
AMC/Eagle	361	26.6
Chrysler	5,117	40.3
Ford	13,277	44.0
GM	33,220	42.6
VW	2,203	53.6
Toyota	6,015	61.9
Datsun/Nissan	4,318	49.7
Honda	4,410	62.8
Jeep	392	50.0
Other Imports	8,882	56.5
Total	78,195	47.6

When the older model vehicles were removed from the data summaries, Toyota displayed the highest driver usage rate (table 10).

Table 10. Driver safety belt usage by verified vehicle manufacturer for 1980 - 1989 model years.

Vehicle Manufacturer	Base	Percent Restrained
AMC/Eagle	147	32.7
Chrysler	3,719	45.3
Ford	9,571	51.3
GM	24,266	48.3
VW	1,258	60.7
Toyota	5,046	65.4
Datsun/Nissan	3,600	52.6
Honda	3,981	64.0
Jeep	339	52.8
Other Imports	7,825	57.8
Total	59,752	52.8

Safety Belt Use By Time of Day

Table 11 presents 1987 and 1988 usage rates stratified by the four daily data collection periods.

Table 11. Driver safety belt usage by time period.

	1987		1988	
	Base	Percent Restrained	Base	Percent Restrained
7 - 10 a.m.	73,912	41.4	77,867	45.6
10 a.m. - 1 p.m.	70,057	43.2	78,805	47.1
1 - 4 p.m.	77,938	40.5	81,296	45.5
4 - 7 p.m.	50,950	45.2	58,743	47.2
Total	272,857	42.3	296,711	46.3

Safety Belt Use By Site Characteristics

Driver safety belt usage rates stratified by site type and area type, are presented in tables 12 and 13, respectively. Table 12 indicates that driver safety belt usage was higher on freeways than on non-freeway facilities. This characteristic was also present in the 1986 and 1987 studies.

Table 12. Driver safety belt usage by site type.

Site Type	Base	Percent Restrained
Primary Road	217,479	45.1
Freeway Exit	79,232	49.7
Total	296,711	46.3

Safety belt use in city versus suburban areas is presented in table 13. City areas are characterized as central business district areas while suburban areas include commercial, industrial or residential areas outside of the central city area. The 1988 rates indicate that drivers tend to use safety belts more in city areas than in suburban areas. Study findings in 1987 displayed a similar difference in rates between city and suburban areas.

Table 13. Driver safety belt usage by area type.

Area Type	Base	Percent Restrained
City	194,082	47.5
Suburb	102,629	44.0
Total	296,711	46.3

Vehicle Occupancy

Safety belt use observations were only recorded for drivers and front-outboard passengers during the driver observations. However, information was also recorded on the number and age of passengers in each vehicle for which a driver observation was made. The data of table 14 indicate that 77.4 percent of the 278,738 vehicles observed were occupied by only the driver. Passenger data was not available for 17,973 vehicles and hence were excluded from this table.

Table 14. Occupancy for vehicles observed during the driver observation.

Passenger Occupancy Per Vehicle	Observed	Percent of Total
0	215,676	77.4
1	56,268	20.2
2	4,787	1.7
3	1,613	0.6
4 or more	394	0.1
Total	278,738	100.0

Table 15 indicates the age distribution of passengers as recorded during the driver observations. Of the 278,738 vehicles observed, less than one percent had an infant passenger in either study 1 or study 2. These percentages represent the distribution of passengers in the traffic population and differ from the passenger distribution obtained during the passenger observations where observers were instructed to concentrate primarily on vehicles with toddlers and infants at shopping centers. In the driver observations, the observers sampled from the second car stopped for a traffic signal.

Table 15. Percent of cars with passengers by age group during the driver observation.

Age Group	Percent of Vehicles	
	Study 1	Study 2
Infants (less than 1 year)	0.1	0.1
Toddlers (1-4 years)	0.8	0.9
Subteens (5-12 years)	2.1	2.5
Teens (13-19 years)	2.2	2.3
Adults (20 and older)	18.6	21.2

Table 16 presents the occupancy rate for each seating position by age group. In 65.4 percent of the vehicles observed the driver was categorized in the 25-49 year age group. This age group also occupied the front-outboard position most often (9.3 percent).

Shoulder Belt Misuse

The following data summaries illustrate the total number of verified drivers observed, those observed wearing the shoulder belt and the percentage of shoulder belt misuse. The misuse percentage is based on only those drivers that were observed wearing the shoulder belt. Observers classified shoulder belt misuse by one of three categories; under the arm (i.e., under the driver's left arm), behind the back (i.e., positioned behind the right side of the driver's body, resulting in no restraint of the upper torso), and loose (i.e., having a fist width or more as slack near chest area or excessive slack in belt behind driver). Those drivers that were wearing only lap belts in vehicles equipped with separate lap/shoulder systems and those drivers not utilizing any part of the combination lap/shoulder systems were excluded from the following analyses.

Shoulder Belt Misuse by Verified Vehicle Model Year

The Vindicator program generated data on a total of 78,195 drivers, 37,043 of which were observed to be utilizing the shoulder belt during 1988. Table 17 gives shoulder belt misuse rates by verified vehicle model year for drivers that were observed to be wearing shoulder belts. Overall, 3.2 percent of drivers utilizing shoulder belts misused them.

Table 16. Occupancy by seat position and age group for vehicles in the driver study 1.

Age Group	Front Driver		Front Center		Front Outboard		Back Driver		Back Center		Back Outboard	
	No.	Percent of Total	No.	Percent of Total	No.	Percent of Total	No.	Percent of Total	No.	Percent of Total	No.	Percent of Total
Infant	0	--	6	0.0	57	0.1	10	0.0	9	0.0	11	0.0
Toddler	0	--	44	0.1	157	0.2	188	0.2	162	0.2	247	0.3
Subteen	0	--	33	0.1	993	1.1	319	0.3	253	0.3	392	0.4
Teen	1,983	2.2	25	0.0	1,582	1.7	168	0.2	65	0.1	250	0.3
Adult 20-24	9,939	10.8	25	0.0	2,275	2.5	81	0.1	28	0.0	116	0.1
Adult 25-49	60,226	65.4	23	0.0	8,518	9.3	196	0.2	32	0.0	334	0.4
Adult 50 or over	19,891	21.6	8	0.0	5,615	6.1	162	0.2	15	0.0	321	0.3
Empty	0	--	91,875	99.8	72,842	79.1	90,915	98.8	91,475	99.5	90,368	98.2
Total	92,039	100.0	92,039	100.0	92,039	100.0	92,039	100.0	92,039	100.0	92,039	100.0

Minneapolis/St. Paul, Fargo/Moorhead, and Phoenix were removed from the data base for the second half of study 1.

Table 17. Driver shoulder belt misuse by verified vehicle model year.

Model Year	Vindicator Observations	Shoulder Belt Base	Percent Misused			Total Percent Misused
			Under Arm	Behind Back	Loose	
1967	170	3	0.0	0.0	0.0	0.0
1968	226	24	8.3	0.0	0.0	8.3
1969	264	36	5.6	0.0	0.0	5.6
1970	355	63	3.2	1.6	1.6	6.4
1971	449	99	3.0	0.0	3.0	6.0
1972	633	112	3.6	0.0	4.5	8.1
1973	838	154	3.2	0.6	2.6	6.4
1974	923	261	3.1	1.5	2.3	6.9
1975	1,137	319	2.5	0.6	0.9	4.0
1976	1,949	547	3.8	1.5	0.9	6.2
1977	3,043	894	3.3	0.4	1.1	4.8
1978	3,828	1,300	2.6	0.5	1.4	4.5
1979	4,628	1,675	2.0	0.5	1.3	3.8
1980	4,236	1,677	2.5	0.6	1.1	4.2
1981	4,421	1,960	2.4	0.3	1.0	3.7
1982	4,510	2,123	2.0	0.2	0.5	2.7
1983	5,030	2,391	1.9	0.5	1.1	3.5
1984	7,443	3,876	1.8	0.3	1.2	3.3
1985	8,519	4,567	1.7	0.2	1.4	3.3
1986	9,449	5,262	1.8	0.1	1.0	2.9
1987	10,338	6,092	1.1	0.1	0.8	2.0
1988/89	5,806	3,608	1.4	0.0	1.0	2.4
Total	78,195	37,043	1.8	0.3	1.1	3.2

Shoulder Belt Misuse by Driver Gender

Observed shoulder belt misuse by driver gender, based on verified vehicle data of drivers observed utilizing the shoulder belt in 1988, are presented in table 18. This table reveals shoulder belt misuse to be higher for females than males (4.0 percent versus 2.5 percent), due primarily to the difference in "Under Arm" misuse.

Table 18. Driver shoulder belt misuse by driver gender for all verified vehicle model data.

Driver Gender	Base	Percent Misused			Total Percent Misused
		Under Arm	Behind Back	Loose	
Male	19,958	1.3	0.2	1.0	2.5
Female	17,085	2.5	0.4	1.1	4.0
Total	37,043	1.8	0.3	1.1	3.2

Shoulder Belt Misuse by Driver Age

Table 19, based on all verified vehicle models with drivers observed utilizing the shoulder belt in 1988, indicates that shoulder belt misuse was the highest among the 50 or over age group (4.8 percent).

Table 19. Driver shoulder belt misuse by age group for all verified vehicle models.

Age Group	Base	Percent Misused			Total Percent Misused
		Under Arm	Behind Back	Loose	
Under 20	454	1.5	0.0	0.9	2.4
20-24	3,667	2.4	0.2	0.8	3.4
25-49	24,793	1.6	0.2	0.8	2.7
50 or over	8,129	2.4	0.4	2.0	4.8
Total	37,043	1.8	0.3	1.1	3.2

Shoulder Belt Misuse by Vehicle Make (Domestic Versus Import)

Table 20 presents driver shoulder belt misuse, by vehicle make for all model years, based on data generated by the Vindicator program for drivers utilizing the shoulder belt. Drivers of domestic vehicles were much more likely to wear the shoulder belts "loose" than drivers of imported vehicles. This is probably due to the "Window Shade" design used by domestic manufacturers.

Table 20. Driver shoulder belt misuse by verified vehicle make for all model years.

Vehicle Make	Base	Percent Misused			Total Percent Misused
		Under Arm	Behind Back	Loose	
Domestic	22,217	2.0	0.4	1.7	4.1
Import	14,826	1.6	0.1	0.1	1.8
Total	37,043	1.8	0.3	1.1	3.2

Shoulder Belt Misuse by Vehicle Size

The relationship between shoulder belt misuse and vehicle size, based on all verified model years, is presented in table 21. Shoulder belt misuse is the lowest for subcompact vehicles and may be due to the large proportion of imported cars in this classification.

Table 21. Driver shoulder belt misuse by verified vehicle size for all model years.

Vehicle Size	Base	Percent Misused			Total Percent Misused
		Under Arm	Behind Back	Loose	
Subcompact	17,658	1.7	0.1	0.6	2.4
Compact	14,342	2.0	0.4	1.4	3.8
Intermediate	4,117	2.0	0.5	1.5	4.0
Full Size	926	1.5	1.1	2.3	4.9
Total	37,043	1.8	0.3	1.1	3.2

Shoulder Belt Misuse by Vehicle Manufacturer

Driver shoulder belt misuse by vehicle manufacturer for all model years, based on data from the Vindicator program for those drivers observed utilizing shoulder belts, is presented in table 22. Drivers of AMC/Eagle and Ford products experienced the highest shoulder belt misuse rate among the domestic manufacturers.

Table 22. Driver shoulder belt misuse by vehicle manufacturer for verified vehicles for all model years.

Vehicle Manufacturer	Base	Percent Misused			Total Percent Misused
		Under Arm	Behind Back	Loose	
AMC/Eagle	93	4.3	0.0	3.2	7.5
Chrysler	2,044	1.9	0.2	2.2	4.3
Ford	5,814	2.3	0.2	1.9	4.4
GM	14,078	1.9	0.5	1.5	3.9
Jeep	185	2.7	0.5	0.5	3.7
VW	1,177	3.0	0.0	0.2	3.2
Toyota	3,721	1.0	0.0	0.2	1.2
Datsun/Nissan	2,147	1.8	0.0	0.2	2.0
Honda	2,770	1.7	0.2	0.1	2.0
Other Imports	5,014	1.6	0.1	0.0	1.7
Total	37,043	1.8	0.3	1.1	3.2

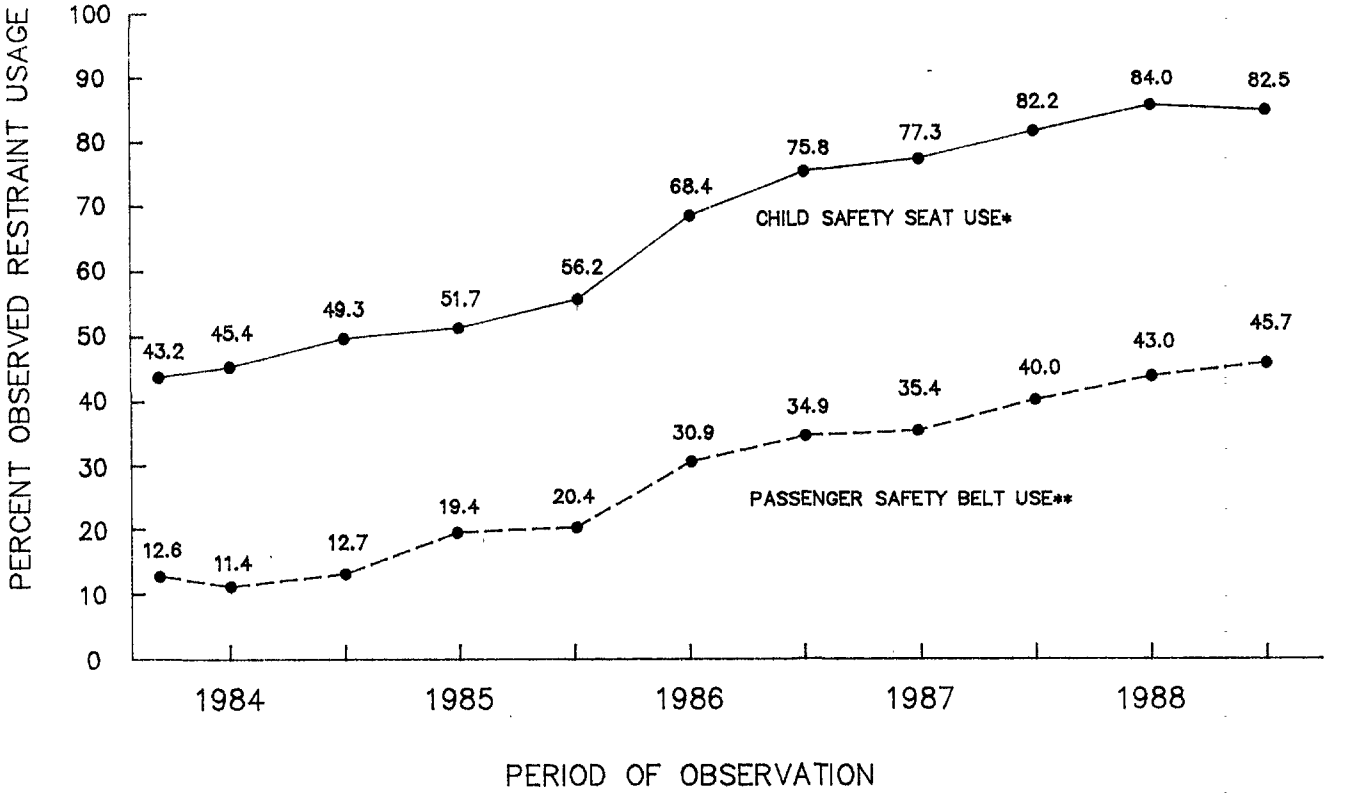
Table 23 illustrates driver shoulder belt misuse rates by verified manufacturer's division for all model years.

Table 23. Driver shoulder belt misuse by manufacturer's division for all verified vehicle model years.

Manufacturer's Division	Base	Percent Misused			Total Percent Misused
		Under Arm	Behind Back	Loose	
• Chrysler					
Chysler	671	1.1	0.1	1.2	2.4
Dodge	725	2.2	0.1	2.9	5.2
Plymouth	648	2.5	0.2	2.5	5.2
• Ford					
Ford	4,407	2.4	0.1	1.9	4.4
Lincoln	370	2.4	0.5	1.4	4.3
Mercury	1,037	1.7	0.4	2.3	4.4
• GM					
Buick	2,527	1.7	0.7	1.6	4.0
Cadillac	1,462	1.5	0.6	2.0	4.1
Chevrolet	5,018	2.0	0.5	1.3	3.8
Oldsmobile	3,185	2.0	0.5	1.6	4.1
Pontiac	1,886	2.4	0.2	1.5	4.1

PASSENGER OBSERVATION FINDINGS

A total of 106,157 passengers were observed during 1988. The data collection effort recognized three specific age groups within the "child" population: infants under one year old; toddlers from ages 1 to 4; and subteens from ages 5 to 12. Observers categorized children within one of these groups to the best of their ability. However, since this observation is relatively difficult, classification of children may not be accurate for all observations. Other age categories included teens (13-19 years old) and adults (20 years and older). Passenger safety belt and child safety seat use (children age 4 and under) are presented bi-annually for 1985 through 1988 in figure 4. The percentages contained in figure 4 represent the appropriate age categories combined (with each observation receiving equal weight) from the summaries presented in Appendix D. The child seat usage rate for the first half of 1988 was slightly higher than in the second half but was still above the percentages in previous years. It should be understood that mandatory safety belt laws were in effect in the majority of cities for both data collection periods in 1987. Therefore, the 19-city passenger safety belt use summaries presented in this chapter include data collected in numerous cities with mandatory safety belt laws,



*Comprised of children age 4 and under (i.e., toddlers and infants) with each observation receiving equal weight.

**Comprised of passengers over 4 years of age (i.e., excluding infants and toddlers) with each observation receiving equal weight.

Figure 4. Observed use of passenger restraint system over time.

Table 24 summarizes 1988 passenger restraint system use for various age groups. Teen belt usage dropped from 25.1 percent to 24.0 percent and continues to be the lowest restraint percentage age group.

Table 24. Passenger restraint system use (1988) by age group.

Age Group	Base	Safety Seat	Safety Belt	Total
Infant	971	81.3	1.1	82.4
Toddler	9,861	83.4	3.9	87.3
Subteen	16,948	2.4	36.9	39.3
Teen	13,513	N/A	24.0	24.0
Adult	64,864	N/A	44.3	44.3

The total passenger restraint use (safety seat and safety belt) by age group for the years 1986, 1987 and 1988 are presented in table 25. This table indicates that restraint use has increased over the past two years in all but the teen age group. Detailed summaries of the passenger study observations are provided in the next sections for each age group.

Table 25. Passenger restraint use by age group and year.

	1986		1987		1988	
Age Group	Base	Percent	Base	Percent	Base	Percent
Infant	723	71.7	1,164	79.1	971	82.4
Toddler	9,851	78.2	8,530	84.5	9,861	87.3
Subteen	15,294	30.2	13,139	37.3	16,948	39.3
Teen	14,461	19.1	15,842	25.1	13,513	24.0
Adult	66,601	36.9	59,561	41.7	64,864	44.3

Infants (Under 1 Year)

Infant observations consisted of recording the seating position and type of restraint for children estimated to be younger than 1 year of age. Possible observations for infant restraint type include:

- Safety belt
- Infant/convertible safety seat
- Unsafe seat (home/feeder seat)
- No restraint

A total of 971 infants were observed during the passenger observation. Of this total, 81.3 percent were observed in approved safety seats, up 3.7 percent from last year. In addition, the percent of all infants on passengers' laps dropped from 20.0 percent to 15.3 percent. Unsafe (unapproved) seats were observed in 0.1 percent of the observations. Table 26 summarizes the infant observations.

Table 26. Methods of restraining infants.

Type of Restraint	Number	Percent
Infant/Convertible Seat	789	81.3
Safety Belt	11	1.1
None or Unsafe Seats	171	17.6
On Lap	149	15.3
Unrestrained	21	2.2
Unsafe Seat	1	0.1
Total	971	100.0

If an infant was observed in an infant-only safety seat, use of the safety seat harness and car belt to secure the safety seat in the vehicle was recorded. The assessment of correct/incorrect belt use could be made accurately for most observations involving an infant-only seat since the car belt crosses in front of the infant to secure the child seat. If the infant was observed to be properly harnessed and the seat appeared to be belted and facing toward the rear of the vehicle, the restraint condition was classified as "Appears Correct". If either improper harnessing, belting or positioning was observed, the condition was classified as "Obviously Incorrect". If an infant was observed in a convertible safety seat, use of the harness was recorded. However, use of the car belt to secure the safety seat in the vehicle could not be recorded due to the difficulty in ascertaining proper fastening.

Table 27 presents infant safety seat usage by city. Overall 61.3 percent of all infants were observed to be correctly harnessed in an approved safety seat in 1988, as compared to 55.8 percent in 1987. 75.4 percent of the infants in safety seats appear to be correctly secured.

Table 27. Infants observed in safety seats by city.

City	Base	Percent In Safety Seat	Percent Appears Correct From Base	Percent Appears Correct From Seat Total
Atlanta	35	97.1	71.4	73.5
Baltimore	43	88.4	83.7	94.7
Birmingham	101	84.2	61.4	72.9
Boston	45	82.2	66.7	81.1
Chicago	6	50.0	16.7	33.3
Dallas	57	63.2	45.6	68.4
Fargo/Moorhead	67	80.6	73.1	90.7
Houston	58	53.4	36.2	67.7
Los Angeles	48	77.1	64.6	83.8
Miami	48	85.4	22.9	26.8
Minn./St. Paul	68	95.6	86.8	90.8
New Orleans	49	96.0	42.9	44.7
New York	47	78.7	59.6	75.7
Phoenix	52	80.8	53.8	66.7
Pittsburgh	37	67.6	37.8	56.0
Providence	44	86.4	77.3	89.5
San Diego	55	87.3	76.4	87.5
San Francisco	47	83.0	72.3	87.2
Seattle	64	78.1	67.2	86.0
Total	971	81.3	61.3	75.4

Table 28 presents the characteristics of infants observed in safety seats. For the 789 infants observed in safety seats, 75.4 percent were observed to be correctly harnessed (and belted for infant-only seats) as compared to 71.9 percent in 1987. The harness was not used in 11.0 percent of the observations, while nonuse of the car belt was observed 2.9 percent of the time. In addition, the percent of the safety seats observed facing forward during 1988 remained at 12.0 percent. These findings indicate that many parents/guardians do not understand the importance of securing the child seat to face rearward. Table 29 presents apparent correct usage of infant safety seats by year (1986 through 1988).

Table 28. Characteristics of infants observed in safety seats.

Safety Seat Usage	Number	Percent
Correctly Used	595	75.4
No Harness	70	8.9
No Belt	6	0.8
No Harness or Belt	17	2.1
Forward Facing	95	12.0
Unsure	6	0.8
Total	789	100.0

Table 29. Correct safety seat usage by year for infants observed in safety seats.

Year	Percent Appears Correct
1986	67.8
1987	66.4
1988	75.4

Table 30 indicates that infants were more commonly transported in the front seat, with the front seat outboard position being the most frequent placement. Table 30 also indicates that an infant in the back seat was more likely to be in an approved safety seat and properly transported in that seat than infants observed in the front seat. This phenomenon was also found in 1987.

Table 30. Safety seat usage for infants by seat position.

Seat Position	Base	Percent Observed in Safety Seat	Percent Appears Correct
Front Seat - Center	58	93.1	40.7
Front Seat - Outboard	532	75.8	79.7
Total Front Seat	590	77.5	75.1
Back Seat - Driver	133	87.2	79.3
Back Seat - Center	87	94.3	65.9
Back Seat - Outboard	150	84.0	80.2
Total Back Seat	370	87.6	76.2
Rear (for station wagons & hatchbacks)	11	72.7	62.5
Total	971	81.3	75.4

Toddlers (Ages 1 to 4 Years)

Toddler observations consisted of recording the same type of data as collected for infants. However, the correct usage of toddler safety seats could not include an assessment for the belting of the seat to the vehicle, due to the difficulty in ascertaining proper fastening by the seat belt. Correct usage of toddler seats, therefore, was based solely on the use of the harness and shield (for seats requiring shields). In addition, some children who were classified as toddlers, were observed in booster seats. Booster seat observations were recorded as correct when either a harness/lap belt, shoulder/lap belt, or shield/belt system was properly used.

A total of 9,861 toddlers were observed during the passenger study. Of these, 8,227 (83.4 percent) were observed in either a toddler seat or booster seat. A comparison of these findings with those of 1987 indicates an increase in the percentage of toddlers in safety seats. Safety seat usage increased from 80.4 percent during 1987 to 83.4 percent during 1988. Table 31 summarizes the toddler observations.

Table 31. Methods of restraining toddlers.

Type of Restraint	Number	Percent
Toddler Seat	7,748	78.5
Booster Seat	479	4.9
Safety Belt	389	3.9
None or Unsafe Seat Total	1,245	12.7
On Lap	630	6.4
Unrestrained	596	6.1
Unsafe Seats	19	0.2
Total	9,861	100.0

Table 32 presents the type of restraint usage by toddlers and the percentage of usage by city. Overall, 68.3 percent of observed toddlers were harnessed and/or shielded (in accord with the proper restraint requirements of the seat) in a child safety seat.

Table 33, which presents harness/shield use by year, indicates a continued decrease in correct usage compared to the 1986 and 1987 results.

Table 32. Restraint usage by city for toddlers.

City	Base	Percent Observed Using Safety Belt	Percent Observed In Toddler Seats	Percent Harnessed/ Shielded In Toddler Seats	Percent Observed In Toddler Seats and Properly Restrained	Percent Observed In Booster Seats	Percent Appears Correct In Booster Seats	Percent Observed In Booster Seats and Properly Restrained	Percent Observed In Safety Seats
Atlanta	436	0.0	84.7	61.5	72.6	10.3	5.0	48.9	95.0
Baltimore	576	0.7	93.2	72.7	78.0	0.2	0.2	100.0	93.4
Birmingham	471	2.8	71.3	65.4	91.7	11.3	6.4	56.6	82.6
Boston	524	1.0	90.1	76.3	84.7	0.2	0.2	100.0	90.3
Chicago	348	0.3	85.1	61.2	72.0	6.3	1.7	27.3	91.4
Dallas	453	8.2	70.0	41.4	94.0	11.3	10.4	92.2	81.3
Fargo/Moorhead	597	14.2	64.3	61.0	93.8	3.2	2.3	73.7	67.5
Houston	390	4.1	69.7	63.1	90.4	9.3	8.0	86.1	79.0
Los Angeles	700	1.9	80.1	79.6	99.3	2.9	2.4	85.0	83.0
Miami	495	2.4	78.8	52.7	66.9	2.6	0.6	23.0	81.4
Minn./St.Paul	510	13.5	65.1	60.4	92.8	6.5	4.9	75.8	71.6
New Orleans	438	0.7	80.6	59.8	74.2	4.1	1.8	44.4	84.7
New York	556	0.2	86.9	73.7	84.9	0.2	0.2	100.0	87.1
Phoenix	455	13.0	55.4	48.1	86.9	5.9	3.3	55.6	61.3
Pittsburgh	343	3.2	63.6	53.9	84.9	16.0	9.6	60.0	79.6
Providence	580	1.2	89.8	78.4	87.3	0.0	--	--	89.8
San Diego	719	2.4	82.9	82.1	99.0	5.1	4.9	94.6	88.0
San Francisco	661	2.3	85.1	74.6	87.6	1.1	1.1	100.0	86.2
Seattle	609	3.4	80.8	78.7	97.4	6.6	6.2	95.0	87.4
Total	9,861	3.9	78.5	68.3	86.9	4.9	3.4	69.7	83.4

Table 33. Correct harness/shield use by year for toddlers observed in toddler seats.

Year	Base	Percent Harness/Shield
1986	6,652	91.2
1987	5,712	90.2
1988	7,748	86.9

Table 34 summarizes the observations of toddlers in booster seats. Of the 479 toddlers observed in booster seats, 69.7 percent were recorded as correct as was observed in last year's study. Of the 231 booster safety seats requiring shields, 229 (99.1 percent) were correctly used, while only 105 of the 248 booster seats not requiring a shield were correctly used (42.3 percent).

Table 34. Characteristics of toddlers observed in booster seats.

Booster Seat Usage	Number	Percent
Correctly Used	334	69.7
Harness/Lap Belt	40	8.3
Shoulder/Lap Belt	65	13.6
Shield/Belt	229	47.8
Lap Belt Only	126	26.3
No Harness/Belt	17	3.6
No Shield/Belt	2	0.4
Total	479	100.0

Overall, 85.1 percent of the toddlers observed in toddler and/or booster seats were restrained with the use of a harness or shield.

The relationship between seating position and safety belt/seat use is summarized in table 35. Toddlers were observed transported in the back seat in 76.7 percent of the 9,861 observations. As was the case for infants, toddlers in safety seats were more likely to be observed in the back seat than in the front; 90.4 percent in the back seat compared to 60.7 percent in the front seat.

Table 35. Safety seat/belt usage by seat position for toddlers.

Seat Position	Base	Percent Observed Using Safety Belt	Percent Observed In Toddler Seats	Percent Harnessed/ Shielded In Toddler Seats	Percent Observed In Booster Seats	Percent Appears Correct In Booster Seats	Percent Observed In Safety Seats
Front Seat - Center	269	7.8	32.3	24.9	8.2	3.3	40.5
Front Seat - Outboard	1,959	9.7	57.1	49.2	6.4	5.8	63.5
Total Front Seat	2,228	9.5	54.1	46.2	6.7	6.3	60.7
Back Seat - Driver	2,190	3.7	85.0	75.9	4.7	3.5	89.7
Back Seat - Center	1,557	0.8	85.4	75.7	3.3	2.1	88.8
Back Seat - Outboard	3,815	2.0	86.9	74.2	4.6	2.6	91.4
Total Back Seat	7,562	2.3	86.0	75.0	4.3	2.8	90.4
Rear (i.e., station wagons* and hatch-backs)	71	7.0	52.1	49.3	4.2	2.8	54.0
Total	9,861	3.9	78.6	68.3	4.9	3.4	83.4

Note: The percentages shown in a particular row reflect the corresponding base in that row.

Subteens (Ages 5 to 12 Years)

Table 36 indicates that a total of 16,948 subteens were observed in the 19 cities during the passenger study. Overall, safety belt use for this age group was found to be 36.9 percent in 1988 compared to 36.3 percent in 1987.

Table 36. Passenger safety belt usage by city for subteens.

City	Base	Percent Restrained
Atlanta	1,280	38.4
Baltimore	443	44.0
Birmingham	1,181	32.8
Boston	453	35.5
Chicago	1,484	36.3
Dallas	638	60.0
Fargo/Moorhead	587	39.5
Houston	625	51.5
Los Angeles	1,362	23.8
Miami	1,307	39.7
Minneapolis/St. Paul	798	49.1
New Orleans	1,274	29.9
New York	570	30.7
Phoenix	737	38.9
Pittsburgh	858	38.4
Providence	477	41.7
San Diego	1,072	32.5
San Francisco	906	28.1
Seattle	896	36.4
Total	16,948	36.9

Table 37 presents subteen safety belt usage by seating position. The current study indicates that the majority of subteens were observed in back seat positions similar to the 1987 findings. The highest usage rate was experienced in the front-outboard position. The usage rate for this position was observed to be 67.9 percent in 1988 compared to 60.4 percent in 1987, an increase of over 7 percent.

Table 37. Passenger safety belt usage for subteens by seat position.

Seat Position	Base	Percent Restrained
Front Seat - Center	527	8.0
Front Seat - Outboard	5,776	67.9
Total Front Seat	6,303	62.8
Back Seat - Driver	3,071	30.3
Back Seat - Center	2,737	3.9
Back Seat - Outboard	4,465	27.8
Total Back Seat	10,273	22.2
Rear (i.e., station wagons & hatchbacks)	372	2.1
Total	16,948	36.9

Teens (Ages 13 to 19 Years)

Teens, with the exception of children 4 years of age and younger, were observed to have the lowest rate of safety belt usage. Of a total of 13,513 teens, only 24.0 percent were observed using safety belts. In 1987 only 25.1 percent of 15,842 teens were observed using safety belts. This is the only drop in safety belt usage rates among the various age groups. Table 38 presents teen safety belt usage by city for each of the 19 cities. The percentage of use ranged from a high of 43.3 percent in Dallas to a low of 9.8 percent in Providence.

Safety belt use by seating position (table 39) indicates that teens in front seat positions were approximately six times more likely to be observed wearing safety belts than those in back seat positions. Also, the majority of teens were observed in the front-outboard position. Safety belt usage for teens in the front-outboard position increased from 39.1 percent in 1987 to 55.1 percent in 1988.

Table 38. Passenger safety belt usage for teens by city.

City	Base	Percent Restrained
Atlanta	545	15.0
Baltimore	482	24.5
Birmingham	904	16.2
Boston	522	12.8
Chicago	537	17.7
Dallas	781	43.3
Fargo/Moorhead	759	17.4
Houston	780	33.6
Los Angeles	783	24.4
Miami	763	28.8
Minneapolis/St. Paul	844	31.5
New Orleans	482	20.1
New York	678	12.7
Phoenix	861	23.6
Pittsburgh	922	21.1
Providence	593	9.8
San Diego	837	33.6
San Francisco	696	23.1
Seattle	744	33.7
Total	13,513	24.0

Table 39. Passenger safety belt usage for teens by seat position.

Seat Position	Base	Percent Restrained
Front Seat - Center	331	2.7
Front Seat - Outboard	7,011	55.1
Total Front Seat	7,342	39.0
Back Seat - Driver	1,730	7.2
Back Seat - Center	701	0.9
Back Seat - Outboard	3,671	6.9
Total Back Seat	6,102	6.3
Rear (i.e., station wagon & hatchbacks)	69	4.3
Total	13,513	24.0

Adults (20 Years and Older)

Adult passengers were observed wearing safety belts in 44.3 percent of 64,864 observations. This compares with 40.0 percent for the 1987 study. Table 40 presents the number of observations and percent safety belt usage for each of the 19 cities. The highest safety belt usage was in Dallas (60.7 percent) and the lowest was in Providence (26.4 percent).

Table 40. Passenger safety belt usage for adults by city.

City	Base	Percent Restrained
Atlanta	3,386	43.0
Baltimore	3,605	47.6
Birmingham	3,446	33.5
Boston	3,056	31.6
Chicago	2,829	49.7
Dallas	3,502	60.7
Fargo/Moorhead	3,026	41.2
Houston	3,427	57.0
Los Angeles	3,907	46.3
Miami	3,420	46.3
Minneapolis/St. Paul	3,137	48.4
New Orleans	3,067	35.6
New York	3,569	29.2
Phoenix	2,736	38.9
Pittsburgh	2,957	34.0
Providence	3,264	26.4
San Diego	4,454	54.9
San Francisco	3,793	48.4
Seattle	4,283	57.6
Total	64,864	44.3

Front seat adults were observed to use safety belts in 49.1 percent of the observations while only 8.2 percent safety belt usage was observed for back seat adult passengers (table 41). All front seating positions displayed an increase in safety belt usage for adults during 1988. The largest increase in adult safety belt usage between 1987 and 1988 was 4.7 percent for the front seat outboard position with a corresponding decrease of 1.9 percent for back seat adult passengers

Table 41. Passenger safety belt usage for adults by seat position.

Seat Position	Base	Percent Restrained
Front Seat - Center	433	4.4
Front Seat - Outboard	56,939	49.4
Total Front Seat	57,372	49.1
Back Seat - Driver	2,058	5.1
Back Seat - Center	388	0.5
Back Seat - Outboard	5,005	10.0
Total Back Seat	7,451	8.2
Rear (i.e., station wagons and hatchbacks)	41	2.4
Total	64,864	44.3

OBSERVATIONS OF CHILD SAFETY SEAT INSTALLATION

Passenger observations were made from curb locations near the exit points of selected shopping malls. Due to the limited amount of observation time available for each vehicle, the assessment of several aspects of child safety seats are difficult or impossible to obtain. For example, difficulty is encountered in observing safety seat manufacturer, and correct vehicle safety belt tether use during the passenger observations. As a result, the primary toddler safety seat observation in the passenger study is that of observing if the child is harnessed in the safety seat and whether a shield is used (for those safety seats designed with shields). The child safety seat observation was designed to provide information on safety seat installation that could not be obtained as part of the passenger observation.

During this study, 4,344 safety seats were observed in parked vehicles at the same shopping malls used for the passenger observations. The type of safety seat and the observed mode of use are presented in table 42. Of the 372 seats observed in an infant mode (rearward facing), 246 (66.1 percent) were of the "infant-only" (non-convertible) variety. This style seat cannot be converted between infant and toddler modes. The most popular models of the "infant only" seat were the INFANT LOVE and DYN-O-MITE seats. The most prominent "convertible" seat, observed in the infant mode was the FISHER PRICE seat. STROLEE was the most frequently observed seat in the toddler mode, while CENTURY seats were the most frequently observed booster seats.

Table 43 presents the types of toddler safety seats by model observed during this study. As previously discussed, STROLEE seats (including the 500 and 600 Series) were observed more frequently in the toddler mode than any other manufacturer. However, in looking at individual models the One Step, manufactured by Evenflo, was the most frequently observed seat (21.9 percent).

Within the toddler seat category, two types of systems are available for securing the safety seat to the vehicle seat; (1) securing with the safety belt only, and (2) securing with the safety belt and a tether. Of the 3,683 toddler seats, 3,369 (91.5 percent) with the belt only and 314 (8.5 percent) with the belt and tether systems were observed, as presented in Table 44. This table also indicates that safety seats requiring only a safety belt for installation were observed to be correctly installed 84.8 percent of the time, whereas, those requiring a tether were much less likely to be installed correctly, 8.3 percent. Overall, 78.3 percent of the toddler seats observed were properly secured.

Table 42. Types of child safety seats installed (percentage of safety seat observations by mode are shown parenthetically).

Name/ Manufacturer	Observed Mode			All Safety Seats
	Infant	Toddler	Booster	
Century	17(4.5)	882(24.0)	87(30.1)	986(22.7)
[Infant Love Seat]	62(16.7)	N/A	N/A	62(1.4)
[Model 570]	2(0.5)	N/A	N/A	2(0.0)
[Model 580]	20(5.4)	N/A	N/A	20(0.4)
Collier-Keyworth	3(0.8)	89(2.4)	51(17.7)	143(3.3)
[Cuddle-Shuttle]	12(3.2)	N/A	N/A	12(0.3)
Cosco	3(0.8)	259(7.0)	40(13.8)	302(7.0)
[First Ride]	11(3.0)	N/A	N/A	11(0.3)
[TLC]	8(2.2)	N/A	N/A	8(0.2)
Evenflo	19(5.1)	819(22.2)	40(13.8)	878(20.2)
[Dyn-O-Mite]	82(22.0)	N/A	N/A	82(1.9)
[Infant Seat]	9(2.4)	N/A	N/A	9(0.2)
Fisher Price	31(8.3)	295(8.0)	0(0.0)	326(7.5)
Ford	0(0.0)	1(0.0)	0(0.0)	1(0.0)
Gerry	1(0.3)	29(0.8)	0(0.0)	30(0.7)
Graco	0(0.0)	4(0.1)	0(0.0)	4(0.1)
International Man	1(0.3)	76(2.1)	21(7.3)	98(2.3)
Kolcraft	4(1.1)	85(2.3)	30(10.4)	119(2.7)
[Rock-N-Ride]	39(10.5)	N/A	N/A	39(0.9)
Nissan	3(0.8)	41(1.1)	0(0.0)	44(1.0)
Pride Trimble	3(0.8)	23(0.7)	2(0.7)	28(0.6)
Questor (Kantwet)	8(2.2)	115(3.1)	0(0.0)	123(2.8)
Strolee	28(7.5)	957(26.0)	17(5.9)	1,002(23.1)
[Rock-It]	1(0.3)	N/A	N/A	1(0.0)
Welsh	0(0.0)	7(0.2)	0(0.0)	7(0.2)
Other Infant Seat	5(1.3)	1(0.0)	1(0.3)	7(0.2)
Total	372(100.0)	3,683(100.0)	289(100.0)	4,344(100.0)

[ ] = Infant only seats.

Table 43. Types of toddler safety seats installed by model.

Manufacturer/Model	Base	Percent of Grand Total
*Bobby-Mac	(73)	(2.0)
Deluxe	11	0.3
Deluxe II	17	0.5
Champion	34	0.9
Other	11	0.3
Century	(882)	(24.0)
100	155	4.2
200	272	7.4
300	229	6.2
Child Love	36	1.0
400 XL	48	1.3
1000 STE	14	0.4
2000 STE	70	1.9
2500 STE	22	0.6
3000 STE	27	0.7
Unknown	9	0.3
Collier-Keyworth	(89)	(2.4)
Safe & Sound	66	1.8
Roundtripper	7	0.2
Sprint Convertible	6	0.1
Unknown	10	0.3
Cosco	(259)	(7.1)
Commuter	58	1.6
Commuter 5 PT	1	0.0
Safe-T-Seat	34	0.9
Safe-T-Shield	60	1.7
Safe & Snug	61	1.7
Safe & Easy	26	0.7
Auto Trak	1	0.0
Other	18	0.5
Evenflo	(819)	(22.2)
One Step	808	21.9
7-Year Car Seat	11	0.3
Fisher Price Car Seat	(295)	(8.0)
Ford Tot Guard	(1)	(0.0)
Gerry Guardian	(29)	(0.8)

( ) Refers to category subtotal.
* Manufactured by Questor.

Table 43. Types of toddler safety seats installed by model (con't).

Manufacturer/Model	Base	Percent of Grand Total
Graco Little Traveler	(4)	(0.1)
International Manufacturing		
Teddy-Tot Astroseat	(76)	(2.1)
Kolcraft	(85)	(2.3)
Hi-Rider	20	0.5
Redi-Rider	22	0.6
Quick Step	11	0.3
Ultra Ride	31	0.8
Unknown	1	0.0
Nissan		
Child Safety Seat	(41)	(1.1)
Pride Trimble	(23)	(0.6)
Pride Ride	22	0.6
Unknown	1	0.0
Questor	(42)	(1.1)
Kantwet Care Seat	19	0.5
Kantwet Safeguard	19	0.5
Other	4	0.1
Strolee	(957)	(26.0)
500 Series	268	7.3
600 Series	611	16.6
GT 2000	30	0.8
GT 3000	21	0.6
Model 61	13	0.3
Model 615	12	0.3
Unknown	2	0.1
Welsh Travel Tot	(7)	(0.2)
Other	(1)	(0.0)
Grand Total	3,683	100.0

( ) Refers to category subtotal.
* Manufactured by Questor.

Table 44. Correct installation of toddler safety seats by method of fastening the seat.

Method of Fastening Seat	Base	Percent Correct Installation
Secured by Car Safety Belt Only	3,369	84.8
Secured by Tether and Car Safety Belt	314	8.3
Total	3,683	78.3

Figure 5 presents the percentage of belt-only and belt and tether type toddler seats observed since 1984. This figure illustrates a continual increase in the percentage of the use of belt-only seats accompanied by a decline the use of belt and tether seats. The disparity of 28.4 percent in 1984 between the two types of seats has increased to 83.0 percent in 1988. Figure 6 indicates that the 84.8 percent rate of correctly installed belt-only seats is a substantial increase over 1984 correct usage. Inspecting figures 5 and 6 simultaneously reveals that the increasing correct installation of toddler safety seats corresponds with the increasing use of belt-only seats. Part of this increase in correct installation is believed to be attributed to the clearly marked, correct car belt routing stickers on many of the newer seats.

The installation characteristics of the 3,369 toddler seats observed in 1988, that require securing with safety belts only, are as follows. In 84.8 percent of the observations, the safety belt was properly used to secure the belt-only toddler seat types. The safety belt was observed not to be used with this seat type 2.9 percent of the time and improperly used 12.3 percent of the time. Table 45 presents installation characteristics by manufacturer for toddler seats that require securing by only the vehicle safety belt.

For toddler seats that require securing by the safety belt and tether, there exists the possibility that more than one misuse may be present. Figure 7 illustrates the correct/incorrect installation characteristics for the 314 toddler seats observed that require securing by the safety belt and tether. This figure shows that only 8.3 percent of the seats observed were properly tethered and belted. Failure to tether the seat was the most prominent type of misuse observed (87.6 percent) with the tether used incorrectly in 3.8 percent of the observations. The most frequently observed multiple misuse was not using the tether and incorrectly belting the seat to the vehicle (21.6 percent). This figure also shows that only 6.7 percent of the toddler seats were not belted (by summing the "Not Used" percentages in the belt use column) and in 22.2 percent of the observations, the safety belt was incorrectly attached to the toddler seat (by summing the "Incorrect" percentages in the belt use column). Table 46 shows installation characteristics by manufacturer for toddler seats that require securing by the safety belt and tether strap.

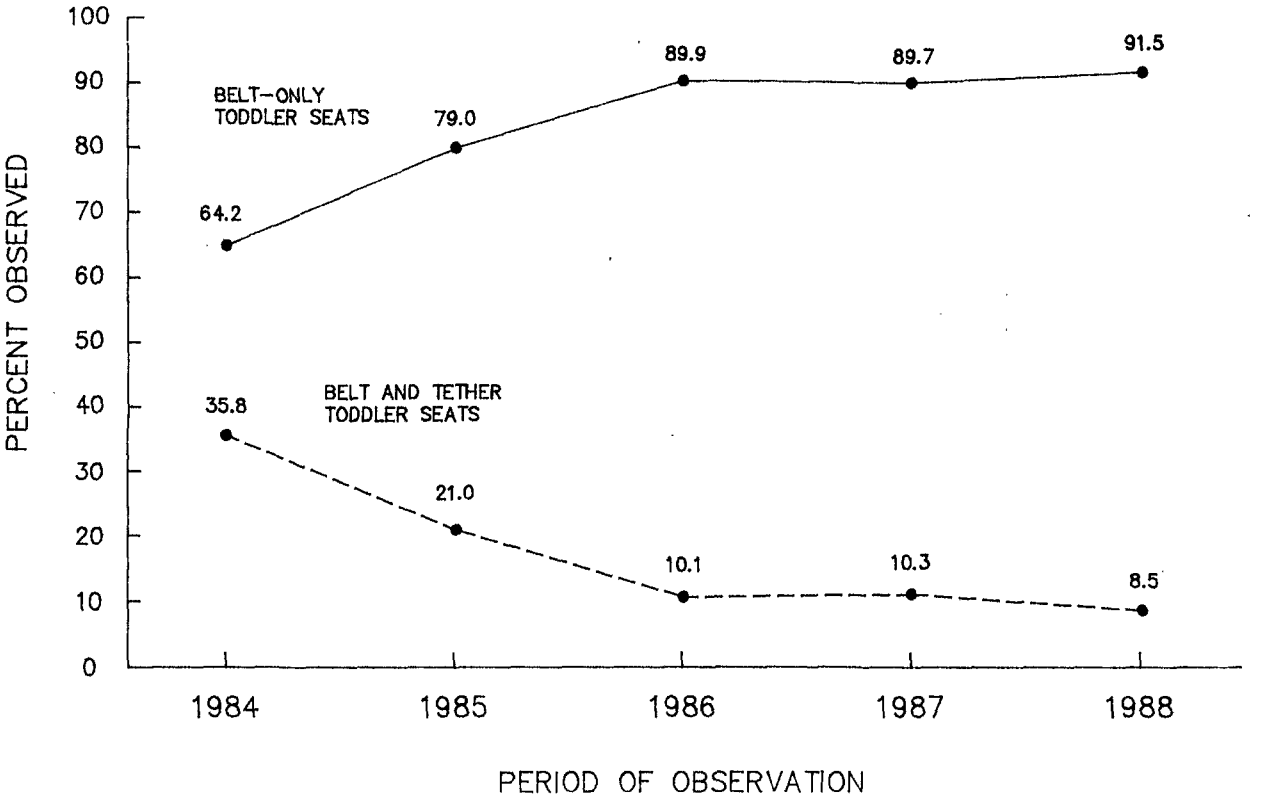


Figure 5. Percent of toddler safety seats observed over time by type of system.

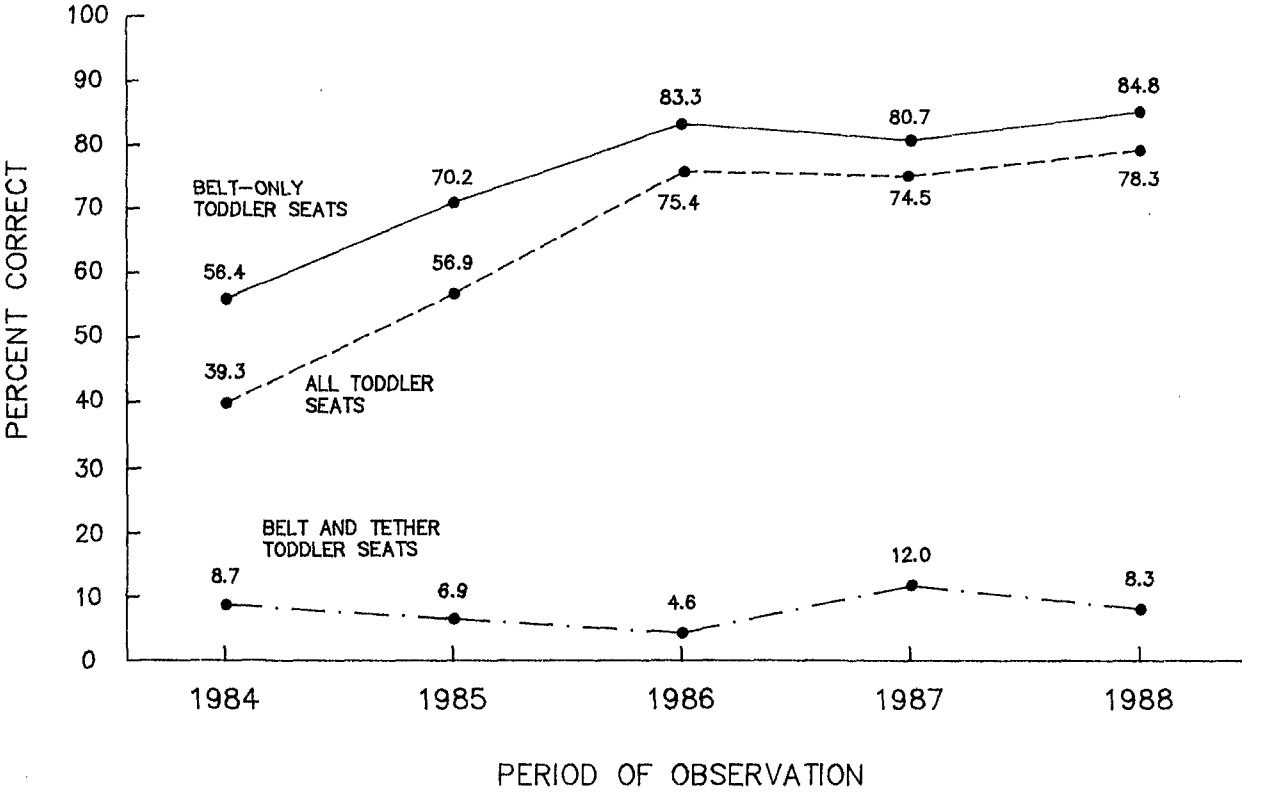


Figure 6. Correct installation of toddler safety seats over time by type of system.

Table 45. Percent correct and incorrect fastening of child safety seats (toddler seats) by manufacturer.

Manufacturer	Base	Percent Correct* Use	Percent Car Belt Not Used	Percent Car Belt Used Incorrectly
Century	845	704(83.3)	17(2.0)	124(14.7)
Collier-Keyworth	89	79(88.8)	5(5.6)	5(5.6)
Cosco	254	223(87.8)	3(1.2)	28(11.0)
Evenflo	818	661(80.8)	26(3.2)	131(16.0)
Fisher Price	295	272(92.2)	11(3.7)	12(4.1)
Gerry	29	28(96.6)	0(0.0)	1(3.4)
Graco	4	4(100.0)	0(0.0)	0(0.0)
International Mfg.	76	59(77.6)	3(3.9)	14(18.4)
Kolcraft	85	76(89.4)	3(3.5)	6(7.1)
Nissan	41	38(92.7)	3(7.3)	0(0.0)
Pride Trimble	23	18(78.3)	2(8.7)	3(13.0)
Questor (Kantwet)	111	96(86.5)	8(7.2)	7(6.3)
Strolee	690	590(85.5)	16(2.3)	84(12.2)
Welch	7	7(100.0)	0(0.0)	0(0.0)
Other	2	2(100.0)	0(0.0)	0(0.0)
Total	3,369	2,857(84.8)	97(2.9)	415(12.3)

*Seats that require fastening around the child and shield (and are unfastened) are coded as correctly belted.

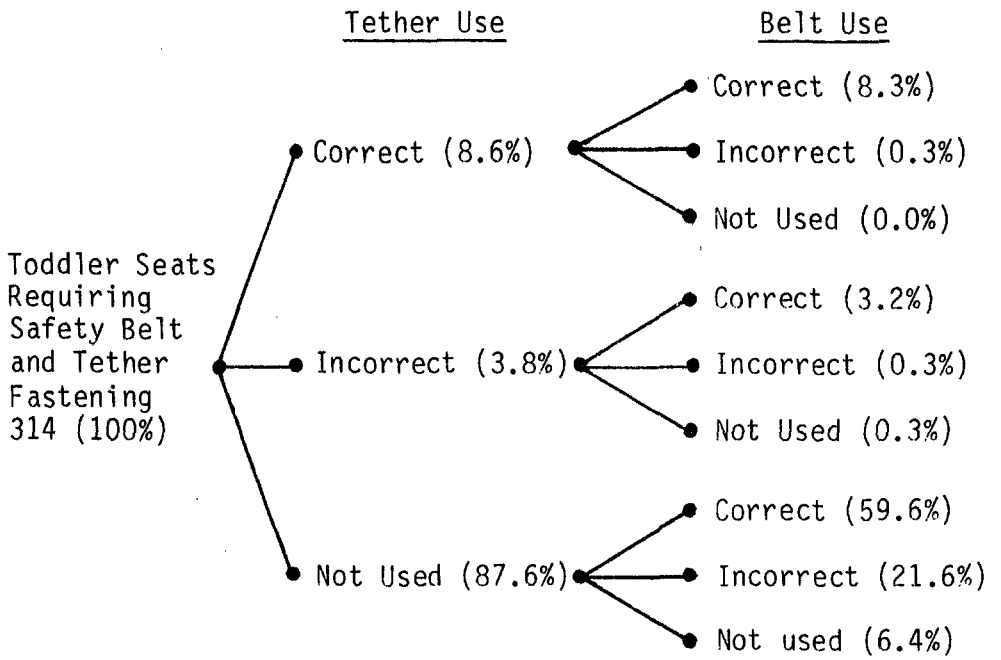


Figure 7. Installation characteristics of toddler seats that require securing by the safety belt and tether.

Table 46. Toddler seat installation characteristics by manufacturer (for toddler seats that require the vehicle safety belt and tether strap).

Manufacturer	Base	Percent Appears Correct	Percent Tether Not Used	Percent Tether Used Incorrectly	Percent Belt Not Used	Percent Car Belt Used Incorrectly
Century (Child Love)	37	8.1	83.8	8.1	8.1	8.1
Cosco	5	0.0	100.0	0.0	0.0	20.0
Evenflo (One Step)	1	100.0	0.0	0.0	0.0	0.0
Questor	4	0.0	100.0	0.0	0.0	0.0
Strolee	267	8.2	88.0	3.4	6.7	24.7
Total	314	8.3	87.6	3.8	6.7	22.3

MOTORCYCLE/MOPED OBSERVATION FINDINGS

During 1988, observations were made of helmet use by operators and passengers of 19,941 motorcycles and mopeds. Table 47 presents helmet usage rates in each city for drivers and passengers of motorcycles. Of 18,234 motorcycle drivers, 59.8 percent were observed wearing helmets compared to 50.2 percent of the 2,012 passengers.

Table 47. Helmet use for motorcycle operators and passengers.

City	Driver Base	Percent Helmet On	Passenger Base	Percent Helmet On
Atlanta	1,104	88.3	153	56.9
Baltimore	672	29.6	44	27.3
Birmingham	960	97.1	101	82.2
Boston	455	99.6	45	100.0
Chicago	596	76.7	89	53.9
Dallas	795	51.8	88	50.0
Fargo/Moorhead	568	29.9	50	26.0
Houston	899	56.4	80	52.5
Los Angeles	1,718	39.2	204	25.0
Miami	1,187	93.5	174	81.0
Minneapolis/St.Paul	1,173	44.0	128	22.7
New Orleans	719	88.3	119	55.5
New York	366	99.7	49	100.0
Phoenix	1,670	44.2	173	34.7
Pittsburgh	440	100.0	70	100.0
Providence	521	28.4	38	97.4
San Diego	2,139	51.1	179	40.2
San Francisco	1,419	42.0	132	18.2
Seattle	833	58.0	96	39.6
Total	18,234	59.8	2,012	50.2

Driver and passenger helmet usage rates by year (1985 through 1988) are displayed in figure 8.

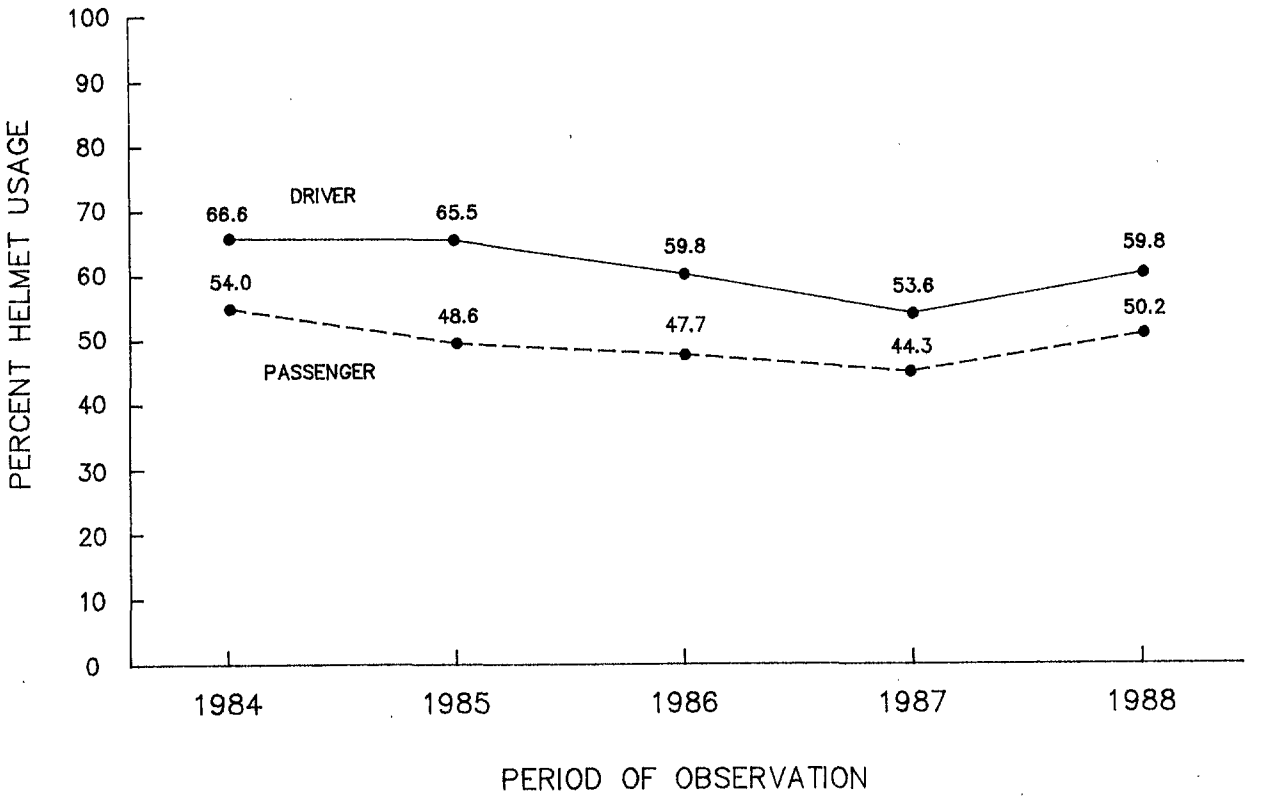


Figure 8. Motorcycle helmet use trends for operators and passengers.

Table 48 presents helmet usage rates in each city for drivers and passengers of mopeds (motorized bicycles). Comparing the results of this table (27.5 percent for drivers and 11.3 percent for passengers) to table 47 reveals that, overall, drivers and passengers of mopeds were less likely to be wearing helmets than their counterparts on motorcycles. The helmet use for mopeds has dropped 8 percent since 1987.

In order to examine differences in helmet use in conjunction with mandatory helmet use laws, motorcycle usage rates were stratified into two groups: with and without or limited helmet laws. Table 49 lists the seven cities in which mandatory helmet laws exist. Helmet use for both drivers and passengers were recorded to be 93.9 percent for drivers and 76.1 percent for passengers. Table 50 lists the twelve cities with no or limited helmet use law. Driver and passenger helmet use rates for these cities were observed to be 46.1 and 36.1 percent, respectively.

Table 48. Helmet use for moped operators and passengers.

City	Driver Base	Percent Helmet On	Passenger Base	Percent Helmet On
Atlanta	114	2.6	0	--
Baltimore	13	0.0	0	--
Birmingham	72	51.4	3	100.0
Boston	6	0.0	0	--
Chicago	48	0.0	0	--
Dallas	49	16.3	0	--
Fargo/Moorhead	16	43.8	1	0.0
Houston	57	43.9	3	0.0
Los Angeles	187	25.7	28	14.3
Miami	148	23.6	0	--
Minneapolis/St.Paul	64	34.4	5	0.0
New Orleans	61	6.6	1	0.0
New York	31	64.5	1	0.0
Phoenix	176	23.9	19	10.5
Pittsburgh	7	100.0	1	100.0
Providence	13	0.0	1	0.0
San Diego	269	24.5	20	5.0
San Francisco	254	32.3	26	7.7
Seattle	122	51.6	6	0.0
Total	1,707	27.5	115	11.3

Table 49. Motorcycle helmet use in cities with mandatory helmet use laws.

City	Driver Base	Percent Helmet On	Passenger Base	Percent Helmet On
Atlanta	1,104	88.3	153	56.9
Birmingham	960	97.1	101	82.2
Boston	455	99.6	45	100.0
Miami	1,187	93.5	174	81.0
New Orleans	719	88.3	119	55.5
New York	366	99.7	49	100.0
Pittsburgh	440	100.0	70	100.0
Total	5,231	93.9	711	76.1

Table 50. Motorcycle helmet use in cities with no or limited helmet use laws.

City	Driver Base	Percent Helmet On	Passenger Base	Percent Helmet On
Baltimore	672	29.6	44	27.3
Chicago	596	76.7	89	53.9
Dallas	795	51.8	88	50.0
Fargo/Moorhead	568	29.9	50	26.0
Houston	899	56.4	80	52.5
Los Angeles	1,718	39.2	204	25.0
Minneapolis/St.Paul	1,173	44.0	128	22.7
Phoenix	1,670	44.2	173	34.7
Providence	521	28.4	38	97.4
San Diego	2,139	51.1	179	40.2
San Francisco	1,419	42.0	132	18.2
Seattle	833	58.0	96	39.6
Total	13,003	46.1	1,301	36.1

Figure 9 illustrates the trend of driver and passenger helmet use on motorcycles, in cities with mandatory helmet laws and cities with no or limited helmet use laws.

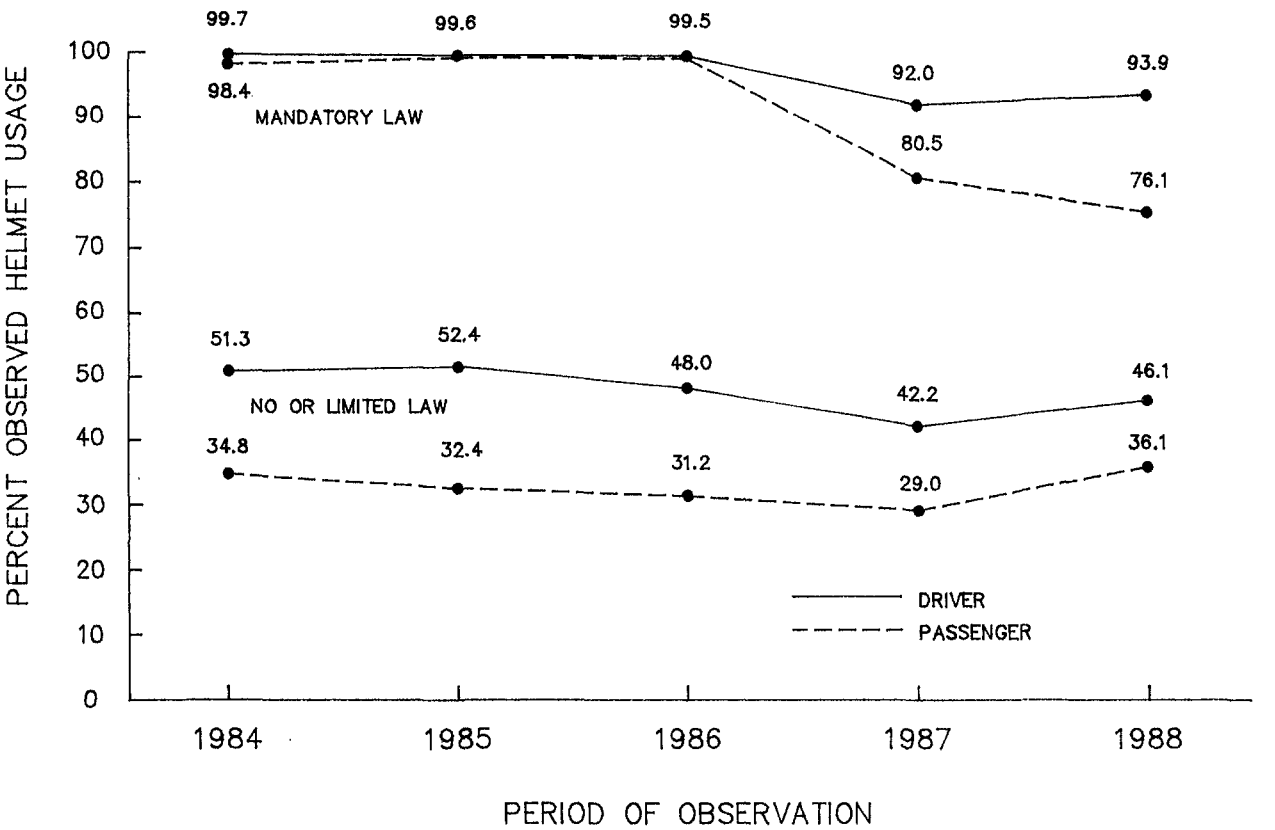


Figure 9. Motorcycle helmet use trends for operators and passengers by the existence of mandatory helmet use laws.

OBSERVATIONS ON CARS WITH AUTOMATIC SAFETY BELTS

Beginning with 1987 models, the automobile manufacturers are required to equip 10 percent of their passenger cars with automatic restraints. This percentage "phase-in" increases each year with 25 percent for 1988 models, 40 percent for 1989 models and 100 percent for the 1990 models. Most of the manufacturers are providing automatic safety belts and some are providing air bag restraint systems to meet these new Federal requirements. There are three basic designs for the automatic safety belt systems: motorized shoulder belts with a knee bolster, non-motorized shoulder belts with a knee bolster and the third design is a combination lap and shoulder belt. A manually operated lap belt is provided by most of the manufacturers of the automatic shoulder belt systems.

Because the frequency of these automatic safety belts is so low in the vehicle population, special efforts were undertaken to observe cars equipped with these new systems. This special study is labeled in this report as study 2. At each of the 30 traffic sites in the 19 cities, observers spent 3 hours collecting safety belt use data and the procedures used were described earlier in this report in more detail under Project Methodology. Observers were carefully trained to identify automatic safety belt systems as opposed to manual belt systems when looking into the interior of the car. Automatic systems are relatively easy to spot because of their protruding upper shoulder belt connector. In addition, the observers were further trained to identify the particular model cars that incorporated these automatic belt systems. The procedures used to select the car for observation in study 2 were somewhat different than study 1. For the automatic belt study (study 2) observers were told to wait for all the cars to stop at a stoplight and then to "spot" any cars that were equipped with automatic belts and record data from those cars first. Once observations were completed of any automatic belt equipped cars, the observer would return to the second car in line at the traffic signal and conduct observations the same as done in study 1. The number of automatic belt vehicles observed in 1987 was 4,233, while the number of automatic belt observations recorded for 1988 have increased to 16,769.

Observations by Automatic System Type

Overall use of automatic safety belts was 88.1 percent based on 16,769 observations during 1988 (see table 51). Figure 10 presents a graphical display of automatic safety belt use by type of system. The most frequently observed automatic belt system during 1988 were the motorized shoulder belt systems without belt disconnects. There were 7,256 of these systems observed and belt use was 98.3 percent. For the 1,856 cars observed with the motorized shoulder belt but with a disconnect feature, use was 92.1 percent. For the 1,711 systems observed with non-motorized shoulder belt use was 80.2 percent. For the 5,946 combination lap and shoulder belt systems observed (mostly General Motors with 5,634 observations), use was 76.6 percent. These use rates were all much higher than

Table 51. Driver belt usage by automatic system type.

All Studies 1988										
	First Half				Second Half					
	Study 1 Base	Belted	(%)	Study 2 Base	Belted	(%)	Study 1 Base	Belted	(%)	Study 2 Base	Belted	(%)	Total Base	Belted	(%)
Total Non-Motorized Three Point (Lap/Shoulder) Automatic Belt System	733		(74.5)	1,849		(78.6)	1,150		(75.0)	2,214		(76.6)	5,946		(76.6)
Chevrolet Total	6		(50.0)	112		(79.5)	95		(80.0)	242		(76.4)	455		(77.6)
Buick Total	145		(77.2)	425		(77.2)	237		(73.0)	468		(77.8)	1,275		(76.6)
Oldsmobile Total	203		(70.0)	543		(79.2)	294		(77.9)	537		(78.8)	1,577		(77.6)
Pontiac Total	341		(76.5)	689		(78.7)	469		(73.3)	828		(76.0)	2,327		(76.3)
Honda Total	38		(73.7)	80		(80.0)	55		(72.7)	139		(67.6)	312		(72.4)
Total Automatic Non-Motorized Shoulder Belt	154		(63.0)	510		(86.1)	373		(78.3)	674		(80.9)	1,711		(80.2)
Chrysler LaBaron Coupe	51		(43.2)	91		(70.3)	63		(61.9)	120		(60.8)	325		(60.9)
Dodge Daytona	9		(55.6)	19		(47.4)	9		(33.3)	16		(62.5)	53		(50.9)
Hyundai Excel	56		(69.6)	226		(89.8)	192		(76.0)	345		(81.2)	819		(81.6)
Peugeot 505	1		(100.0)	2		(100.0)	1		(100.0)	1		(100.0)	5		(100.0)
Volkswagon Total	37		(81.1)	170		(94.1)	106		(96.2)	192		(94.3)	505		(93.7)
Yugo GV/VUX	0		(--)	2		(50.0)	2		(50.0)	0		(--)	4		(50.0)
Total Automatic Motorized Shoulder Belt With Disconnect	226		(93.8)	572		(94.2)	359		(88.6)	699		(91.7)	1,856		(92.1)
*Total Automatic Motorized Shoulder Belt Without Disconnect	1,012		(99.8)	2,179		(99.4)	1,378		(97.6)	2,687		(97.2)	7,256		(98.3)
Total Automatic Motorized Shoulder Belt	1,238		(98.7)	2,751		(98.3)	1,737		(95.7)	3,386		(96.1)	9,112		(97.0)
AMC/Eagle Medallion	0		(--)	1		(100.0)	0		(--)	10		(100.0)	11		(100.0)
Plymouth Sundance	4		(100.0)	24		(79.2)	15		(80.0)	47		(83.0)	90		(82.2)
Chrysler Conquest	2		(100.0)	1		(100.0)	0		(--)	1		(100.0)	4		(100.0)
Dodge Shadow	14		(71.4)	37		(78.4)	27		(77.8)	51		(88.2)	129		(81.4)
*Ford Total	401		(99.8)	1,063		(99.4)	697		(96.2)	1,403		(96.3)	3,564		(97.5)
*Isuzu Impulse	9		(100.0)	7		(100.0)	6		(83.3)	4		(100.0)	26		(96.2)
Jaguar	0		(--)	0		(--)	0		(--)	1		(100.0)	1		(100.0)
Mazda Total	47		(95.7)	148		(98.0)	74		(91.9)	173		(97.1)	442		(96.4)
*Mercury Total	41		(100.0)	143		(99.3)	73		(94.5)	132		(92.4)	389		(96.1)
Mitsubishi Starion	3		(33.3)	10		(80.0)	1		(100.0)	2		(66.7)	16		(68.8)
Nissan Maxima	142		(95.8)	332		(96.1)	231		(89.6)	385		(91.9)	1,090		(93.2)
Saab 900S	8		(100.0)	4		(100.0)	3		(100.0)	8		(87.5)	23		(95.7)
Subaru XT Coupe	6		(100.0)	15		(86.7)	8		(75.0)	21		(71.4)	50		(80.0)
*Toyota Total	561		(99.8)	966		(99.5)	602		(99.7)	1,148		(99.0)	3,277		(99.4)
Total All Automatic Belt Systems (19 Cities)	2,125		(87.7)	5,110		(90.0)	3,260		(86.4)	6,274		(87.6)	16,769		(88.1)

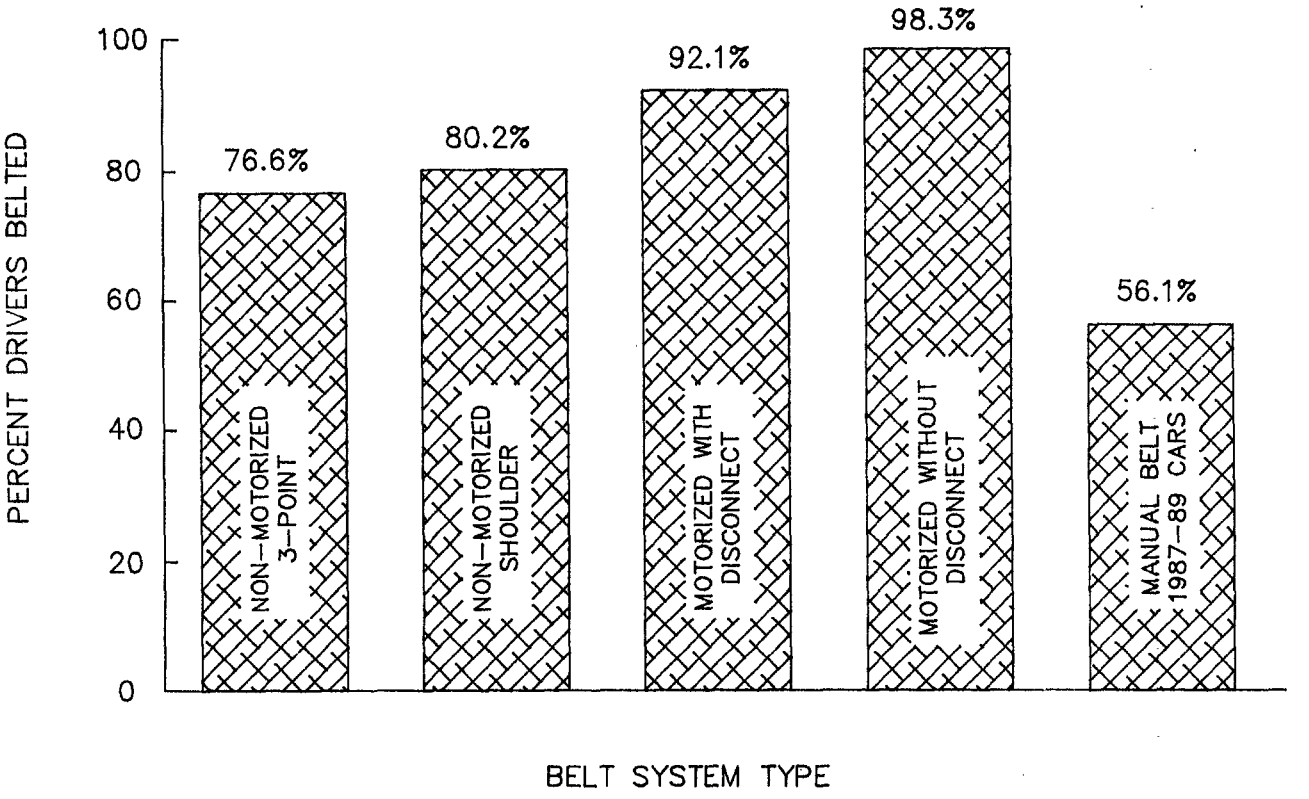


Figure 10. Comparison of driver belt use percentage for different types of automatic and manual belt systems.

the 56.1 percent use of manual belts in 1987-1989 cars. Figure 10 indicates that the systems which achieve the highest driver usage are the motorized systems. The lowest usage rate of the automatic systems are the three-point automatic. The majority of the three-point systems are provided with an easy disconnect. All of the automatic systems, however, were substantially higher than the manual usage rate for comparable 1987-1989 model vehicles of 56.1 percent.

Automatic Safety Belt Use by Manufacturer

A summary of driver automatic belt usage by manufacturer and vehicle model is presented in table 52. The usage rates on many of the model categories should be interpreted with care since the number of observations in many instances are too small to provide reliable estimates. The driver usage rates by those manufacturers with total observations exceeding 100 are presented in figure 11. The lowest usage rate for manufacturers is 61.4 percent for Chrysler Corporation with Toyota Motors being the highest at 99.4 percent.

Table 52. Driver automatic belt usage by vehicle manufacturer.

All Studies 1988										
	First Half				Second Half					
	Study 1 Base	Belted(%)	Study 2 Base	Belted(%)	Study 1 Base	Belted(%)	Study 2 Base	Belted(%)	Total Base	Belted(%)
American Motors	0	(--)	1	(100.0)	1	(100.0)	10	(100.0)	12	(100.0)
Chrysler Total	55	(43.6)	92	(70.7)	63	(61.9)	124	(62.1)	334	(61.4)
Unknown	2	(0.0)	0	(--)	0	(--)	3	(100.0)	5	(60.0)
LeBaron Coupe	51	(43.1)	91	(70.3)	63	(61.9)	120	(60.8)	325	(60.9)
Conquest	2	(100.0)	1	(100.0)	0	(--)	1	(100.0)	4	(100.0)
Dodge Total	24	(66.7)	59	(69.5)	36	(66.7)	86	(81.4)	205	(73.7)
Unknown	1	(100.0)	3	(100.0)	0	(--)	19	(78.9)	23	(82.6)
Daytona	9	(55.6)	19	(47.4)	9	(33.3)	16	(62.5)	53	(50.9)
Shadow	14	(71.4)	37	(78.4)	27	(77.8)	51	(88.2)	129	(81.4)
Ford Total	401	(99.8)	1,063	(99.4)	697	(96.2)	1,403	(96.3)	3,564	(97.6)
Unknown	7	(100.0)	16	(100.0)	5	(100.0)	38	(89.5)	66	(93.9)
Escort	272	(100.0)	672	(99.3)	472	(96.8)	930	(96.2)	2,346	(97.7)
Tempo	122	(99.2)	375	(99.7)	220	(95.0)	435	(97.0)	1,152	(97.7)
Mercury Total	41	(100.0)	143	(99.3)	73	(94.5)	132	(92.4)	389	(96.1)
Unknown	3	(100.0)	0	(--)	3	(100.0)	13	(84.6)	19	(89.5)
Lynx	18	(100.0)	58	(98.3)	39	(89.7)	41	(92.7)	156	(94.9)
Topaz	20	(100.0)	85	(100.0)	31	(100.0)	78	(93.6)	214	(97.7)
Buick Total	145	(77.2)	425	(77.2)	237	(73.0)	468	(77.8)	1,275	(76.6)
Unknown	3	(66.7)	6	(83.3)	5	(100.0)	29	(69.0)	43	(74.4)
Somerset	18	(61.1)	89	(69.7)	55	(63.6)	45	(75.6)	207	(68.6)
Skylark	11	(81.8)	26	(84.6)	14	(85.7)	33	(75.8)	84	(81.0)
LeSabre	92	(76.1)	245	(77.6)	124	(71.8)	220	(79.5)	681	(76.9)
Regal	21	(95.2)	59	(83.1)	39	(82.1)	141	(78.0)	260	(81.2)

Table 52. Driver automatic belt usage by vehicle manufacturer (continued).

All Studies 1988										
	First Half				Second Half					
	Study 1 Base,Belted(%)		Study 2 Base,Belted(%)		Study 1 Base,Belted(%)		Study 2 Base,Belted(%)		Total Base,Belted(%)	
Oldsmobile Total	203	(70.0)	543	(79.2)	294	(77.9)	537	(78.8)	1,577	(77.6)
Unknown	2	(100.0)	11	(81.8)	3	(66.7)	38	(76.3)	54	(77.8)
Calais	59	(69.5)	188	(78.2)	104	(80.8)	129	(74.4)	480	(67.7)
Delta 88	129	(70.5)	274	(78.5)	147	(76.9)	242	(78.9)	792	(77.0)
Cutlass Supreme	13	(61.5)	70	(84.3)	40	(75.0)	128	(83.6)	251	(81.3)
Plymouth Sundance	4	(100.0)	24	(79.2)	15	(80.0)	47	(83.0)	90	(82.2)
Chevrolet Total	6	(50.0)	112	(79.5)	95	(80.0)	242	(76.4)	455	(77.6)
Unknown	0	(--)	0	(--)	0	(--)	17	(88.2)	17	(88.2)
Beretta	6	(50.0)	112	(79.5)	92	(80.4)	206	(74.8)	416	(76.9)
Corsica	0	(--)	0	(--)	3	(66.7)	19	(84.2)	22	(81.8)
Pontiac Total	341	(76.2)	689	(78.7)	469	(73.3)	828	(76.0)	2,327	(76.3)
Unknown	6	(83.3)	6	(83.3)	3	(66.7)	18	(55.6)	33	(66.7)
Grand Am	244	(71.7)	456	(78.1)	327	(70.6)	518	(74.9)	1,545	(74.4)
Bonneville	81	(86.4)	180	(78.3)	105	(76.2)	196	(79.1)	562	(79.4)
Grand Prix	10	(100.0)	47	(85.1)	34	(91.2)	96	(79.2)	187	(84.0)
Other Domestic	5	(100.0)	0	(--)	0	(--)	13	(84.6)	18	(88.9)
Volkswagon Total	37	(81.1)	170	(94.1)	106	(96.2)	192	(94.3)	505	(93.7)
Unknown	1	(0.0)	10	(90.0)	2	(50.0)	11	(90.9)	24	(83.3)
Gulf	11	(100.0)	29	(93.1)	30	(93.3)	35	(97.1)	105	(96.2)
Jetta	25	(76.0)	131	(94.6)	74	(98.6)	146	(93.8)	376	(93.9)
Nissan Maxima	142	(95.8)	332	(96.1)	231	(89.6)	385	(91.9)	1,090	(93.2)

Table 52. Driver automatic belt usage by vehicle manufacturer (continued).

All Studies 1988										
	First Half				Second Half					
	Study 1 Base,Belted(%)		Study 2 Base,Belted(%)		Study 1 Base,Belted(%)		Study 2 Base,Belted(%)		Total Base,Belted(%)	
Honda Total	38	(73.7)	80	(80.0)	55	(72.7)	139	(67.6)	312	(72.4)
Unknown	0	(--)	0	(--)	1	(100.0)	1	(100.0)	2	(100.0)
Accord	29	(75.9)	51	(84.3)	38	(71.0)	80	(71.3)	198	(75.3)
Prelude	9	(66.7)	29	(72.4)	16	(75.0)	58	(62.0)	112	(67.0)
Isuzu Impulse	9	(100.0)	7	(100.0)	6	(83.3)	4	(100.0)	26	(96.2)
Jaguar	0	(--)	0	(--)	0	(--)	1	(100.0)	1	(100.0)
Mazda Total	47	(95.7)	148	(98.0)	74	(91.9)	173	(97.1)	442	(96.4)
Unknown	0	(--)	1	(100.0)	0	(--)	10	(90.0)	11	(90.9)
Mazda 626	47	(95.8)	146	(97.9)	74	(91.9)	163	(97.6)	430	(96.5)
MX Coupe	0	(--)	1	(100.0)	0	(--)	0	(--)	1	(100.0)
Peugeot 505	1	(100.0)	2	(100.0)	1	(100.0)	1	(100.0)	5	(100.0)
Saab 900S	8	(100.0)	4	(100.0)	3	(100.0)	8	(87.5)	23	(95.7)
Subaru XT Coupe	6	(100.0)	15	(86.7)	8	(75.0)	21	(71.4)	50	(80.0)
Toyota Total	561	(99.8)	966	(99.5)	602	(99.7)	1,148	(99.0)	3,277	(99.4)
Unknown	8	(100.0)	9	(100.0)	5	(100.0)	20	(95.0)	42	(97.6)
Cressida	235	(100.0)	408	(99.3)	221	(100.0)	382	(99.5)	1,246	(99.6)
Camry	318	(99.7)	549	(99.6)	376	(99.5)	746	(98.8)	1,989	(99.3)
Hyundai Excel GL	56	(69.6)	226	(89.8)	192	(76.0)	345	(81.2)	819	(81.6)
Mitsubishi Starion	3	(33.3)	10	(80.0)	1	(100.0)	2	(50.0)	16	(68.8)
Yugo GV/GUX	0	(--)	2	(50.0)	2	(50.0)	0	(--)	4	(50.0)
Other Imports	6	(66.7)	2	(100.0)	6	(83.3)	12	(75.0)	26	(76.9)

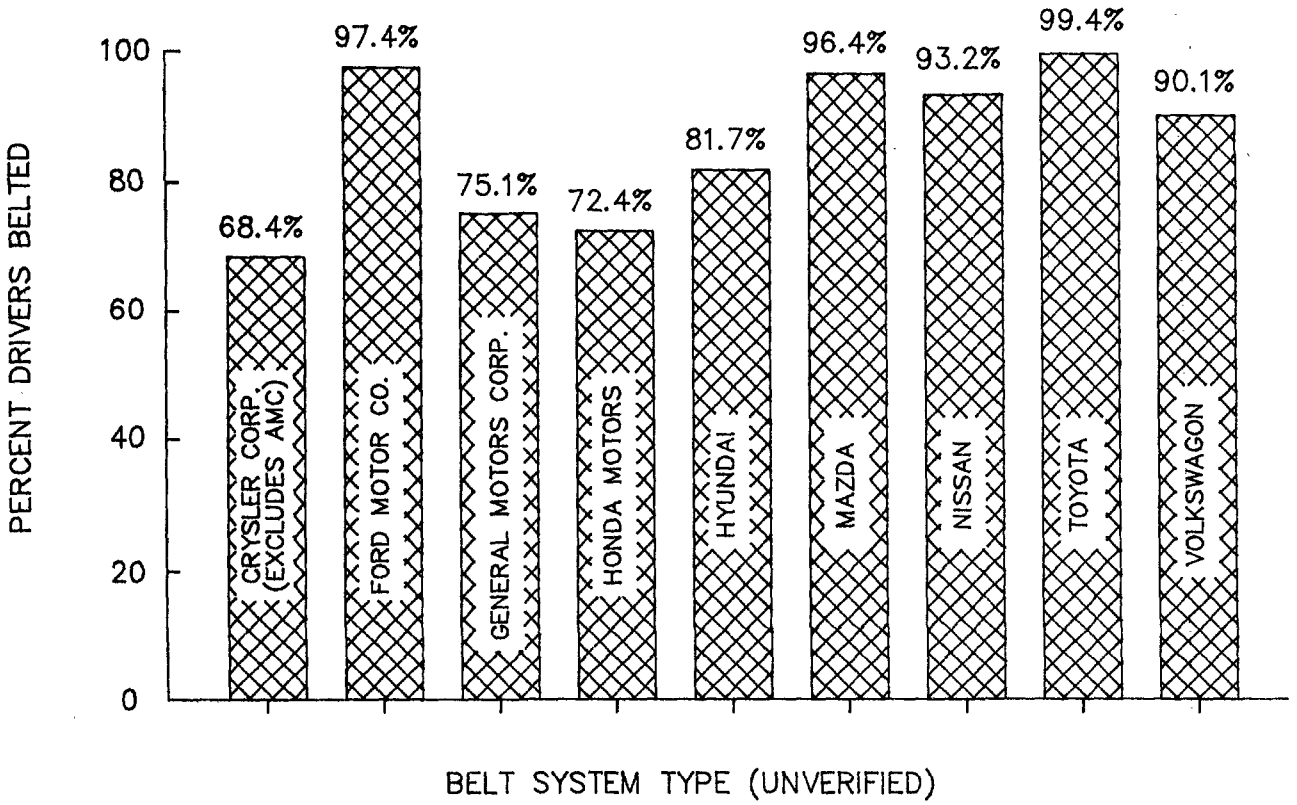


Figure 11. Comparison of unverified driver belt usage by vehicle manufacturer for automatic belt systems.

(Note: manufacturer totals not exceeding 100 observations are excluded from figure).

Automatic Belt Use by Manufacturers for Verified Data*

Model Comparisons With and Without Automatic Safety Belt Systems

Inspecting the usage rate totals for specific models by manufacturer in table 53, indicates that the belting rate is typically higher for vehicles with automatic belt systems. The manufacturer total percentages found here are similar to the unverified belting percentages in figure 11.

*See page 15 for information on verified data.

Table 53. Safety belt use comparison of automatic belt vs. manual belt systems for verified vehicle types.

(Based on analysis of 1987-1989 model cars.)

Manufacturer	Automatic Belt Use		Manual Belt Use	
	Base	Percent Belt Use	Base	Percent Belt Use
Chrysler Motors				
Dodge Daytona	22	45.5	4	25.0
Dodge Shadow	2	100.0	59	66.1
Chrysler LeBaron Coupe	65	52.3	3	33.3
Chrysler Totals	89	51.7	66	62.1
Ford Motor Company				
Ford Tempo	161	96.3	192	54.7
Ford Escord	535	97.6	57	57.9
Mercury Lynx	17	100.0	5	60.0
Mercury Topaz	36	94.4	44	70.5
Ford Totals	749	97.2	298	57.7
General Motors				
H Line:				
Bonneville	142	81.7	32	59.4
Delta 88	195	70.3	41	65.9
LeSabre	175	77.1	82	70.7
Total H Line	512	75.8	155	67.1
L Line:				
Corsica	1	0.0	246	56.5
Beretta	42	73.8	118	53.4
Total L Line	43	72.1	364	55.5
N Line:				
Grand Am	292	78.8	127	54.3
Cutlass Calais	111	78.4	58	58.6
Skylark	35	65.7	26	65.4
Sommerset	13	53.8	28	32.1
Total N Line	451	76.9	239	54.0
Total H, L & N Lines	1,006	76.1	758	57.4

Table 53. Safety belt use comparison of automatic belt vs. manual belt systems for verified vehicle types (continued).

(Based on analysis of 1987-1989 model cars.)

Manufacturer	Automatic Belt Use		Manual Belt Use	
	Base	Percent Belt Use	Base	Percent Belt Use
Imported Cars				
Honda Prelude	43	58.1	61	59.0
Honda Accord	53	79.2	54	55.6
Honda Totals	96	69.8	115	57.4
Hyundai	125	75.2	358	54.5
Nissan Maxima	165	90.3	87	54.0
Saab 900S	5	40.0	25	68.0
Subaru XT Coupe	7	85.7	3	33.3
Subaru GL	3	33.3	80	57.5
VW Jetta	34	82.4	91	56.0
VW Golf	10	90.0	21	29.0
VW Totals	44	84.1	112	53.6
Yugo	1	0.0	52	42.3
Opel/Isuzu Impulse	4	75.0	58	65.5
Jaguar	5	20.0	36	36.1
Total Imports	455	79.1	926	54.5

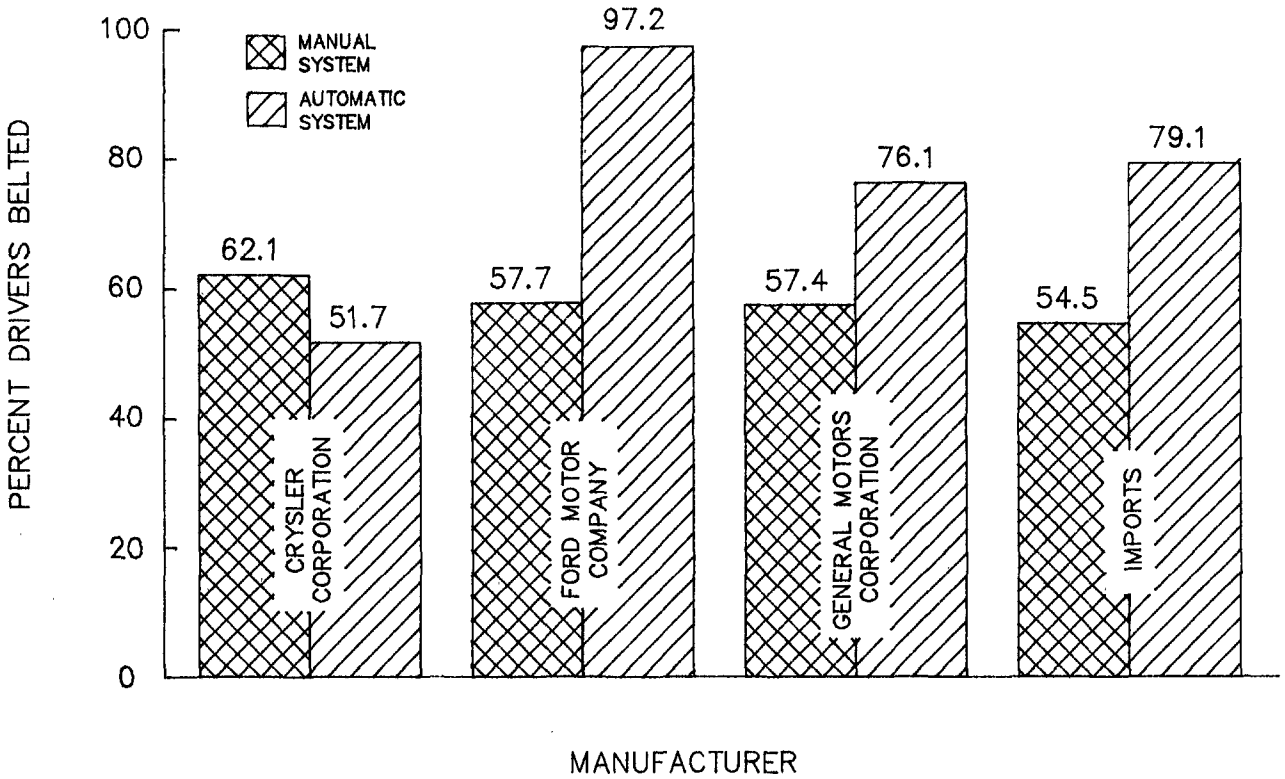


Figure 12. Comparison of automatic and manual verified belt use for specific vehicle models.

Figure 12 presents the driver usage rates for the different types of belt systems, that were verified by the VINDICATOR program, as existing in selected 1987 thru 1988 model years. The relative ranking of the different belt systems exhibited by the unverified data of figure 10 also exists in the verified data of figure 13.

Safety Belt Use by Restraint System Type

Observed safety belt usage, stratified by type of safety belt system is shown in table 54. Passive (automatic) safety belt systems for the 1987-1989 model years comprised less than 4.0 percent of all driver observations and resulted in a usage rate of 85.3 percent. Manual system usage varied from 19.9 percent for separate systems to 46.8 percent for combination systems. Due to model year limitations of the Vindicator program, rates for pre-1967 model years, which have only lap belt restraints, could not be determined.

Table 54. Driver safety belt usage by safety belt system type.

Safety Belt System Type	Base	Percent Restrainted
Automatic (Passive) Safety Belt (Model Years 1987-1989)	2,978	85.3
Automatic (Passive) Safety Belt (Pre-1987 Models)	402	86.6
Lap/Shoulder Combination with Inflatable Bags	281	51.6
Lap/Shoulder Combination (Model Years 1974-1989)	71,599	46.8
Lap/Shoulder Separate (Model Years 1967-1973)	2,935	19.9

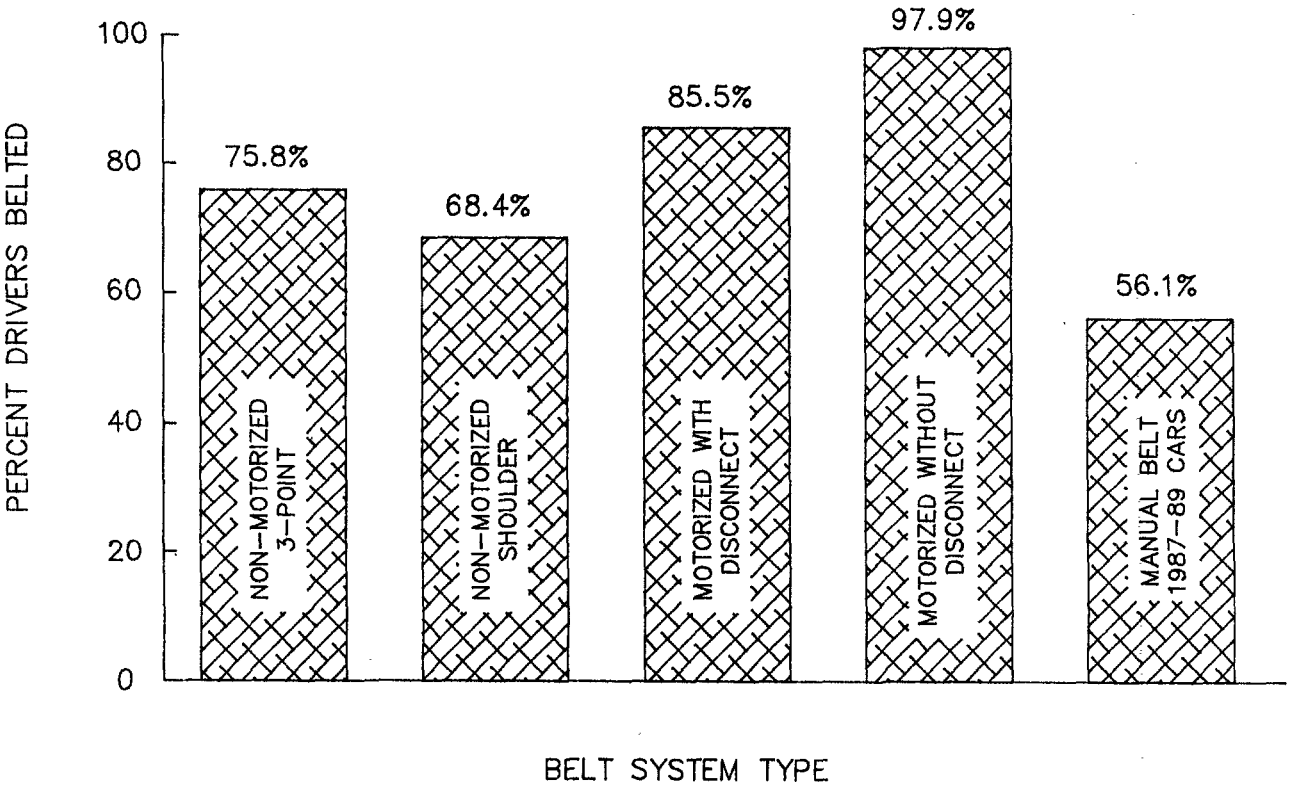


Figure 13. Comparison of driver belt use percentage for different types of automatic systems and comparable manual belt vehicles included in tables 53 and 54.

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APPENDIX A - DRIVER SAFETY BELT USAGE BY MANUFACTURER'S DIVISION AND MODEL YEAR (1980-1989)

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Table 55. Driver safety belt usage for AMC/Eagle by model year.

Model Year	Base	Percent Belted
1980	54	27.8
1981	42	35.7
1982	25	28.0
1983	13	38.5
1984	4	50.0
1985	2	50.0
1986	4	25.0
1987	3	66.7
1988	0	-
Total	147	32.7

Table 56. Driver safety belt usage for Jeep by model year.

Model Year	Base	Percent Belted
1980	5	100.0
1981	8	37.5
1982	11	36.4
1983	18	38.9
1984	32	50.0
1985	58	70.7
1986	59	47.5
1987	85	50.6
1988	63	50.8
Total	339	52.8

Table 57. Driver safety belt usage for Plymouth by model year.

Model Year	Base	Percent Belted
1980	42	31.0
1981	102	44.1
1982	72	44.4
1983	94	35.1
1984	121	43.8
1985	179	51.4
1986	139	44.6
1987	229	48.5
1988	119	53.8
Total	1,097	46.0

Table 58. Driver safety belt usage for Dodge by model year.

Model Year	Base	Percent Belted
1980	61	37.7
1981	96	49.0
1982	86	32.6
1983	123	39.8
1984	166	44.0
1985	193	43.5
1986	199	46.2
1987	238	45.4
1988	146	56.8
Total	1,308	44.9

Table 59. Driver safety belt usage for Chrysler by model year.

Model Year	Base	Percent Belted
1980	34	23.5
1981	27	25.9
1982	86	33.7
1983	134	40.3
1984	198	47.0
1985	238	42.9
1986	227	48.5
1987	252	52.0
1988	116	50.0
Total	1,312	45.1

Table 60. Driver safety belt usage for Buick by model year.

Model Year	Base	Percent Belted
1980	349	34.4
1981	459	37.5
1982	452	44.0
1983	466	43.3
1984	612	53.3
1985	686	49.1
1986	579	58.5
1987	552	57.2
1988/89	288	64.2
Total	4,443	49.4

Table 61. Driver safety belt usage for Chevrolet by model year.

Model Year	Base	Percent Belted
1980	807	35.1
1981	711	40.8
1982	630	39.0
1983	698	41.0
1984	1,133	47.0
1985	1,128	48.1
1986	1,336	50.2
1987	1,211	52.0
1988/89	958	53.7
Total	8,612	46.4

Table 62. Driver safety belt usage for Cadillac by model year.

Model Year	Base	Percent Belted
1980	193	33.2
1981	165	35.8
1982	215	42.8
1983	251	36.7
1984	292	41.1
1985	432	53.1
1986	327	54.1
1987	361	51.5
1988/89	188	49.5
Total	2,423	45.9

Table 63. Driver safety belt usage for Oldsmobile by model year.

Model Year	Base	Percent Belted
1980	466	35.4
1981	486	37.9
1982	427	48.2
1983	539	42.7
1984	730	47.8
1985	890	53.3
1986	912	57.9
1987	675	58.1
1988/89	331	70.7
Total	5,456	50.6

Table 64. Driver safety belt usage for Pontiac by model year.

Model Year	Base	Percent Belted
1980	252	28.6
1981	205	33.7
1982	213	38.5
1983	188	42.0
1984	430	42.3
1985	410	47.3
1986	606	55.4
1987	581	58.3
1988/89	447	69.8
Total	3,332	50.0

Table 65. Driver safety belt usage for Ford by model year.

Model Year	Base	Percent Belted
1980	422	34.4
1981	371	36.1
1982	460	43.5
1983	455	43.7
1984	899	51.6
1985	965	49.1
1986	1,131	52.3
1987	1,311	66.8
1988/89	895	70.8
Total	6,909	53.8

Table 66. Driver safety belt usage for Mercury by model year.

Model Year	Base	Percent Belted
1980	78	30.8
1981	112	42.9
1982	151	36.4
1983	153	43.8
1984	244	48.0
1985	261	44.1
1986	282	46.8
1987	336	56.0
1988/89	222	59.9
Total	1,839	47.8

Table 67. Driver safety belt usage for Lincoln by model year.

Model Year	Base	Percent Belted
1980	44	45.5
1981	35	28.6
1982	57	36.8
1983	54	42.6
1984	114	36.8
1985	141	40.4
1986	131	42.0
1987	80	30.0
1988	165	37.0
Total	823	38.2

Table 68. Driver safety belt usage for Volkswagen by model year.

Model Year	Base	Percent Belted
1980	141	58.9
1981	127	63.8
1982	111	57.7
1983	58	39.7
1984	133	53.4
1985	224	65.6
1986	191	68.1
1987	194	59.8
1988	77	61.0
Total	1,256	60.7

Table 69. Driver safety belt usage for Toyota by model year.

Model Year	Base	Percent Belted
1980	440	48.0
1981	447	58.2
1982	445	62.7
1983	446	64.6
1984	482	69.1
1985	644	63.8
1986	787	69.0
1987	904	71.0
1988/89	451	73.4
Total	5,046	65.4

Table 70. Driver safety belt usage for Datsun/Nissan by model year.

Model Year	Base	Percent Belted
1980	299	42.5
1981	277	41.9
1982	318	50.3
1983	360	49.7
1984	441	54.9
1985	486	55.8
1986	408	54.4
1987	842	57.8
1988/89	169	52.1
Total	3,600	52.6

Table 71. Driver safety belt usage for Honda by model year.

Model Year	Base	Percent Belted
1980	206	59.2
1981	288	58.3
1982	266	58.3
1983	371	66.6
1984	486	66.0
1985	577	66.2
1986	674	62.3
1987	709	65.9
1988	404	65.6
Total	3,981	64.0

Table 72. Driver safety belt usage for Mazda by model year.

Model Year	Base	Percent Belted
1980	94	57.4
1981	93	58.1
1982	118	50.0
1983	111	57.7
1984	141	62.4
1985	167	61.1
1986	223	61.0
1987	241	63.9
1988/89	139	71.9
Total	1,327	61.1

Table 73. Driver safety belt usage for other imports by model year.

Model Year	Base	Percent Belted
1980	217	51.2
1981	324	54.3
1982	335	57.3
1983	464	53.2
1984	705	57.2
1985	752	61.4
1986	1,135	55.5
1987	1,490	57.6
1988/89	621	59.9
Total	6,043	57.1

APPENDIX B - DRIVER SAFETY BELT USAGE BY CAR SERIES BY MANUFACTURER'S DIVISION

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The tables in Appendix B show driver safety belt usage for 1979-1988 model years by car series for each manufacturer. Only those models that have 20 or more observations are presented.

Manufacturer/Series	Base	Percent Belted
American Motors		
Concord	81	30.9
Eagle	34	50.0
Spirit	32	34.4
Jeep		
Cherokee	204	54.9
CJ-7	38	52.6
Wagoneer	66	51.5
Wrangler	21	33.3
Plymouth		
Caravelle	96	45.8
Grand Fury	36	25.0
Horizon	274	45.6
Reliant	584	46.1
Sundance	82	63.4
Volare	25	24.0
Dodge		
Aries	464	44.6
Aspen	23	39.1
Daytona	82	45.1
Diplomat	66	39.4
Lancer	55	56.4
Omni	283	44.2
400	33	21.2
600	158	36.7
Shadow	102	66.7
Dynasty	25	52.0
Chrysler		
Cordoba	20	30.0
E Class	29	62.1
Laser	66	42.4
LeBaron	595	46.4
New Yorker	595	44.2

Manufacturer/Series	Base	Percent Belted
Buick		
Century	953	51.4
Electra	545	49.2
Le Sabre	767	56.5
Regal	990	42.2
Riviera	203	39.4
Skyhawk	282	48.9
Skylark	671	42.5
Somerset	140	59.3
Chevrolet		
Beretta	160	58.8
Camaro	858	39.3
Caprice	1,046	46.3
Cavalier	1,493	51.0
Celebrity	1,394	52.2
Chevette (Regular)	698	35.7
Citation	582	44.0
Corsica	247	56.3
Corvette	122	32.8
Impala	182	39.0
Malibu	399	46.1
Monte Carlo	557	35.7
Monza	63	25.4
Nova	383	63.2
Spectrum	243	61.3
Sprint	182	53.3
Cadillac		
Brougham	381	39.6
Cimarron	141	51.8
Deville	1,142	45.8
Eldorado	413	45.3
Fleetwood	114	63.2
Seville	231	45.9

Manufacturer/Series	Base	Percent Belted
Oldsmobile		
Calais	405	65.4
Custom Cruiser	89	52.8
Cutlass	1,700	44.4
Delta 88	1,123	54.5
Firenza	153	48.4
Ninety-Eight	540	47.4
Omega	188	46.3
Toronado	131	33.5
Ciera	1,127	55.2
Pontiac		
Bonneville	424	57.3
Fiero	219	42.9
Firebird	385	35.3
Grand Am	655	67.3
Grand Prix	335	36.4
Grand Le Mans	46	23.9
J 2000	340	48.5
Lemans	80	42.5
Parisienne	83	47.0
Phoenix	99	38.4
Sunbird	42	21.4
T 1000	93	32.3
6000	525	57.3
Ford		
Escort	685	47.9
Escort (New)	1,017	74.2
EXP	87	41.4
Fairmont	307	38.4
Fiesta	20	50.0
Festiva	39	46.2
Granada	147	36.7
LTD	1,017	44.5
Mustang	948	44.0
Pinto	37	29.7
Taurus	847	64.0
Tempo	1,052	63.2
Thunderbird	696	46.8

Manufacturer/Series	Base	Percent Belted
Mercury		
Capri	81	44.4
Cougar	497	40.4
Lynx	179	55.9
Marquis	571	41.5
Sable	209	64.1
Topaz	200	67.0
Zephyr	70	32.9
Lincoln		
Continental	662	38.7
Mark Series	158	36.1
Foreign Models		
Accura	204	67.2
Audi	453	57.0
BMW	661	56.0
Chry/Plym/Mits	91	42.9
Datsun/Nissan	3,600	52.6
Dodge/Mitsubishi	185	54.6
Honda	3,981	64.0
Hyundai	861	55.3
Jaguar	142	43.7
Mazda	1,327	61.1
Mercedes Benz	447	50.1
Mitsubishi	278	59.0
Opel/Isuzu	238	59.7
Peugeot	124	62.9
Porsche	130	40.8
Renault/Eagle	304	51.0
Saab	224	58.0
Subaru	892	58.1
Suzuki	150	56.7
Toyota	5,046	65.4
Volkswagen	1,256	60.7
Volvo	993	67.4
Yugo	86	34.9

APPENDIX C - DATA FORMS AND INSTRUCTIONS

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Driver Study Data Form

Printed data forms entitled "Driver Restraint Observation: Form #1" will be used in the study 1 and study 2 (Figure 15). Fifty observations can be recorded on the front and back of the form. Use as many forms as necessary but always use a new form when you change to a new site. Send all completed forms to Goodell-Grivas, Inc. using the addressed envelopes provided at the end of each week.

General Information

The top portion of each form provides a description of observer, location, date and environmental conditions. This information is very important to the study and should be completed prior to each collection period at a location.

1. **Observer:** Write in your last name.
2. **City:** Write in the city.
3. **Day:** Circle the appropriate day of the week.
4. **Date:** Write in the month, date, and year. For example write in 11/15/88 for November 15, 1988.
5. **Area Type:** Circle the appropriate description of the area.
   City - Downtown, central city area
   Suburban - Heavy commercial, industrial or highly residential area outside the central city area. (Usually color highlighted)
6. **Location No:** Record the number shown on your site listing or map.
7. **Site:** Circle the appropriate description of primary road or freeway exit.
8. **Location:** Write in the street name on which data are collected and the direction (north, east, south, west) and name of the nearest cross-street.
9. **Roadway Conditions:** Circle the condition with best describes the road condition at the time of observation.
10. **Start Time:** Specify the hour and minutes, and circle AM or PM for the start of the collection period.
11. **End Time:** Specify the hour and minutes, and circle AM or PM for the ending of the collection period.

DRIVER RESTRAINT OBSERVATION: FORM #1

1. Observer:_____ 2. City:_____

3. Day: Su M Tu W Th F Sa 4. Date:___/___/___

5. Area Type: City Suburb 6. Location No.:_____

7. Site: Primary Road Freeway Exit

8. Location: On_____ N E S W Of_____

9. Road Conditions: Dry Wet Snow/Ice

10. Start Time:_____ AM PM 11. End Time_____ AM PM

No.	License Number	Make (Model)	Model Code	Driver Sex 1 M 2 F	Driver Belt 1 Both 2 Lap 3 None 4 Shldr 5 * 6 **	Misuse 1 Under arm 2 Behind back 3 Loose	Automatic Belt 1 Yes 2 No	Driver and Passenger Position by Age Group Driver Center Outboard			Pass. Sex 1 M 2 F	Pass. Belt 1 Both 2 Lap 3 None 4 Shldr. 5 CRD	Rear Sta. Wagon Htchbk No. of Chldrn.
1.													
2.													
3.													
4.													
5.													
6.													
7.													
8.													
9.													
10.													
11.													
12.													
13.													
14.													
15.													
16.													
17.													
18.													
19.													
20.													

* (Shoulder belt on, lap belt unknown)
** (Shoulder belt not on, lap belt unknown)
} Used in second lane situations when lap belt use can not be determined.

Age Group: 1-Infant (Under 1 yr) 2-Toddler (1-4 yrs) 3-Subteen (5-12) 4-Teenager (13-19) 5-Adult (20-24) 6-Adult (25-49) 7-Adult (50 or over)

Figure 14. Driver study data form.

Observation Data

Complete one line on the form for each vehicle observed. In Study 1, start with the second car stopped for the traffic light. Obtain an additional observation during the red light if time permits. If only one car stops at the light, observe that car. In Study 2, first priority is 1988-1989 model year vehicle with automatic safety belt system and second priority is identical to study 1 procedure of starting at second vehicle and working back as time permits.

1. **License Number:** The license numbers of the cars you observe are a very important part of the information you collect. By comparing the license numbers with records of the Department of Motor Vehicles (DMV's), we will be able to ascertain model year and obtain other needed information about the car observed.

   Be sure to print the license number so it is both accurate and legible. Print in bold letters and numbers, i.e., DXU 613. Be careful when printing "U" and "V" and "Z", "5" and "S", "6" and "G".

2. **Make (Model):** We are interested in the general make categories. For example, under the make of Chevrolet, there are several specific models such as: Caprice, Impala, BelAir, Chevelle, Nova, Vega, Camaro, Monte Carlo, and Corvette. All of these should be listed as Chevrolet. Other makes like Ford, AMC, etc., have similar categories. Models within a given make category differ in size as well as name. They may also differ in type of safety belt installation. These differences are important. If the vehicle is an automatic belt vehicle, include the model name.

   Most cars carry the model identification on the car. For these cars, you will be able to obtain the make identification by simply reading it off the car. If the make is not readily apparent, as is possible on some older or damaged cars, you will have to settle for the general car make (domestic or foreign). Where possible, we prefer a specific make category. However, if the rest of the data is good, an observation with general car model, is still usable information.

3. **Model Code:** At the end of the observation period or day, for each make name recorded, insert the appropriate two-digit code in the space provided. You will be provided with a list of model names and codes to assist you in the coding task. If the model name that you have recorded is not on the list, use code 29 for other domestic make and code 59 for other import make.

4. **Driver Gender:** Write in the code to describe the gender of the driver.

5. **Observed Driver Restraint System Usage:** There are four possible code categories for describing the drivers use of shoulder harness and lap belts. These are:

Both On (Code 1)

This means that a positive observation has been made that the lap belt is across the driver's waist or lap and that the shoulder harness is over the driver's left shoulder. If drivers in cars with one-piece harness and belt systems are wearing the shoulder harness under the arm, too loose, or behind the back you must still record Code 1 in this column.

Lap Belt Only (Harness Off) (Code 2)

In cars that have a two-piece harness and belt, the shoulder harness is a separate strap that is stored in a clip attached to the car's headliner or simply left dangling if it is not stored properly. If you observe that the shoulder harness is not being worn or not being worn properly, but that the lap belt has been buckled, you should record Code 2.

NOTE: In older model cars that have only a lap belt, record Code 2 if the driver is belted and record Code 3 if the driver is not belted. You will never use Code 1 if the car contains only a lap belt.

None (Code 3)

If the driver is not wearing either the lap belt or shoulder harness, record Code 3.

Shoulder Harness Only (Code 4)

If the driver is only wearing the shoulder harness and not the manual lap belt in cars with an automatic safety belt system record Code 4.

Code 5

If an automatic vehicle is seen in the second lane where lap belt use cannot be determined, use code 5 when shoulder belt is used.

Code 6

If an automatic vehicle is seen in the second lane where lap belt use cannot be determined use code 6 when shoulder belt is not used.

6. Driver Safety Belt Misuse: There are three possible misuse categories, all pertaining to the shoulder harness. These misuse categories are:

Under Arm (Code 1)

This means that the shoulder harness is under the left arm of the driver instead of over the left shoulder.

Behind Back (Code 2)

This means that the shoulder harness is entirely behind the back of the driver.

Loose (Code 3)

The distance between the shoulder belt and the driver's chest should not be much more than the width of a normal fist, as a general rule. If the shoulder belt is excessively loose or falling off the shoulder, record as Code 3. Watch for slack in the belt behind the back of the front seat on older large 2 door vehicles.

7. Automatic Restraint System: Automatic safety belt systems will be found in various 1987, 1988 and 1989 model year cars. There are four types of automatic safety belt systems:

1. Automatic shoulder belt.
2. Automatic shoulder belt and manual lap belt.
3. Motorized auto shoulder belt and manual lap belt.
4. Automatic shoulder/lap belt combination.

Appendix E lists the models with automatic seat belts and the types used in each model.

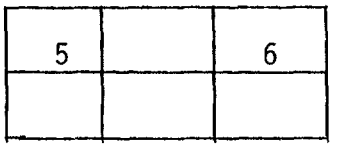
The automatic safety belt system will also be found in pre-1987 Volkswagon Rabbits and Jettas, Chevrolet Chevettes, and Toyota Cressidas. When observing these makes, you will have to determine whether the belt system is an "automatic" system (Code 1) or a regular lap and shoulder combination system (Code 2). Observations made on these older model vehicle are not as important to us as on the newer vehicles, but should still be included. The automatic belt is designed to fit across the drive and front seat passenger each time he/she enters the car and closes the door. Each time he/she leaves the car by opening the door, the belt is designed to let the driver or passenger exit without unbuckling. When observing the type of belt system, particularly in Rabbits, Jettas, Chevettes, and Toyotas, if you see that the safety belt is attached to the door or there is a buckle on the door with no belt attached to it, you can be fairly certain that the car has an automatic belt system.

The Toyota Cressida is equipped with a separate lap belt which has to be manually fastened. Automatic safety belts are also found in the diesel VW Rabbit and Jetta models but were discontinued as an option in the Chevrolet Chevette in 1981. Although it has been discontinued there are still some Chevettes with automatic safety belts in the traffic population.

8. **Driver and Passenger Position by Age Group:** Record the age group code shown at bottom of the form in one of the six seat position boxes on the observation form. The six boxes are intended to illustrate the six seat positions of the passenger car with the driver side on the left, and the outboard on the right as indicated on the form.

Examples:

Adult driver (age 20-24) and adult passenger (age 25-49) on front seat:



The age groups codes for the driver and/or passengers are:

1 = Infant (under 1 yr.)	2 = Toddler (1-4 yrs.)	3 = Subteen (5-12 yrs.)	4 = Teen (13-19 yrs.)
5 = Adult (20-24 yrs.)	6 = Adult (25-49 yrs.)	7 = Adult (50 or over)	

9. Front-Outboard Passenger Gender: Write in the code to describe the gender of the front-outboard passenger.

10. Front-Outboard Passenger Restraint System Usage: There are five front-outboard passenger restraint codes. The first four (both on, lap belt only, none, and shoulder harness only, are identical to those codes used for driver restraint. Code 5 is recorded when a child is observed in a child safety seat.

11. Rear of Station Wagon or Hatchback: Record number of children who are riding behind the back seat of a station wagon or hatchback.

Passenger Study Data Form (Study 1)

Printed data forms entitled "Passenger Restraint Observation: Form #2" will be used in this study (Figure 16). Fifty passenger observations can be recorded on the front and back of the form. Use as many forms as necessary for a study period but begin each collection period with a new form. For example, if you collect data for a two-hour period and then take a break, use a new data form to show the start and end time for the next collection period. Send all completed forms to Goodell-Grivas, Inc. as specified on your schedule.

General Information

The top portion of each form provides a description of observer, location, date and environmental conditions. This information is very important to the study and should be completed prior to each collection period at a location.

The general information needed is similar to that required for the Driver Study form. The exceptions are items 7 and 8. For item 7, write in the name of the shopping center shown on your list of locations. For item 8, write in the street name onto which the vehicles are exiting. If you change locations, begin a new data form.

Observation Data

Complete one line on the form for each passenger (not including the driver) observed. For example, if an observed vehicle has a driver and three passengers, three lines will be coded for the observation.

1. **Total Passengers:** Write total number of passengers in the car. Do not count the driver. This is only recorded once for each vehicle when recording data for the first passenger in the vehicle.
2. **Age Group:** Write in the age group code for each passenger. Refer to bottom of the form for a description of the age range for each group.
3. **Seat:** Write in the seat code number 1 for front seat, 2 for back seat, and 3 for the rear of station wagons or hatchbacks, for each passenger.

PASSENGER RESTRAINT OBSERVATION: FORM #2

1. Observer:_____ 2. City:_____

3. Day: Su M Tu W Th F Sa 4. Date:__/__/__

5. Area Type: City Suburb 6. Location No.:_____

7. Shopping Center:_____

8. Exit To:_____
(Street Name)

9. Road Conditons: Dry Wet Snow/Ice

10. Start Time:_____ AM PM 11. End Time:_____ AM PM

No.	Total Passengers	Age Group*	Seat 1 Front 2 Back 3 Rear	Position 1 Driver Side 2 Center 3 Outboard	Passenger Restraint 1 L/S Belt 2 Lap Belt 3 Infant Seat 4 Toddler Seat 5 Booster Seat 6 Unsafe Seat 7 None 8 On Lap	Infant Seat 1 Harness/Car Belt 2 Harness Only 3 Car Belt Only 4 No Harness/Car Belt 5 - 6 - 7 Facing Wrong Dir. 8 - 9 Unused Seat	Toddler Seat 1 Harness/Shield 2 - 3 - 4 No Harness/Shield 5 - 6 - 7 Other/Unsafe 8 - 9 Unused Seat	Booster Seat 1 Harness/Lap Belt 2 Shoulder/Lap Belt 3 Shield/Belt 4 Lap Belt Only 5 No Harness/Car Belt 6 No Shield/Car Belt 7 Other/Unsafe 8 - 9 Unused Seat
1.								
2.								
3.								
4.								
5.								
6.								
7.								
8.								
9.								
10.								
11.								
12.								
13.								
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16.								
17.								
18.								
19.								
20.								

*Age Group: 1 - Infant (Under 1 yr) 2 - Toddler (1-4 yrs) 3 - Subteen (5-12) 4 - Teenager (13-19) 5 - Adult (20-24) 6 - Adult (25-49) 7 - Adult (50 or over)

Figure 15. Passenger study data form.

4. **Position:** Write in the position code number 1, if passenger is located on the driver side, 2 for center, or 3 for outboard seat for each passenger.

5. **Passenger Restraint:** Write in the code number showing the restraint system observed for each passenger.

Lap/Shoulder Belt (Code 1)

This means that a positive observation has been made that the lap belt is across the passengers waist or lap and that the shoulder harness is over the passengers shoulder.

Lap Belt Only (Shoulder Harness Off) (Code 2)

The passenger has the lap belt across the waist or lap but does not have the shoulder harness over the shoulder.

In cars that have a one-piece harness and belt, passengers who are buckled up but are not wearing the shoulder harness over the shoulder may either have the harness under the arm or behind the back. This is not the proper way to wear the harness, and if it is in either of these positions, you should record Code 2.

If you observe that the shoulder harness is not being worn or not being worn properly, but that the lap belt has been buckled, you should record Code 2.

NOTE: In older model cars that have only a lap belt, you record Code 2 if the passenger is belted and record Code 7 if the passenger is not belted. You will never use Code 1 if the car contains only a lap belt.

Infant-Only Safety Seat (Code 3)

Infant-only safety seats are generally designed for infants less than 1 year old, and are designed to face the rear of the vehicle. This position allows the back of the infant to absorb the force of a crash. Infant-only safety seats are equipped with a five-point harness (straps) to secure the infant to the safety seat and have provisions for using the auto safety belt system to secure the seat to the car. The principle for the 5-point

system in an infant-only safety seat is the same. The 5-point system includes a pair of straps that fit over the infants shoulders, lap belts and a crotch strap. Note that no infant-only safety seats are designed to face forward. Consult the list of infant seats to determine if the safety seat is approved by NHTSA. You are not responsible for identifying the specific type (brand) of safety seat but you should be able to distinguish between a NHTSA approved safety seat and an unapproved seat which is referred to as an unsafe seat (refer to Code 6).

Toddler/Convertible Safety Seats (Code 4)

Toddler safety seats are generally designed for small children between the ages of 1-4 years old. Toddler seats face forward and some have a five-point harness system (straps) to secure the toddler to the seat. Most models use a shield or a combination of a harness system and shield to secure the child. All models have provisions for securing the safety seat to the car through auto safety belts. Some early models have a tether strap which is to be attached to the rear safety belt or deck lid to prevent pivoting (tipping forward). There are also convertible safety seats which can be used for toddlers or can be used in the infant position (rearward facing). If an infant is observed in a convertible safety seat, record Code 4. Also consult the list of NHTSA approved toddler safety seats provided to you. Again, you are not responsible for identifying the exact type of safety seat in this particular study, but you should be aware of the models that have tether straps and shields.

Booster Seats (Code 5)

Boosters are strong, firm seats which usually have no back. Booster seats designed for use in a vehicle have a device to secure an auto lap belt. Many seats must be used with a lap belt and some type of upper-body harness. This can be either the auto lap/shoulder safety belt or the auto lap belt used with the two-strap harness sold with the booster seat, which is fastened with a tether strap. Many newer models utilize a shield which must be secured to the car with the vehicle safety belt.

Unsafe Seat (Flimsy Seat) (Code 6)

There are several types of seats that are erroneously considered as safety seats for infants and small children. These seats are intended for use in the home and do not provide occupant protection in the event of an accident. The seats are usually made of thin plastic and are usually equipped with thin plastic straps. They have no provisions for attachment to the car using safety belts. The seats are not designed to withstand the stresses and impacts associated with an accident and are not NHTSA approved for use as safety seats in autos. There are also some older type infant/toddler seats originally designed to be used in the car which may still be used, but are not dynamically tested nor provide ample protection in the event of a collision. Any child seat with "hooks" that are designed to hang over the car seat or child seats that have attachments that fit between the car seat cushion and back should be considered an unsafe seat. Devices such as car beds are also not acceptable as a child safety seat and should be given a Code 6.

None (Code 7)

If the passenger is not wearing either the lap belt or shoulder harness, not placed in a safety seat, record Code 7.

Child on Lap (Code 8)

If an infant, toddler or subteen is observed being held in the arms of another passenger use a code 8 signifying child on lap. Do not use a code 8 for the adult holding the child, instead use code 1, 2 or 7 depending on the adults restraint usage.

6. Child Safety Seat Use: Indicate the code that describes the way in which the infant, toddler or booster safety seat is used. Provide a code in the column specifically related to whatever type device being observed only when Passenger Restraint observation (Item 6) indicates that an infant or child is being transported in a NHTSA approved infant-only (Code 3), toddler/convertible (Code 4), or booster (Code 5) safety seat. Since the codes vary based on the restraint system used, each will be described separately.

Infant-Only Seat

This column should only be used when an infant-only safety seat is being used (Code 3 for Passenger restraint) or when an unused infant safety seat is observed.

Harness/Car Belt (Code 1)

Use this code if the infant is in an approved infant-only safety seat, and is restraind by a 5-point harness (straps), the auto safety belt is properly used, and the seat is rearward facing.

Harness Only (Code 2)

Use this code if the infant is properly restrained in the seat by a 5-point system but the safety seat is not secured by the auto safety belt.

Car Belt Only (Code 3)

Use this code if the infant safety seat is secured by the auto safety belt, but the infant is not restrained by the harness on the safety seat.

No Harness/Car Belt (Code 4)

Use this code if the infant is in an approved infant safety seat, but the seat is not secured by an auto safety belt and the infant is not restrained by the harness on the safety seat.

Facing Wrong Direction (Code 7)

Use this code if the infant safety seat is observed being used facing forward or sideways.

Unused Seat (Code 9)

If there is an infant in the vehicle not using a safety seat and the car also contains an unused infant-only seat, use a code 9.

Toddler/Convertible Seat

This column should only be used when a toddler/convertible seat is being used (Code 4 for Passenger Restraint) or when an unused toddler safety seat is observed. When observing toddler/convertible safety seats, you need not assess the use of the auto safety belt to secure the seat to the car. Therefore, the only possible toddler/convertible seat codes are 1, 4, 7, 8 and 9.

Harness/Shield (Code 1)

Use this code if any child (infant, toddler or subteen) is in an approved toddler/convertible safety seat and is restrained by a 5-point harness or shield (if applicable). Some toddler/convertible safety seats come equipped with an arm rest. The use of an arm rest does not provide any additional protection to the child, and does not replace the use of the harness.

No Harness/Shield (Code 4)

Use this code if the child (infant, toddler or subteen) is in an approved toddler/convertible safety seat, but is not restrained by the harness or shield.

Wrong Direction/Other (Code 7)

Use this code if an unsafe use of a toddler/convertible safety seat is observed (with exception of the auto safety belt). For infants this usually means that the seat is facing forward while for toddlers and subteens this predominately pertains to the tether strap not being used for a seat requiring a tether strap (i.e., Child Love Seat).

Unused Seat (Code 9)

If there is a child in the vehicle not using a safety seat and the car also contains an unused toddler/convertible seat, use a Code 9.

Booster Seat

This column should only be used when a booster seat is being used (Code 5 for Passenger Restraint) or an unused booster seat is observed.

Harness/Lap Belt (Code 1)

If a toddler/subteen is observed in a booster seat and the seat is secured by the auto lap belt and the child is using a two-strap harness, fastened by a tether strap, then use this code.

Shouder/Lap Belt (Code 2)

If a toddler/subteen is observed in a booster seat and the seat and child is secured by a combination lap and shoulder harness, use Code 2. If the shoulder harness on an one piece safety belt system is placed behind the child and only the lap belt restrains the seat use Code 4.

Shield/Belt (Code 3)

Use this code if the child is observed in an approved "shield" type booster seat secured by the auto safety belt. Most of these seats require the auto belt be secured over the shield.

Lap Belt Only (Code 4)

Use this code if the child is in an approved booster seat that is secured by the auto safety belt, but is not restrained by a shoulder belt or a harness/tether device.

No Harness/Car Belt (Code 5)

Use this code if the child is in an approved booster seat, but the seat is not restrained by a lap belt and is not restrained by a shoulder harness or a harness/tether device.

No Shield/Car Belt (Code 6)

Use this code if the child is in an approved "shield" type booster seat with either the auto belt unsecure or the shield not in the proper position.

Other/Unsafe (Code 7)

Use this code if an other unsafe use of a booster seat is observed. Please indicate what the unsafe usage was.

Unused Seat (Code 9)

If there is a toddler or subteen (up to age 8) in the vehicle not in a safety seat, and the car also contains an unused booster seat, use this code.

Comments

You are encouraged to briefly describe any unsafe safety seat usage or explain difficulty in viewing the usage of the safety seat. This is particularly important if a code 7 or 8 is used to describe the use of a child safety seat. This information will not be coded but will be used to verify coding of unusual or confusing observations.

Special Study Data Form (Study 1)

Printed data forms entitled "Special Study - Child Safety Seats - Form A" will be used in study 1 (Figure 17). Fifty observations can be recorded on the front and back of the form. Use as many forms as necessary during each hour of observation. Send all completed forms to Goodell-Grivas, Inc. using the addressed envelopes provided at the end of each week.

General Information

The top portion of the form provides a description of observer, location, date, and environmental conditions. The general information is identical to the Passenger Restraint Observation Form except that Number 8, "Exit To", has been deleted since you will be observing parked cars in the lot. Begin a new sheet for each Special Study period. Use more than one sheet if necessary.

Observation Data

Complete one line on the form for each infant, toddler or booster safety seat observed. If a vehicle has two child safety seats in it, two lines of data will be coded for the observation.

1. **Seat:** Write in the vehicle seat code number 1 for front seat, 2 for back seat, and 3 for the rear of station wagons or hatchbacks, for the location of each child safety seat.

2. **Position:** Write in the position code number 1 if the safety seat is located on the driver side, 2 for center, or 3 for outboard position. If a seat is located in the rear of a station wagon or a hatchback, do not code in the position.

3. **Tether:** (Code for Toddler Seats Only), write in the code describing the tether requirement and its use. The codes are as follows:

SPECIAL STUDY - CHILD SAFETY SEATS: FORM A

1. Observer:_____ 2. City:_____

3. Day: Su M Tu W Th F Sa 4. Date:___/___/___

5. Area Type: City Suburb 6. Location No.:_____

7. Shopping Center:_____

8. Road Conditons: Dry Wet Snow/Ice

9. Start Time:_____ AM PM 10. End Time:_____ AM PM

No.	Seat 1 Front 2 Back 3 Rear	Position 1 Driver side 2 Center 3 Outboard	Tether 1 Tether required properly used 2 Tether required improperly used 3 Tether required but not used 4 Tether not required	Belting Attached to Seat 1 Proper 2 Improper 3 No 4 Not required	Shield Required 1 Yes 2 No	Infant, Toddler or Booster Model/Comments
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
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Figure 16. Child safety seat study data form.

Tether Required, Properly Used (Code 1)

This means that the toddler seat has been positively identified as one that requires the use of a tether and that the tether is properly secured. Proper use of a tether is as follows; if the toddler seat is in the front seat the tether strap must be attached to the back seat lap belt; if the toddler seat is in the back seat the tether must be bolted to the rear deck lid or bolted to the rear of a station wagon or hatchback at a proper angle (approximately 45 degrees or greater).

Tether Required, (and used but) Improperly Used (Code 2)

This means that a positive identification has been made as to the need for a tether but that there is something improper about the use of the tether (this code implies that the tether is secured in some way but that the securing is improper). Please explain the improper use whenever the Code 2 is used.

Tether Required But Not Used (Code 3)

This means that a toddler seat has been positively identified as requiring a tether but that the tether is not used at all. For example the Child Love Seat requires a tether. If this seat model was observed without the tether strap used it would receive a Code 3.

Not Required (Code 4)

This means that a toddler seat has been positively identified as a seat that does not require a tether strap.

4. **Belting Attached to Seat:** Write in the code describing the belting of the safety seat to the vehicle seat. The codes are as follows:

Proper (Code 1)

This indicates that the safety seat has been positively identified as one in which the vehicle's belt (lap or lap/shoulder combination) should be wrapped around the undercarriage of the safety seat or through the molded plastic frame in order to hold the seat in-place. This is in contrast to seats that use the vehicle's belt system (that goes around the child) to hold the child and the seat in place. The coding for this type of seat will be explained later in the section.

Improper (Code 2)

This means that a safety seat has been positively identified as one that requires the vehicles belt system to be attached to the undercarriage of the seat or through the molded plastic frame to hold it in place, but there is something improper about the usage of the vehicle belt system. The most common misusage will probably be misplacement of the vehicle belt. Use the illustrations in the manual to note where and how the belting system should be attached.

No (Code 3)

This means that a safety seat has been positively identified as one that requires the vehicles belt system to be attached to the undercarriage or through the molded plastic frame but that the belting is not used, i.e., the safety seat is not restrained and is simply setting on the vehicle seat or is laying in the rear of a station wagon or hatchback. This observation would receive a Code 3.

Not Required (Code 4)

This code deals with child safety seats in which the child must first be placed in the seat and then the safety belt is belted around the child (or sometimes the child and shield) and attached to the vehicle seat. Examples of this type of safety seat are: Bobby Mac Champion and Deluxe II, Century (GM) Child Love Seat and Infant Love Seat.

5. **Shield Required:** (Code for Toddler/Convertible or Booster Seats) Write in the code to describe whether or not a shield is required for proper use of the safety seat. Code a 1 for yes or a 2 for no. Refer to the manual for illustrations of the safety seats that require a shield. The Ford Tot Guard is an example of a seat which has a shield which is permanently attached to the seat and would always receive a Code 1. The Bobby-Mac Deluxe II toddler seat requires a shield and would be coded as a 1. Note: The shield may or may not be in the car so be certain about the type of safety seat. Don't assume that the safety seat is not a shield-type seat just because you do not see a shield.

6. **Model:** Write in the brand name and model of the observed toddler, infant or booster seat. The model names can be found in your manual along with the illustrations of the seats. You may be able to read the name directly off the seat. Be sure to indicate if the seat is a toddler, infant or booster seat. If a convertible seat is being used as an infant seat, code it as an infant seat.

When identifying a seat, please try to be as specific as possible. For example when you identify a Bobby Mac Deluxe II seat, do not simply write down "Bobby Mac", but also include the model description (Deluxe II) or model code number (i.e., Strolee 599). This information will assist us in checking if the seat requires a tether or shield.

Helmet Study Data Form (Study 1)

Printed data forms entitled "Motorcycle/Moped Observation: Form #3" will be used in this study (Figure 18). Fifty-five observations can be recorded on the front and back of the form.

General Information

Complete the top portion of the form to indicate the city, day and date and your name. The other general information is not applicable since you will be conducting this study throughout the course of the day. Use as many forms as necessary but start with a new form at the beginning of each day.

Observation Data

Complete one line on the form for each motorcycle/moped observation.

1. **Driver:** Code 1 if driver is wearing helmet.
   Code 2 if driver is not wearing helmet.

2. **Passenger:** Code 1 if passenger is wearing helmet.
   Code 2 if passenger is not wearing helmet.
   (If no passenger, don't enter any code number.)

3. **Type of Cycle:** Leave third column blank if observing a motorcycle.
   Code 1 if observing a moped or motorbike.

MOTORCYCLE - MOPED OBSERVATION: FORM #3

1. Observer:_____ 2. City:_____

3. Day: Su M Tu W Th F Sa 4. Date: / /

No.	Driver 1 - Helmet On 2 - Helmet Off	Passenger 1 - Helmet On 2 - Helmet Off (If no Passenger, Leave Blank)	Type of Cycle 1 - Moped or Motorbike (If Motorcycle Leave Blank)
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
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21.			
22.			
23.			
24.			
25.			

Figure 17. Helmet study data form.

APPENDIX D - SUMMARY OF BI-ANNUAL OBSERVATIONS

PERCENT OF INFANTS OBSERVED IN CHILD SAFETY SEATS

	February - May, 1988	
	Base	Percent
Total (19 Cities)	461	76.8
Boston	26	88.4
Providence	20	80.0
New York	31	74.2
Baltimore	24	91.7
Pittsburgh	23	65.2
Minneapolis/St. Paul	18	94.4
Fargo/Moorhead	20	60.0
Phoenix	24	62.5
Seattle	36	75.0
San Francisco	21	76.2
Los Angeles	16	75.0
San Diego	31	90.3
Chicago	4	75.0
Atlanta	8	87.5
Miami	28	75.0
Birmingham	55	72.7
Houston	31	64.5
Dallas	33	81.8
New Orleans	12	83.3

PERCENT OF TODDLERS OBSERVED IN CHILD SAFETY SEATS

	February - May, 1988	
	Base	Percent
Total (19 Cities)	4,823	84.7
Boston	243	90.1
Providence	297	89.9
New York	277	85.6
Baltimore	272	93.7
Pittsburgh	167	75.5
Minneapolis/St. Paul	215	82.3
Fargo/Moorhead	174	76.4
Phoenix	202	64.4
Seattle	305	83.9
San Francisco	382	82.5
Los Angeles	343	83.7
San Diego	355	87.3
Chicago	176	88.6
Atlanta	185	93.5
Miami	308	79.5
Birmingham	234	84.2
Houston	191	84.8
Dallas	257	89.5
New Orleans	240	87.5

PASSENGER SAFETY BELT USE BY AGE GROUP AND CITY

February - May, 1988

	TODDLER		SUBTEEN		TEEN		ADULT	
	Base	Percent Belted	Base	Percent Belted	Base	Percent Belted	Base	Percent Belted
Total Passengers (19 Cities)	4,821	2.3	8,651	34.9	7,904	23.1	33,157	44.8
Boston	243	0.0	208	35.1	311	10.3	1,462	26.3
Providence	297	2.4	235	47.7	292	9.9	1,664	25.2
New York	277	0.4	247	34.8	350	10.3	1,715	27.5
Baltimore	272	0.0	185	46.5	208	28.4	1,811	53.0
Pittsburgh	167	3.0	421	33.0	483	18.8	1,391	26.6
Minneapolis/St.Paul	215	3.3	444	46.6	501	25.7	1,478	47.2
Fargo/Moorhead	174	0.6	239	25.1	522	10.5	1,332	23.1
Phoenix	202	7.9	321	35.5	475	16.0	1,527	34.6
Seattle	305	3.9	494	31.4	374	33.2	2,191	57.5
San Francisco	382	2.9	590	22.0	391	24.0	2,185	48.3
Los Angeles	342	1.8	629	21.6	385	23.1	2,027	45.9
San Diego	355	2.5	509	31.4	404	32.7	2,301	54.4
Chicago	175	0.6	765	35.9	311	21.9	1,572	49.3
Atlanta	185	0.0	599	32.7	285	18.2	1,897	45.0
Miami	308	2.3	589	28.4	469	30.5	1,646	45.3
Birmingham	234	2.6	597	38.9	682	17.2	1,855	31.8
Houston	191	3.7	459	55.1	588	33.0	1,897	56.1
Dallas	240	4.3	429	62.7	579	40.4	1,956	57.7
New Orleans	240	0.4	691	24.7	294	24.1	1,250	36.3

PERCENT OF INFANTS OBSERVED IN CHILD SAFETY SEATS

July - September, 1988

	Base	Percent
Total (19 Cities)	510	85.5
Boston	19	73.7
New York	16	87.5
Baltimore	19	84.2
Pittsburgh	14	71.4
Minneapolis/St. Paul	50	96.0
Fargo/Moorhead	47	89.4
Phoenix	28	96.5
Seattle	28	82.2
San Francisco	26	88.4
Los Angeles	32	78.2
San Diego	24	83.3
Chicago	2	0.0
Atlanta	27	100.0
Miami	20	100.0
Birmingham	46	97.8
Houston	27	40.7
Dallas	24	50.0
New Orleans	37	100.0
Providence	24	91.6

PERCENT OF TODDLERS OBSERVED IN CHILD SAFETY SEATS

July - September, 1988

	Base	Percent
Total (19 Cities)	5,038	82.2
Boston	281	90.4
New York	279	88.5
Baltimore	304	93.1
Pittsburgh	176	83.5
Minneapolis/St. Paul	295	63.7
Fargo/Moorhead	423	64.8
Phoenix	253	58.9
Seattle	304	90.8
San Francisco	279	91.4
Los Angeles	357	82.4
San Diego	364	88.7
Chicago	172	94.2
Atlanta	251	96.0
Miami	187	84.5
Birmingham	237	81.0
Houston	199	73.4
Dallas	196	70.4
New Orleans	198	81.3
Providence	283	89.8

PASSENGER SAFETY BELT USE BY AGE GROUP AND CITY

July - September, 1988

	TODDLER		SUBTEEN		TEEN		ADULT	
	Base	Percent Belted	Base	Percent Belted	Base	Percent Belted	Base	Percent Belted
Total Passengers (19 Cities)	5,038	5.6	8,296	38.9	5,609	25.4	31,708	45.7
Boston	281	1.8	245	35.9	211	16.6	1,594	36.5
Providence	283	0.0	242	36.0	301	9.6	1,600	27.7
New York	279	0.0	323	27.6	328	15.2	1,854	30.7
Baltimore	304	1.3	258	42.2	274	21.5	1,794	42.1
Pittsburgh	176	3.4	437	43.7	439	23.7	1,566	40.6
Minneapolis/St.Paul	295	21.0	354	52.3	343	39.9	1,659	49.5
Fargo/Moorhead	423	19.9	348	49.4	237	32.5	1,694	55.5
Phoenix	253	17.0	416	41.6	386	32.9	1,209	44.3
Seattle	304	3.0	402	42.5	370	34.3	2,093	57.8
San Francisco	279	1.4	316	39.6	305	22.0	1,608	48.4
Los Angeles	357	2.0	733	25.6	398	25.6	1,880	46.7
San Diego	364	2.2	563	33.4	433	34.4	2,153	55.4
Chicago	172	0.0	719	36.6	226	11.9	1,257	50.3
Atlanta	251	0.0	681	43.5	260	11.5	1,489	37.9
Miami	187	2.7	718	49.0	294	26.2	1,774	47.2
New Orleans	198	1.0	583	36.0	188	13.8	1,817	35.1
Birmingham	237	3.0	584	26.5	222	13.1	1,591	35.4
Houston	199	4.5	166	41.6	192	35.4	1,529	58.1
Dallas	196	12.8	209	54.5	202	51.5	1,547	64.4

APPENDIX E - VEHICLES EQUIPPED WITH AUTOMATIC RESTRAINTS

VEHICLE MODEL CODE LIST

01	American Motors	- (01A) Alliance
02	Jeep	
03	AM General	
06	Chrysler	- (06A) LeBaron Coupe; (06B) Conquest
07	Dodge	- (07A) Daytona
08	Imperial	
09	Plymouth	- (09A) Sundance
12	Ford	- (12A) Escort; (12B) Tempo
13	Lincoln	
14	Mercury	- (14A) Lynx; (14B) Topaz
18	Buick	- (18A) Somerset; (18B) Skylark; (18C) LeSabre; (18D) Regal;
19	Cadillac	
20	Chevrolet	- (20A) Chevette; (20B) Beretta
21	Oldsmobile	- (21A) Calais; (21B) Delta 88 (Royal); (21C) Cutlass Supreme;
22	Pontiac	- (22A) Grand Am; (22B) Bonneville; (22C) Grand Prix; (22D) Sun Bird; (22E) LeMans
23	GMC	
29	Other Domestic	
30	Volkswagen	- (30A) Rabbit; (30B) Golf; (30C) Jetta
31	Alfa Romeo	- (31A) Spider
32	Audi	
33	Austin/Austin Healy	
34	BMW	
35	Datsun/Nissan (Maxima)	- (35A) Maxima
36	Fiat	
37	Honda	- (37A) Accord; (37B) Prelude
38	Isuzu	- (38A) Impulse
39	Jaguar	- (39A) (No Model Name)
40	Lancia	
41	Mazda	- (41A) 626; (41B) MX-6 Coupe
42	Mercedes-Benz	
43	MG	
44	Peugeot	- (44A) 505
45	Porsche	
46	Renault	
47	Saab	- (47A) 900S 3-Door
48	Subaru	- (48A) XT Coupe; (48B) GL
49	Toyota	- (49A) Cressida; (49B) Camry
50	Triumph	
51	Volvo	
52	Acura	
53	Hyundai	- (53A) Excel GL
54	Mitsubishi	- (54A) Starion; (54B) Precis
55	Suzuki	
56	Yugo	
57	Sterling	
59	Other Imports	

What's on the Road in1988?

	1	2	3	4	5 DRIVER	6 PASSENGER
Acura Legend						
Alfa Romeo						
AMC Alliance						
BMW 6-Series						
BMW 7-Series						
Buick LeSabre						
Buick Regal						
Buick Skylark						
Buick Somerset						
Chevrolet Beretta				Spring88		
Chrysler Conquest						
Chrysler Fifth Avenue					Summer88	
Chrysler LeBaron					Summer88	
Dodge Daytona					Summer88	
Dodge Diplomat					Summer88	
Dodge Shadow			Summer88			
Eagle Medallion			Spring88			
Eagle Premier			Summer88			
Ford Escort						
Ford Tempo						
Honda Accord HB						
Honda Accord Coupe				Winter88		
Honda Prelude						
Hyundai Excel GL & GLS						
Isuzu Impulse						
Jaguar Cabriolet, XJ-S, XJ-C						
Mazda 626 LX (4 door)						
Mazda MX-6			Spring88			
Mercedes-Benz						
Mercury Lynx						
Mercury Topaz						
Mitsubishi Precis						
Mitsubishi Starion						
Nissan Maxima						
Olds Calais						
Olds Cutlass Supreme				Spring88		
Olds Delta 88					Summer88	
Peugeot 505 (gas)						
Plymouth Grand Fury					Summer88	
Plymouth Sundance			Spring88			
Pontiac Bonneville						
Pontiac Grand Am						
Pontiac Grand Prix				Spring88		
Porsche 944						
Saab 900S						
Saab 9000					Spring88	
Sterling						
Subaru XT Coupe						
Subaru - Other Models			Summer88			
Toyota Cressida						
Toyota Camry						
Volkswagen Golf						
Volkswagen Jetta						
Volvo 7-Series						
Yugo						

Listing is latest at time of printing. NHTSA updates this information periodically. Please check prior to Awareness Week for latest information.

LEGEND: *Already on the Road* **DATE:** *When Available*

1. Automatic Shoulder Belt
2. Automatic Shoulder Belt & Manual Lap Belt
3. Motorized Auto. S/Belt & Manual Lap Belt
4. Automatic Shoulder/Lap Belt Combination
5. Driver Air Bag & Manual Belt(s)
6. Passenger Air Bag & Manual Belt(s)

Information subject to change by manufacturer; check with dealer for standard/optional equipment. Unless specified, available on 2 & 4 door models.