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Restraint System Use in 19 U.S. Cities 1989 Annual Report

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SUMMARY

Five observational studies for various segments of the traffic population were conducted 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 use and misuse the shoulder belt system; (2) determine the use of seat belts and child safety seats of passengers in automobiles; (3) determine the correctness of toddler safety seat installation; (4) identify the extent to which helmets are worn by operators and passengers of motorcycles and mopeds; and (5) determine the effectiveness of automatic seat belt systems in increasing shoulder belt use.

This report documents the procedures used to conduct the observational studies and the study findings for 1989.

Driver Observation Findings

This study was conducted for 2 quarters (1st and 3rd quarter) during 1989 calendar year. In 1989, the driver observation study captured the use and misuse of shoulder belt only, since it was determined that accurate determination of lap belt use is difficult and also most vehicles today have lap belts connected to the shoulder belts as a single system.

The following major findings, associated with driver shoulder belt use, are based on 69,232 observations of drivers stopped for traffic signals on major arterial streets and freeway exit ramp locations:

- Driver shoulder belt use increased to 46.3 percent in 1989 (figure 1). Please note the percent use of shoulder belt system for 1985 to 1988 were recalculated from the historical database to allow the comparison with 1989 use rate.
- Female driver shoulder belt use is higher than male driver use (52.1 percent versus 40.0 percent).
- Driver shoulder belt use is found to be the highest among the 25 to 49 year age group and lowest among the 20 to 24 year age group (46.8 percent versus 39.9 percent).
- Drivers were observed to wear shoulder belts more often on expressways than on primary roads (50.1 percent versus 43.2 percent).
- Drivers of imported vehicles were more apt to wear shoulder belts than drivers of domestic vehicles (53.3 percent versus 41.4 percent).

The following major findings are based on shoulder belt misuse of the 69,232 driver observations in 1989.

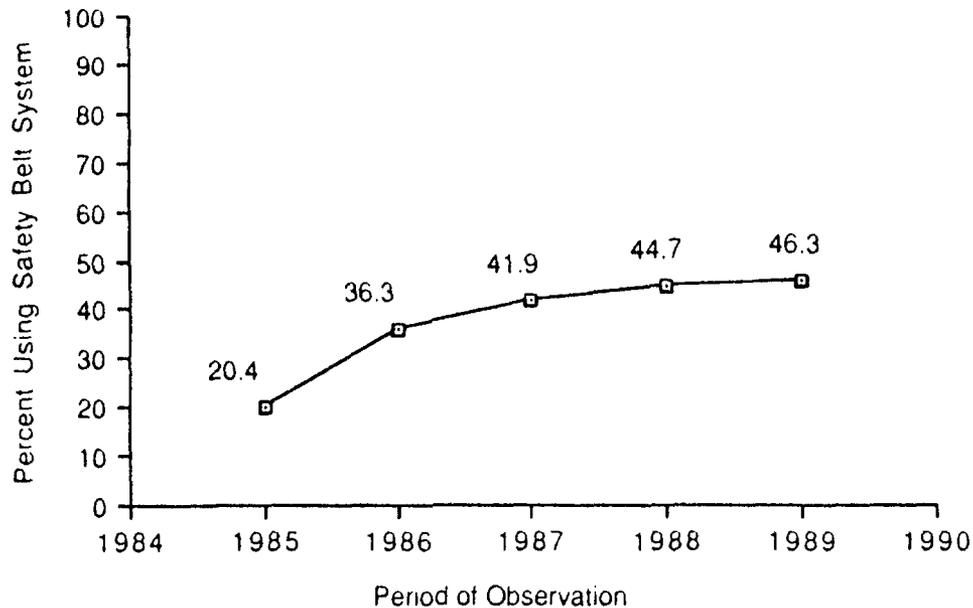


Figure 1. Driver shoulder belt use over the last five years.

- Approximately 2.6 percent of all drivers utilizing shoulder belts misuse them (i.e., were not properly restrained).
- Misuse of shoulder belts were higher among female drivers than male drivers (3.4 percent versus 2.0 percent).

Passenger (Infants, Toddlers and/or Subteens) Observation Findings

This study consisted of determining safety belt use amongst the passengers in the sample vehicles. If a vehicle has infants, toddlers and/or subteens, then only it was included in this study. If a vehicle was observed which did not carry any of the above categories of passengers, those vehicles were not included in the observation.

A total of 58,110 passengers were observed at shopping center entrances/exits during the 1989 passenger observation study. The following are the major findings:

- 80.6 percent of the infants and toddlers were observed to be restrained in child safety seats during 1989 (figure 2).
- Subteens (5-year to 12-year olds) were observed to be secured by safety seats or seat belts 43.5 percent of the time.

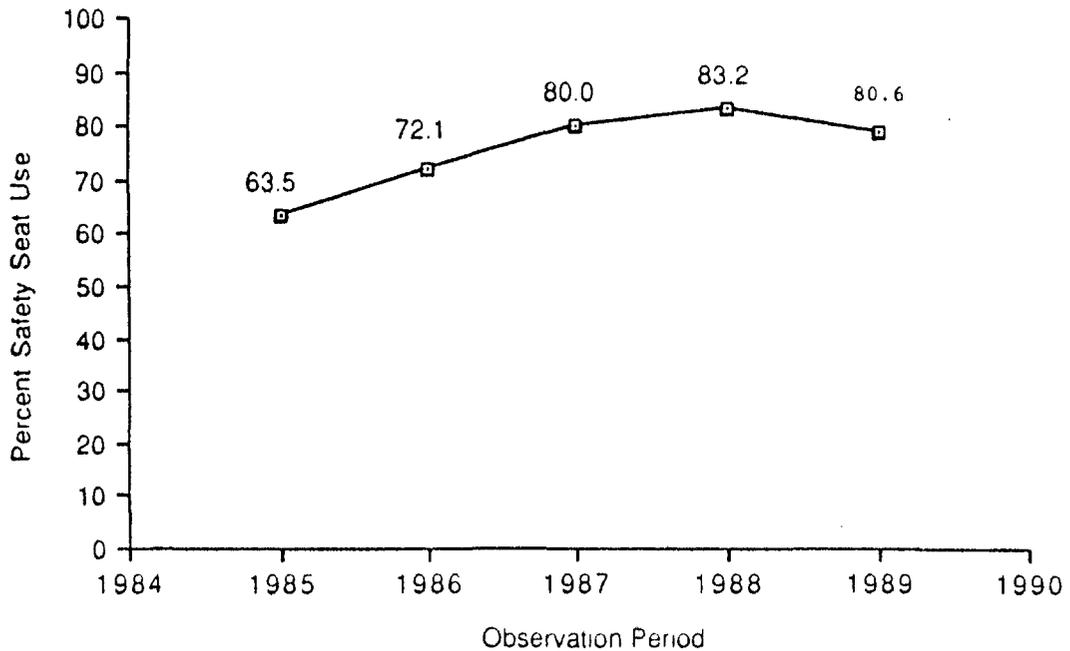


Figure 2. Infant and toddler safety seat use over time.

Toddler Safety Seat Installation

A total of 3,378 toddler safety seats were observed in parked vehicles in shopping malls. Of the 3,378 toddler seats observed, 3,227 required installation only by seat belt, the remaining 151 or 4.5 percent required installation by safety belt and a tether strap. Of the toddler seats that required securing by seat belt, 84.1 percent were observed to be correctly installed, whereas, toddler seats requiring a tether strap were observed to be correctly installed in 4.0 percent of the vehicles. Figure 3 displays correct toddler safety seat installation for the past five years.

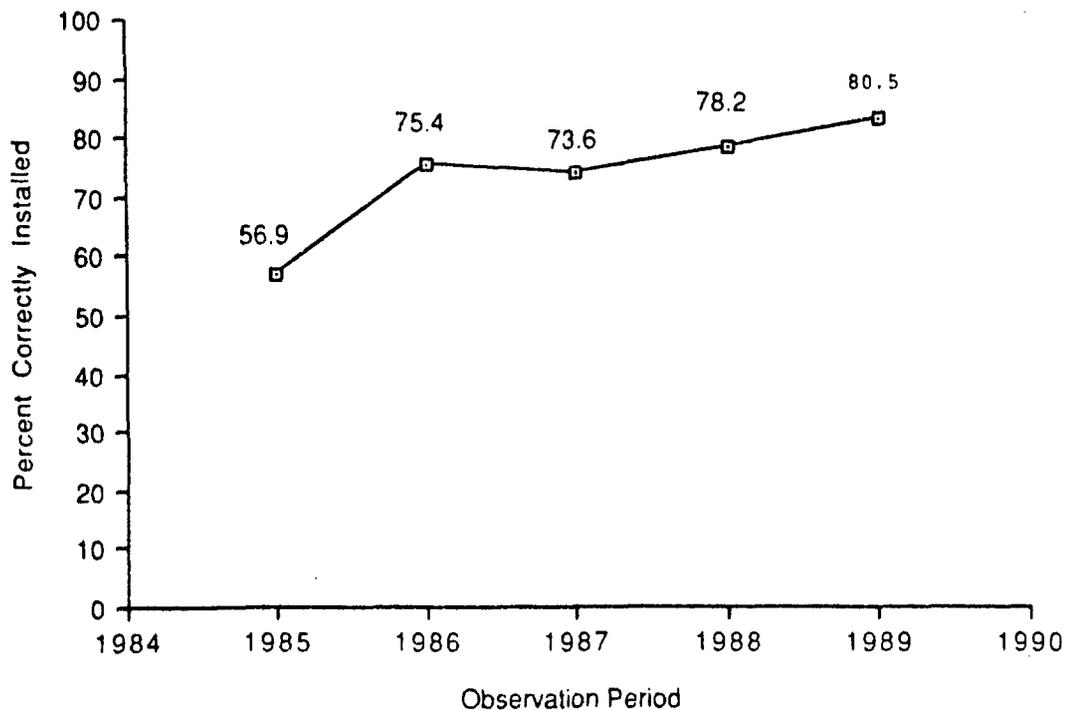


Figure 3. Correct toddler safety seat installation trend.

Motorcycle and Moped Helmet Study Findings

Motorcycle helmet use for operators and passengers were observed to be 56.6 percent and 48.9 percent, respectively, in 1989, based on 16,821 observations. In cities with a mandatory helmet use law, operator helmet use was observed to be 97.9 percent, whereas in cities with no or limited helmet use laws, only 44.2 percent were observed wearing a helmet. Figure 4 depicts the percent of operators wearing helmets over the past five years. Moped helmet use was based on 1,396 observations. Helmet use for mopeds was 37.7 percent for the operators and 18.8 percent for the passengers.

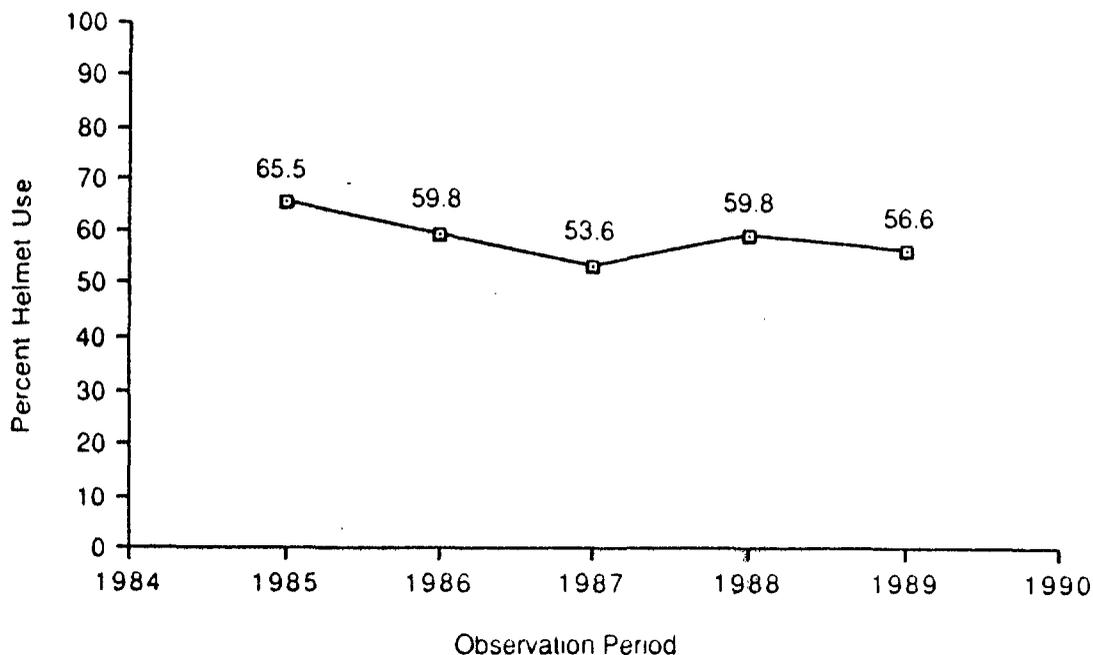


Figure 4. Motorcycle helmet use trend for operators.

Observations of Passenger Restraint Systems

In 1989, 26,610 observations of vehicles with automatic safety belts were made. Automatic seat belt systems for the 1987-1990 model years resulted in 84.8 percent of the drivers being restrained as opposed to 54.9 percent of non-automatic vehicles in the 1987-1990 model year vehicles. The use rates for motorized systems compared to non-motorized systems were 95.5 percent and 74.3 percent, respectively. Approximately 0.9 percent of the vehicles observed in 1989 were equipped with air bag systems for driver side only or driver and passenger sides. Driver shoulder belt use was found to be 57.8 percent of this 0.9 percent.

INTRODUCTION

This report documents the results of a project sponsored by the National Highway Traffic Safety Administration on restraint system and motorcycle helmet use. The results are based on field observations conducted in 19 cities across the nation. Included in the database are observations of drivers and passengers in over 100,000 passenger vehicles and helmet use for the operators and passengers on approximately 18,000 motorcycles and mopeds.

Project Objective

The objective of this study was to observe, record, and report the use of occupant restraints in passenger vehicles and motorcycle/moped helmet use in the 19 cities.

Project Description

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

Study 1

This study was conducted during the first and third quarters of 1989, and it consisted of four different elements of data collection, they are:

- Passenger Vehicle All Restraint Study

The purpose of this study was to monitor the use of shoulder belts by drivers and front-outboard passengers of privately-owned passenger vehicles at designated intersections and freeway exit locations. The data collected for each vehicle and passenger included:

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

● Passenger Study

The purpose of this study was to monitor the use of occupant restraint systems by passengers of private passenger vehicles with a subteen or younger child present. This data was collected at exits/entrances of selected shopping malls. The passenger observations were a component of study 1 only. 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 in reference to each passenger included:

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

● Toddler Safety Seat Installation Study

Installation of toddler safety seats was another component of study 1. This part of data collection consisted of observing toddler safety seats in parked cars located in the same shopping centers as in passenger study to obtain detailed information on the installation of child safety seats. The data collected on toddler safety seat installation were:

- Type of toddler seat (metal tubular or molded plastic construction).
- Tether use (for toddler seats that require the use of tethers).
- Belt use (for toddler seats that require that the lap belt be attached to the undercarriage of the toddler seat).
- Identification of model of toddler seats.

● Motorcycle/Moped Helmet Use Study

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

Study 2

This study was conducted during the second and fourth quarters of 1989, and it consisted of:

● Automatic Restraint Study

This study was conducted in order to monitor the use and misuse of shoulder belts by the driver regarding automatic restraint systems only. Location and information collected are identical to the passenger vehicle all restraint study.

● Motorcycle/Moped Helmet Use Study

The purpose of this study was the same as indicated in study 1.

Study Methodology

This study is a continuation of a series of studies sponsored by the National Highway Traffic Safety Administration (NHTSA) which determines restraint system use trends in 19 U.S. cities. The major elements of the study methodology are described in the following sections.

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 study. This served to provide a consistency of the results of the current and prior years' databases. Any changes in data collection sites necessitated by construction, or other uncontrollable events, were compensated by obtaining data in the same immediate area. The 19 cities selected for this study are from various geographical regions of this country and provide a variety of climate and driving conditions. They were purposely selected to provide a long-term, cost-effective trend data. They are also the same cities and sites within each city that have been utilized since 1974 for similar observations.

The cities and corresponding data collection regions are listed below and presented geographically in figure 5.

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 passenger vehicle all restraint study were primary road intersections and freeway exits. The

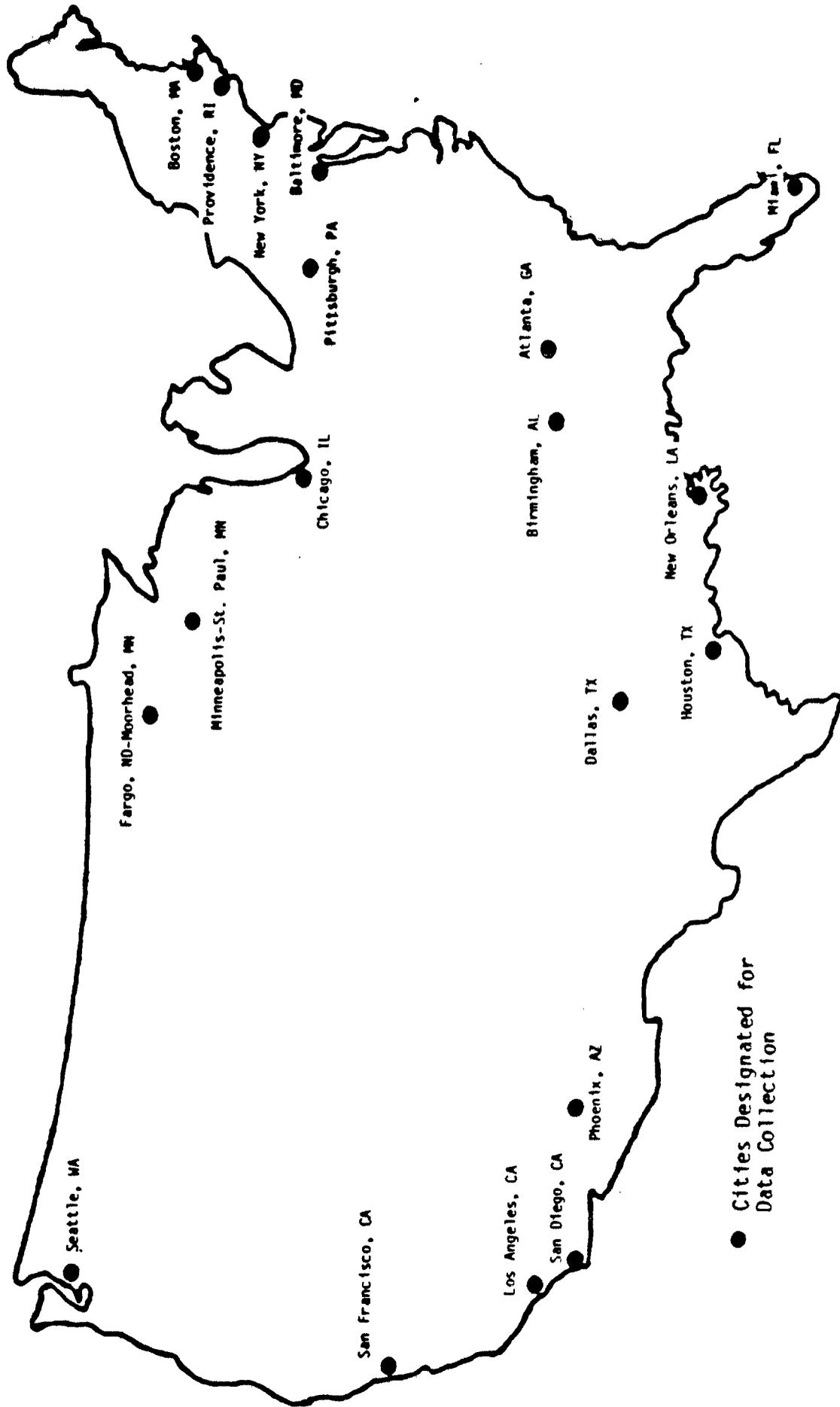


Figure 5. Location of the 19 cities for restraint use observation.

sites were selected to be representative of the land use and socio-economic composite of the city within self-imposed constraints. Site selections were originally made 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 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 initial trip to a 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, the observer inspected the next site on the list and repeated the process until an acceptable site was identified.

Study 1 and study 2 required 30 sites for the driver information studies (70 percent arterial and 30 percent freeway exit) within 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 provide a variety of socio-economic levels, sufficient traffic flow and good vantage points for conducting observations.

Study 1 required 12 days of data collection for each city, consisting of approximately 6 days for the all restraint study, 6 days for the passenger study, and 4 hours for the toddler seat installation study. Helmet study observations were recorded throughout the data collection period as motorcycle and moped observations were made. Study 2 required 11 days of driver observation with the observer recording motorcycle 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 1.0 hours at each of 6 sites per day. Passenger observations required 6 hours per day at a single shopping center during its hours of operation. The driver observation was usually conducted on Monday through Thursday and the passenger observation on Friday through Sunday. The observations for the automatic restraint study of study 2 required 2 hours at three sites per day.

Data Forms and Procedures

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

Whenever possible, data collectors were deployed to a given site on the same day (of the week) and during the same time period each time the city was visited. Only privately-owned passenger cars, station wagons and mini vans 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 sampled for this study.

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 permitted, additional observations were made (i.e., the third and fourth stopped cars). However, if only one car stopped then that vehicle was observed. Any passenger 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 only. 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 was collected on Fridays, Saturdays and Sundays during the peak hours of traffic movement in and out of the shopping malls. This maximized the chance of obtaining observations on infants and toddlers. A total of six passenger observation days were conducted in each city for the passenger study in study 1.

Only non-commercial passenger cars, station wagons, and mini vans were eligible for the passenger study. The primary target observations were vehicles with infants and toddlers. Data collectors were positioned at curbside, at a stop sign or signal controlled exits from the shopping center with the greatest flow of traffic. Observers did not go on the roadway and were only responsible for observing the vehicles in the curb lane.

Procedures for observations of child safety seat installation required inspection of parked vehicles containing toddler 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 pre-determined parking demand periods.

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

Training Procedures

Training procedures were developed during the initial phases of the subject study and were approved by NHTSA prior to conducting training activities. All procedures were developed around those used in the previous studies (1988 and earlier) to maximize consistency in reference to

project efforts. Training included the study of an observer's manual, classroom instruction and 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 field supervisor in the region assigned to a particular observer. All observer training was conducted by the supervisor and/or senior staff members. Follow-up supervisory field visits were made twice per year or more frequently as warranted.

Quality Control

The supervisor was stationed in Detroit and was responsible for scheduling observer activities, supervising data entry and conducting data collection quality control activities at field locations. Supervisory visits to each region were made on a routine basis or additionally when the data collector or supervisor believed such a visit was warranted. 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 identical vehicles for driver and passenger studies. Discrepancies were identified and discussed during an accuracy review.

At the end of each city visit, data forms were submitted by the observers for review and analysis. Data summaries were generated on a monthly basis and submitted to NHTSA along with requested additional information and analyses.

Analysis of 1989 Results

Goodell-Grivas, Inc. has been contracted by NHTSA (since 1983) to conduct observational studies for generation of an annual report detailing restraint system use in 19 U.S. cities. Data from the past four project years have been included in the 1989 report to facilitate comparison of results and identification of trends which may have developed.

The 1989 data was obtained by conducting two studies in a two cycle series. The first study consisted of four unique observations as defined in the project description, the second consisted of one study (with the motorcycle helmet use study being duplicated). One collection cycle consisted of obtaining data in all 19 cities for the first study followed by a return to each city for data collection on study no. 2. This cycle was then duplicated to achieve completion.

The data collection methods for this year were identical during each cycle with site locations also identical as compared to the previous years. Procedurally, changes in this year's program should be noted. These changes were as follows: (1) only shoulder belt use and misuse were obtained for the vehicle driver and only shoulder belt use for the front-

outboard passenger were obtained for the passenger vehicles. In prior studies, field observations also identified the use of lap belts for the driver and front-outboard passenger along with obtaining the age and seating position of all passengers in the vehicle, (2) during the passenger observation study, observers concentrated on obtaining information regarding passengers in vehicles that contained at least one child identified either as a subteen (5-12 year old) or younger inside the vehicle. Earlier studies (1988 and prior years) collected data on all passengers in subject vehicles, (3) safety seat installation observations were only conducted on toddler seats as opposed to infant and toddler seats. This change occurred because of the likelihood of detaching the restraint system on the infant seats when removing the child; toddler seats remain secured to the vehicle's seat at all times, and (4) study no. 2, the automatic restraint study, observations were obtained only on cars that possessed automatic restraint systems. In 1988, observations were collected on all cars concentrating on vehicles with automatic systems.

During the year 1989, results obtained during study no. 1, cycle one in four cities were determined to be unrepresentative and therefore abandoned. Due to a lack of program time in study no. 1, cycle one data for the driver and front-outboard passenger, as well as motorcycle helmet information were combined averages of study 1, cycle two results in 1988 and 1989 for each city. The four cities that displayed unrepresentative results were Pittsburgh, Seattle, Los Angeles, and San Francisco. These four averaged results were an approximation of what might have been observed in those cities. Information based on driver sex and age, driver shoulder belt use rates by site, area, vehicle manufacturer, and all other tables presented are the actual data collected in 1989. Identification of driver information that included the averaged four city data displayed a base of 79,083 observations whereas driver information that did not include the averaged four city data displayed a base of 69,232 observations.

Some tables and figures in this annual report have been completed with the use of a software package called "Vindicator". This program used the vehicle identification numbers obtained from the individual state's Department of Motor Vehicles tag interrogation process. This Vindicator program provided details on the vehicles in question such as: model year, wheel base, restraint system, and the information of an airbag system if present in the vehicle in question.

Data summaries which refer to a "base" represent the total number of observations. The "percent restrained" number represents the use rate recorded for a particular base, with each observation receives equal weight. This procedure was employed in previous NHTSA studies and thus allows for consistency in the comparison of results.

SUMMARY OF THE PASSENGER VEHICLE ALL RESTRAINT STUDY

Driver and Front-Outboard Passenger Shoulder Belt Use by City

Driver and front-outboard passenger shoulder belt use rates for 1989 are presented in table 1. In addition to the use rate being stratified by city, it is also divided into cities that have a mandatory safety belt use law (MUL) and those cities which do not (non-MUL). Currently, 14 out of 19 cities surveyed have MUL's and are designated as such with an asterisk after their names. As shown in table 1, cities with MUL's have a much higher shoulder belt use than non-MUL cities.

Driver shoulder belt use rates for 1989 ranged from a high of 69.2 percent in Dallas to a low of 22.9 percent in Providence, with an overall shoulder belt use rate for drivers of 46.3 percent. Front-outboard passenger (does not include infants and toddlers) use rate ranged from a high of 57.5 percent in Minneapolis/St. Paul to a low of 21.8 percent in Providence, with an overall shoulder belt use rate for front-outboard passengers of 40.0 percent. Shoulder belt use by front-outboard passengers continues to be lower than driver use in all cities studied except for Fargo/Moorhead.

Driver Shoulder Belt Use by Age and Sex

Observer driver shoulder belt use was stratified by driver sex and age and are presented in tables 2 and 3. Female shoulder belt use rate continued to be higher than their male counterparts. 52.1 percent of female drivers utilized shoulder belts as compared to 40.0 percent of males.

The shoulder belt use tables also subdivide driver sex by respective age groups. Drivers in the 25 to 49 year age category were observed to utilize the shoulder belt system more often than any other age group for both male and female drivers. An interesting observation in these tables showed that teenagers in 1989 wore shoulder belts more than the 20 to 24 year old age group drivers. This is the first year that teenage shoulder belt use was higher than any other age group.

Table 1. Driver and passenger shoulder belt use.

City	Driver Shoulder Belt Use		Passenger Shoulder Belt Use	
	Base	Percent Restrained	Base	Percent Restrained
Atlanta*	3,533	48.0	786	39.7
Baltimore*	4,310	48.0	924	43.8
Birmingham	3,898	32.2	964	27.3
Boston	4,321	33.9	962	30.5
Chicago*	5,331	37.4	1,217	31.6
Dallas*	3,635	69.2	761	56.6
Fargo/Moorhead	2,664	32.3	725	36.6
Houston*	4,386	61.4	1,212	51.4
Los Angeles*	5,387	52.1	1,126	44.4
Miami*	4,276	40.7	1,173	37.3
Minneapolis/St. Paul*	3,540	60.1	786	57.5
New Orleans*	4,289	40.5	973	29.0
New York*	4,066	27.6	1,398	26.9
Phoenix	4,115	45.2	907	34.0
Pittsburgh*	3,907	50.6	901	46.4
Providence	4,098	22.9	965	21.8
San Diego*	4,326	55.0	1,202	49.8
San Francisco*	3,823	57.3	906	53.2
Seattle*	5,178	60.7	921	54.6
MUL Cities	59,987	50.3	14,286	43.3
Non-MUL Cities	19,096	33.4	4,523	29.6
Total	79,083	46.3	18,809	40.0

* Mandatory safety belt use law (MUL) in effect.

Table 2. Female driver - shoulder belt use by age.

Age	MUL Cities		Non-MUL Cities		Total	
	Base	Percent Restrained	Base	Percent Restrained	Base	Percent Restrained
Under 20	359	57.9	189	38.1	548	51.1
20 - 24	2,867	51.9	1,394	33.9	4,261	50.0
25 - 49	13,442	58.0	5,317	41.5	18,759	53.3
49 or Over	3,848	59.9	1,687	37.0	5,535	53.0
Total	20,516	57.5	8,587	39.3	29,103	52.1

Table 3. Male driver - shoulder belt use by age.

Age	MUL Cities		Non-MUL Cities		Total	
	Base	Percent Restrained	Base	Percent Restrained	Base	Percent Restrained
Under 20	448	38.4	237	19.4	685	31.8
20 - 24	3,302	36.1	1,398	18.2	4,700	30.7
25 - 49	18,156	45.0	5,976	32.0	24,132	41.8
49 or Over	7,714	45.5	2,898	27.3	10,612	40.5
Total	29,620	44.0	10,509	28.6	40,129	40.0

Driver Shoulder Belt Use by Site Characteristics

Driver shoulder belt use rates stratified by site type and area type are presented in tables 4 and 5, respectively. Table 4 indicates that shoulder belt use for drivers exiting from freeways have a higher use rate (50.1 percent) than the drivers using non-freeway facilities (43.2 percent). This is a recurrent phenomena that has been present since 1986.

Shoulder belt use in city versus suburban areas is presented in table 5. City areas are characterized as central business district areas; while suburban areas include commercial, industrial, and/or residential locations outside of the central business district. Data shown in the tables indicate that drivers observed in suburban areas wear shoulder belts more often than drivers in the city, 47.1 percent versus 44.2 percent. This tendency is the reverse of what was observed in 1988. Although data retrieved in 1988 included lap belt use as being restrained. In the 1989 study, 44.2 percent of the drivers of vehicles identified in the city were restrained, as compared to 47.1 percent of the suburban drivers.

Table 4. Driver shoulder belt use by site type.

Site Type	Base	Percent Restrained
Primary Road	50,022	43.2
Freeway Exit	19,210	50.1
Total	69,232	45.1

Table 5. Driver shoulder belt use by area type.

Area Type	Base	Percent Restrained
City	49,008	44.2
Suburb	20,224	47.1
Total	69,232	45.1

Shoulder Belt Use by Vehicle Manufacturer

Driver shoulder belt use by vehicle manufacturer is presented in table 6. Drivers of imported vehicles displayed a higher use rate than the drivers of domestic made vehicles, 53.3 percent versus 41.4 percent, respectively. Drivers of Toyota vehicles were observed to display the highest shoulder belt use among the imports at 58.4 percent, compared to the highest shoulder belt use of any domestic of 43.1 percent displayed by Ford vehicles.

Table 6. Driver shoulder belt use by vehicle manufacturer.

Vehicle Manufacturer	Base	Percent Restrained
Chrysler	6,353	41.6
Ford	12,137	43.1
GM	28,657	40.5
VW	1,715	48.0
Toyota	4,853	58.4
Datsun/Nissan	3,782	46.7
Honda	3,353	56.9
Mazda	1,146	55.3
Other Domestic	595	45.2
Other Imports	6,641	52.6
Domestic Total	47,742	41.4
Import Total	21,490	53.3
Total	69,232	45.1

Driver Safety Belt Misuse

The data shown in table 7 summarizes the total number of drivers observed, stratified by sex and age categories, by the percent of shoulder belt misuse characteristics observed during the field observations. Misuse of shoulder belt by drivers were classified into three categories: under the arm (i.e., shoulder belt under the driver's left arm), behind the back (i.e., shoulder belt positioned behind the driver's torso resulting in no restraint of the upper body), and loose (i.e., shoulder belts having a fist width or more as slack near the chest area or excessive slack in the belt behind the driver). The driver shoulder belt use percentages shown previously in tables 2 and 3 include misuse as part of the percentages classified as restrained.

Table 7 indicates that female drivers have a higher rate of misuse than male drivers in 1989 primarily due to the difference in "under arm" misuse. Also revealed in the table, all drivers in the 50 years or older category have a higher tendency to misuse the shoulder belt apparatus than any other age group. These same trends have been displayed since 1986, the first year of identifying driver shoulder belt misuse.

Shoulder Belt Misuse by Vehicle Manufacturer

Driver shoulder belt misuse by vehicle manufacturer for those drivers observed utilizing shoulder belts is presented in table 8. Drivers of domestic vehicles were identified as misusing the shoulder belt system a greater percentage of the time than the drivers of imported vehicles. The highest rate of misuse was observed for the General Motors' cars, 3.4 percent and the least misused shoulder belt system found among major vehicle manufacturer were from Mazda, 0.9 percent.

Table 7. Driver shoulder belt misuse by sex and age.

Age Group	Base	Percent Misuse			Total Percent Misused
		Under Arm	Behind Back	Loose	
<u>Female</u>					
Under 20	549	0.9	0.9	0.6	2.4
20 - 24	4,261	1.8	0.8	0.8	3.4
25 - 49	18,758	1.7	0.7	0.8	3.2
50 or Older	5,535	1.9	0.8	1.5	4.2
Subtotal	29,103	1.7	0.7	1.0	3.4
<u>Male</u>					
Under 20	685	0.4	0.6	0.2	1.2
20 - 24	4,700	0.6	0.3	0.5	1.4
25 - 49	24,133	0.9	0.3	0.7	1.9
50 or Older	10,611	0.9	0.5	1.1	2.5
Subtotal	40,129	0.8	0.4	0.8	2.0
Total	69,232	1.2	0.5	0.9	2.6

Table 8. Driver shoulder belt misuse by vehicle manufacturer.

Vehicle Manufacturer	Base	Percent Misuse			Total Percent Misused
		Under Arm	Behind Back	Loose	
Chrysler	6,353	0.9	0.3	0.9	2.1
Ford	12,137	1.3	0.5	1.0	2.8
General Motors	28,657	1.3	0.9	1.2	3.4
Volkswagen	1,715	0.9	0.3	0.2	1.4
Toyota	4,853	1.3	0.1	0.4	1.8
Datsun/Nissan	3,782	1.3	0.2	0.3	1.8
Honda	3,353	1.3	0.1	0.2	1.6
Mazda	1,146	0.4	0.3	0.2	0.9
Other Domestic	595	0.5	0.0	0.2	0.7
Other Imports	6,641	1.0	0.1	0.4	1.5
Domestic Total	47,742	1.2	0.7	1.1	3.0
Import Total	21,490	1.1	0.1	0.3	1.6
Total	69,232	1.2	0.5	0.9	2.6

Verification of Database

The observers noted licence plate numbers during the field surveys. It was, however, not possible for them to determine the model year of the vehicles. As such, various states' vehicular database containing the license plate and vehicle identification (VIN) numbers were utilized to determine the make and model years of the vehicles sampled in the 1989 study.

New York, Massachusetts and Minnesota states' data files could not be used in this verification study due to either incorrect or illegible data tapes received from them. The data collected as a part of 1989 was sent to each state in the form of magnetic tapes. However, the processed data received from the above noted three states either did not have crucial information or the processed database could not be retrieved. As such, the three cities' New York, Boston and Minneapolis/St. Paul, had to be eliminated from the verified database.

Some data was removed which featured vehicles made earlier than 1967 and later than 1990. There were also a few instances where the license plate and make of vehicles coming out of the vindicator program did not match. In such cases, those data pieces were removed from the verified database.

A total of 32,123 records were verified and used for this study. Table 9 shows an overall shoulder belt use rate of 49.8 percent, with 1989/90 model vehicles indicating the highest use rate of 61.3 percent and 1967 model vehicles at the lowest use rate of 16.1 percent.

Table 10 shows driver shoulder belt use rate distribution by size of vehicle, separated by domestic and import makes. It shows a 56.5 percent shoulder belt use rate amongst import vehicles as compared to 46.5 percent among the domestic vehicles. The highest shoulder belt use was observed amongst the drivers of imported compact vehicles (65.3 percent).

Table 11 shows shoulder belt misuse by model year of the vehicles. The lowest misuse was observed amongst the drivers of 1973 vehicles. In contrast, the highest misuse was observed among the drivers of 1975 vehicles.

Table 9. Driver shoulder belt use by model year (Vindicator).

Model Year	Base	Percent Restrained
1967	62	16.1
1968	85	22.4
1969	111	18.9
1970	130	26.9
1971	164	28.0
1972	220	26.8
1973	300	27.0
1974	391	32.2
1975	396	32.6
1976	673	32.0
1977	1,070	35.1
1978	1,436	35.2
1979	1,628	36.9
1980	1,503	41.2
1981	1,548	45.1
1982	1,692	47.5
1983	1,933	48.8
1984	2,774	51.6
1985	3,098	54.0
1986	3,327	56.1
1987	3,369	57.3
1988	3,790	60.7
1989/1990	2,417	61.3
Total	32,123	49.8

Table 10. Driver shoulder belt use by vehicle size and make (Vindicator).

Vehicle Size	Vehicle Make		Total
	Domestic	Import	
Subcompact WB ≤ 101 in.	51.4% (6,471)	54.5% (7,296)	52.3% (13,767)
Compact 101 in. < WB ≤ 110 in.	48.9% (8,839)	65.3% (2,440)	52.4% (11,279)
Midsize 111 in. < WB ≤ 120 in.	42.6% (4,563)	46.9% (288)	42.9% (4,851)
Full Size WB > 120 in.	31.8% (1,271)	46.9% (64)	32.5% (1,335)
No Data	34.1% (507)	46.6% (384)	39.5% (891)
Total	46.5% (21,651)	56.5% (10,472)	49.8% (23,123)

Note: Percentages indicate the safety belt use rates of the base number of observations shown in parenthesis.

Table 11. Driver shoulder belt misuse by model year (Vindicator).

Model Year	Base	Percent Misuse			Total Percent Misuse
		Under Arm	Behind Back	Loose	
1967	62	1.6	0.0	0.0	1.6
1968	85	2.4	0.0	1.2	3.5
1969	111	0.9	0.9	1.8	3.6
1970	130	2.3	1.5	0.0	3.8
1971	164	1.2	0.0	1.2	2.4
1972	220	0.4	0.9	0.0	1.4
1973	300	0.0	0.3	0.3	0.7
1974	391	1.0	1.0	1.0	3.1
1975	396	1.5	1.8	1.3	4.5
1976	673	1.3	0.9	1.0	3.3
1977	1,070	1.3	1.0	1.0	3.4
1978	1,436	0.8	0.8	0.6	2.3
1979	1,628	1.2	0.5	0.9	2.6
1980	1,503	1.3	0.8	1.1	3.2
1981	1,548	1.1	0.4	1.0	2.5
1982	1,692	1.5	0.4	0.9	2.8
1983	1,933	0.9	0.3	1.4	2.6
1984	2,774	1.2	0.3	1.6	3.1
1985	3,098	1.4	0.5	1.5	3.4
1986	3,327	1.8	0.3	1.5	3.6
1987	3,369	1.5	0.4	0.9	2.9
1988	3,790	1.5	0.3	1.0	2.8
1989/1990	2,417	1.6	0.3	1.2	3.2
Total	32,123	1.4	0.5	1.2	3.0

PASSENGER OBSERVATION FINDINGS

A total of 58,110 passengers were observed at subject shopping center exits and entrances during 1989. If a vehicle had infant(s), toddler(s) or subteen(s), it was then included in the sample. 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. Figure 6 shows the restraint system use of passengers in the sample over the past five years. In 1989, infants were found to be correctly restrained in infant seats 67.3 percent, toddlers to be correctly restrained in toddler seats 69.9 percent, subteens restrained by booster seat or safety belt 43.5 percent, teens and adults restrained by safety belt 28.9 and 45.2 percent, respectively. It should be understood that mandatory safety belt use laws were in effect in the majority of cities for both data collection periods since 1987.

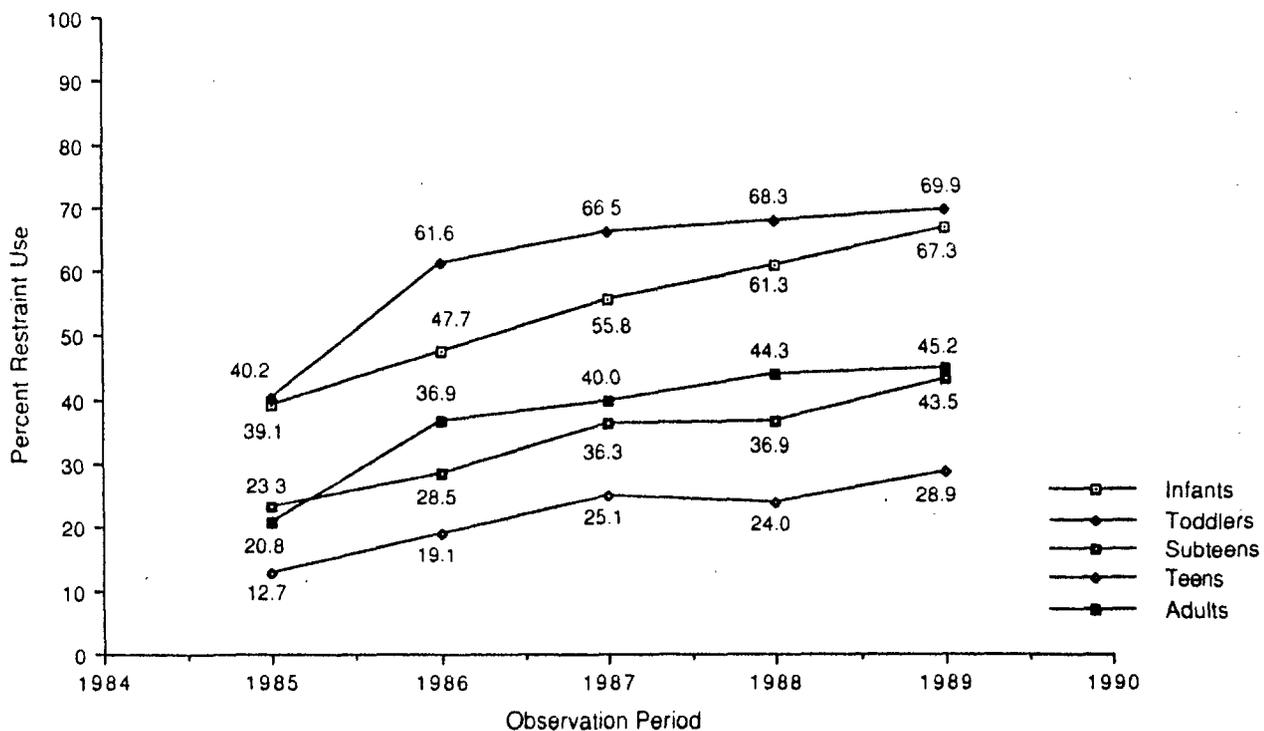


Figure 6. Trend of passenger restraint system use.

Infants (Under 1 Year)

A total of 1,600 infants were observed during the passenger observation study. Of this sample of 1,600 infants, 81.3 percent were observed in infant-only safety seats, identical to last year's percent. Of the 81.3 percent observed in an infant seat this year, 67.3 percent were properly restrained, 3.6 percent were incorrectly restrained, and 10.4 percent of the infants were observed to be restrained in the "wrong direction" (wrong direction refers to either the child or the child seat improperly placed). Table 12 summarizes the infant passenger observations.

Table 12. Methods of restraining infants.

Type of Restraint	Base	Percent
<u>Child in Infant Seat</u>	1,301	81.3
Correctly Restrained	1,077	67.3
Incorrectly Restrained	58	3.6
Wrong Direction	166	10.4
<u>Safety Belt</u>	6	0.4
<u>On Lap</u>	269	16.8
<u>None</u>	24	1.5
Total	1,600	100.0

Use of child safety seats in the sample of 1,600 observations are further subdivided by city in table 13. The data from the city of Miami shows that the infants were restrained in child safety seats 92.6 percent of the time and were properly restrained 81.5 percent of the time, highest among the 19 cities. The lowest use of safety seats and being properly restrained were found in Dallas, 67.1 percent and 48.2 percent, respectively.

Observation of correct installation of infant safety seats in the vehicle was not attempted as a part of this study.

Table 13. Infants restrained by safety seats by city.

City	Base	Percent in Safety Seat	Percent Properly Restrained in Safety Seat
Atlanta	69	76.8	52.2
Baltimore	77	88.3	79.2
Birmingham	79	86.1	68.4
Boston	42	85.7	78.6
Chicago	185	79.5	74.0
Dallas	85	67.1	48.2
Fargo/Moorhead	84	79.8	61.9
Houston	140	82.1	72.1
Los Angeles	99	70.7	63.6
Miami	54	92.6	81.5
Minneapolis/St. Paul	93	81.7	57.0
New Orleans	79	70.9	55.7
New York	51	80.4	70.6
Phoenix	74	87.8	68.9
Pittsburgh	58	91.4	62.1
Providence	46	91.3	82.6
San Diego	137	84.7	69.3
San Francisco	69	81.2	59.4
Seattle	79	81.0	77.2
Total Sample and Average of Total Sample	1,600	81.3	67.3

Toddlers (Ages 1-4 Years)

Toddler observations consisted of recording similar data as that collected for infants. 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/lap belt system was properly utilized.

A total of 11,865 toddlers were observed during the passenger study. Table 14 shows that 76.7 percent were in toddler seats, 3.8 percent were in booster seats, 7.6 percent were unrestrained in someones lap, 7.3 percent were neither in a persons lap nor in a safety belt, and 4.6 percent were restrained by a safety belt.

Table 14. Methods of restraining toddlers.

Type of Restraint	Base	Percent
<u>Safety Seat</u>		
Toddler Seat	9,094	76.7
Booster Seat	453	3.8
<u>Unrestrained</u>		
On Lap	902	7.6
Other	865	7.3
Safety Belt	551	4.6
Total	11,865	100.0

Table 15 shows the restraint system use by cities for toddlers. A brief summary of this is as follows:

- 91.4 percent of the 3.8 percent using booster seats were correctly restrained; with Atlanta, Chicago, Fargo/Moorhead and Miami having 100 percent correct use. Whereas, New York data indicated the lowest correct use rate, which was 75.0 percent.
- Of the 76.7 percent in toddler seats, 91.1 percent were correctly restrained. Fargo/Moorhead data showed a 98.0 percent (highest of 19 cities) correct use rate and the Miami sample showed an 85.0 percent (lowest of 19 cities) correct use rate.
- 80.5 percent of the toddlers were observed to be in a booster seat or a toddler seat and 91.1 percent of them were restrained correctly.
- 4.6 percent of the toddlers sampled were restrained by safety belts.
- 14.9 percent of the total sample of 11,865 toddlers observed were not restrained at all.

Table 15. Restraint system use by city for toddlers.

(A) City	(B) Base	(C) Percent of Col. (B) in Booster Seat	(D) Percent of Col. (C) Correctly Restrained in Booster Seats	(E) Percent of Col. (B) in Toddler Seats	(F) Percent of Col. (E) Correctly Restrained in Toddler Seat	(G) Percent of Col. (B) in Safety Seat (Total of Cols. (C) & (E))	(H) Percent of Col. (G) Correctly Restrained in Safety Seat	(I) Percent of Col. (B) Restrained by Safety Belt	(J) Percent of Col. (B) Not Restrained
Atlanta	422	6.4	100.0	69.4	92.8	75.8	93.4	6.2	18.0
Baltimore	588	0.0	--	91.0	86.4	91.0	86.4	3.1	6.1
Birmingham	418	4.8	95.0	55.5	88.8	60.3	89.3	8.1	31.6
Boston	442	0.0	--	89.4	86.8	89.4	86.8	1.4	9.3
Chicago	811	0.4	100.0	77.4	92.4	77.8	92.4	2.0	20.5
Dallas	620	8.5	84.9	71.3	88.7	72.6	88.3	7.1	13.1
Fargo/Moorhead	839	2.1	100.0	73.1	98.0	75.2	98.1	4.8	20.0
Houston	784	1.4	90.9	77.4	91.8	78.8	91.7	4.2	17.0
Los Angeles	882	2.3	80.0	67.3	96.0	69.6	95.4	6.7	24.4
Miami	489	0.2	100.0	85.7	85.0	85.9	85.0	1.6	11.0
Minn./St.Paul	661	12.6	96.4	79.6	90.3	92.1	91.1	3.9	3.9
New Orleans	723	1.9	85.7	80.1	91.2	82.0	91.1	4.0	14.0
New York	449	0.9	75.0	77.1	85.3	78.0	84.8	3.1	18.7
Phoenix	435	13.8	81.7	68.7	89.6	82.5	88.3	6.7	10.8
Pittsburgh	307	7.8	95.8	71.7	93.6	79.5	93.8	3.2	16.9
Providence	620	0.0	--	90.3	88.0	90.3	88.0	2.1	7.6
San Diego	662	5.4	88.9	51.2	93.2	56.6	92.8	13.1	30.2
San Francisco	584	5.0	93.1	84.8	85.6	89.7	86.1	2.2	8.0
Seattle	1,129	4.4	98.0	86.1	97.0	90.5	97.1	4.1	5.4
Total	11,865	3.8	91.4	76.7	91.1	80.5	91.1	4.6	14.9

Subteens (Ages 5 to 12 Years)

Table 16 indicates that a total of 17,852 subteen passengers were observed in the 19 cities during the passenger study. The overall safety belt use was found to be 41.2 percent in 1989. Another 2.3 percent of the sample were found to be restrained in safety seats; resulting in a total of 43.5 percent of the subteen passengers restrained. This compares to 36.9 percent and 36.3 percent use rates in 1988 and 1987, respectively.

Minneapolis/St. Paul had the highest use rate, 62.8 percent using safety belts and 0.3 percent in safety seats; Birmingham had the lowest, 25.0 percent and 0.4 percent, respectively.

Table 16. Safety belt use by city for subteen passengers.

City	Base	Percent Restrained in Safety Seat	Percent Restrained by Safety Belt	Percent Not Restrained
Atlanta	875	0.5	32.9	66.6
Baltimore	1,405	4.0	48.2	47.8
Birmingham	980	0.4	25.0	74.6
Boston	1,157	5.4	41.1	53.5
Chicago	906	4.8	36.6	58.6
Dallas	943	1.2	51.6	47.2
Fargo/Moorhead	817	0.8	31.3	67.9
Houston	698	1.1	34.1	64.8
Los Angeles	732	0.2	28.4	71.4
Miami	1,203	3.9	41.9	54.2
Minneapolis/St. Paul	1,070	0.3	62.8	36.9
New Orleans	549	1.3	42.1	56.6
New York	1,003	7.1	31.8	61.1
Phoenix	784	0.0	47.1	52.9
Pittsburgh	956	0.0	27.7	72.3
Providence	1,450	5.0	46.5	48.5
San Diego	965	0.2	40.7	59.1
San Francisco	879	1.3	49.9	48.8
Seattle	480	1.9	56.9	41.2
Total	17,852	2.3	41.2	56.5

Teens (Ages 13 to 19 Years)

A total of 6,052 teenage passengers were sampled in the 1989 19-city passenger study. The overall use rate was 28.9 percent in 1989, as compared to 24.0 percent in 1988 and 25.1 percent in 1987.

Table 17 indicates the safety belt use rates by city. The highest use rate was 47.9 percent and was observed in Dallas; whereas, the lowest use rate was 13.1 percent and was observed in Providence. It is interesting to note that Dallas had a 43.3 percent use rate in 1988 and was the highest amongst all 19 cities; and Providence had a 9.8 percent use rate in 1988 and was the lowest.

Table 17. Passenger safety belt use for teens by city.

City	Base	Percent Restrained
Atlanta	391	29.4
Baltimore	233	22.3
Birmingham	364	16.2
Boston	195	19.5
Chicago	141	14.2
Dallas	495	47.9
Fargo/Moorhead	207	24.6
Houston	316	42.7
Los Angeles	238	24.0
Miami	216	18.5
Minneapolis/St. Paul	568	32.0
New Orleans	254	26.0
New York	208	18.8
Phoenix	556	34.7
Pittsburgh	484	22.9
Providence	176	13.1
San Diego	288	35.4
San Francisco	508	31.1
Seattle	214	34.6
Total	6,052	28.9

Adults (Ages 20 and Older)

A total of 20,741 adults were sampled in the passenger study in 1989. The overall use of restraint systems amongst the adult passengers was found to be 45.2 percent in 1989 (presented in table 18), as compared to 44.3 percent in 1988. The highest use of safety belts (58.1 percent) was observed in San Diego; and the lowest use rate (25.9 percent) was observed in New York. In 1989, Dallas use rate was found to be 57.0 percent and Providence sample showed a use rate of 35.7 percent.

Table 18. Passenger safety belt use for adults by city.

City	Base	Percent Restrained
Atlanta	1,032	43.3
Baltimore	932	46.4
Birmingham	886	30.6
Boston	746	40.3
Chicago	832	36.2
Dallas	1,455	57.0
Fargo/Moorhead	522	41.8
Houston	1,125	47.9
Los Angeles	1,373	38.2
Miami	888	39.5
Minneapolis/St. Paul	1,261	54.1
New Orleans	1,087	38.0
New York	741	25.9
Phoenix	1,469	47.3
Pittsburgh	1,125	41.0
Providence	845	35.7
San Diego	1,023	58.1
San Francisco	1,933	51.9
Seattle	1,466	55.2
Total	20,741	45.2

OBSERVATIONS OF CHILD SAFETY SEAT INSTALLATION

During this study, 3,378 toddler safety seats were observed in parked vehicles at the same shopping malls used for the passenger observations. Table 19 presents the data by manufacturers model. Century toddler seats were observed more frequently than any other manufacturer. However, in looking at individual models, the One Step, manufactured by Evenflo, was the most frequently observed seat (530 out of 3,378, i.e., 15.7 percent approx.).

Within the toddler seat category, two types of systems were 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 3,378 toddler seats, 3,227 (95.5 percent) with the belt only and 151 (4.5 percent) with the belt and tether systems were observed (as presented in table 20). Safety seats requiring only a safety belt for installation were observed to be correctly installed 84.1 percent of the time, whereas those requiring a tether were much less likely to be installed correctly, 4.0 percent. Overall, as shown in table 20, 80.5 percent of the toddler seats observed were properly secured. Table 21 subdivides the data into two categories, all plastic safety seats and safety seats that make use of metal tubing. Of the 3,378 toddler seats observed, 2,817 or 83.4 percent were fastened correctly. Safety seats that are made of all plastic construction usually provide slots or notches allowing for easy identification of correct safety belt routing.

Figure 7 shows the trend of toddler seats needing a tether strap over time. In 1985, 21.0 percent of the toddler seats needed a tether strap, as compared to 4.5 percent in 1990.

Table 19. Types of toddler safety seats and percent correctly fastened.

Manufacturer/Model	Base	Percent Correctly Fastened	Percent Incorrectly Fastened	Percent Car Belt Not Used	Percent of Grand Total
Century Total	(911)	(84.3)	(11.3)	(4.4)	(26.9)
100	144	74.3	20.1	0.6	
200	112	77.7	20.5	1.8	
300	182	79.7	17.0	3.3	
400 XL	59	83.0	13.6	3.4	
1000 STE	80	93.8	0.0	6.2	
2000 STE	87	97.8	1.1	1.1	
2500 STE	77	96.1	1.3	2.6	
3000 STE	113	95.6	1.8	2.6	
5000 STE	2	100.0	0.0	0.0	
Child Love	9	0.0	44.5	55.5	
Unknown	46	78.3	8.7	13.0	
Collier-Keyworth Total	(55)	(90.9)	(9.1)	(0.0)	(1.5)
Roundtripper	4	100.0	0.0	0.0	
Safe & Sound	47	89.4	10.6	0.0	
Sprint Convertible	4	100.0	0.0	0.0	
Cosco Total	(280)	(87.1)	(10.0)	(2.9)	(8.1)
Auto Trak	16	93.8	6.2	0.0	
Commuter	64	90.6	6.3	3.1	
Commuter 5-Pt.	29	89.6	10.4	0.0	
Safe & Easy	33	90.9	6.1	3.0	
Safe & Snug	30	96.7	3.3	0.0	
Safe-T-Mate	10	70.0	30.0	0.0	
Safe-T-Seat	27	66.7	33.3	0.0	
Safe-T-Shield	43	88.4	9.3	2.3	
Unknown	28	82.1	3.6	14.3	
Evenflo Total	(629)	(84.3)	(14.6)	(1.1)	(18.2)
7-Year Car Seat	69	95.6	2.9	1.5	
One Step	530	82.3	17.0	0.7	
Ultra	12	91.7	0.0	8.3	
Unknown	18	94.4	0.0	5.6	

Table 19. Types of toddler safety seats and percent correctly fastened (continued).

Manufacturer/Model	Base	Percent Correctly Fastened	Percent Incorrectly Fastened	Percent Car Belt Not Used	Percent of Grand Total
Fisher-Price Car Seat	(266)	(93.2)	(4.9)	(1.9)	(7.9)
Gerry Guardian	(56)	(87.5)	(3.6)	(8.9)	(1.7)
Graco Little Traveler	(4)	(100.0)	(0.0)	(0.0)	(0.1)
International Manufacturing Teddy-Tot Astroseat	(25)	80.0	(20.0)	(0.0)	(0.8)
Kolcraft Total	(44)	(95.4)	(2.3)	(2.3)	(1.3)
Dial-A-Fit	11	100.0	0.0	0.0	
Hi-Rider	4	100.0	0.0	0.0	
Quick Step	1	0.0	0.0	100.0	
Redi-Rider	3	100.0	0.0	0.0	
Ultra Ride	17	100.0	0.0	0.0	
Unknown	8	87.5	12.5	0.0	
Nissan Child Safety Seat	(105)	(93.3)	(1.9)	(4.8)	(2.8)
Pride-Trimble	(18)	(77.8)	(16.7)	(5.5)	(0.5)
Questor Total	(43)	(76.8)	(11.6)	(11.6)	(1.4)
Bobby-Mac Champion	2	0.0	0.0	100.0	
Bobby-Mac Deluxe II	1	0.0	0.0	100.0	
Bobby-Mac Unknown	3	100.0	0.0	0.0	
Kantwet Care Seat	20	85.0	5.0	10.0	
Kantwet Safeguard	17	76.5	23.5	0.0	

Table 19. Types of toddler safety seats and percent correctly fastened (continued).

Manufacturer/Model	Base	Percent Correctly Fastened	Percent Incorrectly Fastened	Percent Car Belt Not Used	Percent of Grand Total
Strolee Total	(670)	(66.9)	(31.0)	(2.1)	(16.9)
GT 2000	15	86.6	6.7	6.7	
GT 3000	17	100.0	0.0	0.0	
Wee Care 500	142	4.2	91.6	4.2	
Wee Care 600	413	83.3	15.5	1.2	
Model 614/615	42	81.0	19.0	0.0	
Unknown	41	82.9	12.2	4.9	
Welsh Travel Tot	(2)	(0.0)	(0.0)	(100.0)	(0.0)
Other	(270)	(63.3)	(7.0)	(29.7)	(9.1)
Total	3,378	80.5	14.4	5.1	100.0

Table 20. Toddler seat with belt only and with belt and tether strap.

Seat Fastening Type	Base	Percent Correctly Restrained
Seats Requiring Seat Belt Only	3,227	84.1
Seats Requiring Seat Belt and Tether Straps	151	4.0
Overall	3,378	80.5

Table 21. Toddler seat belt installation.

Frame Type	Base	Percent Correctly Fastened	Percent Belted but Incorrectly	Percent Not Restrained
Plastic	985	88.8	2.5	8.7
Metal Tube	2,393	81.2	15.1	3.7
Total	3,378	83.4	11.5	5.1

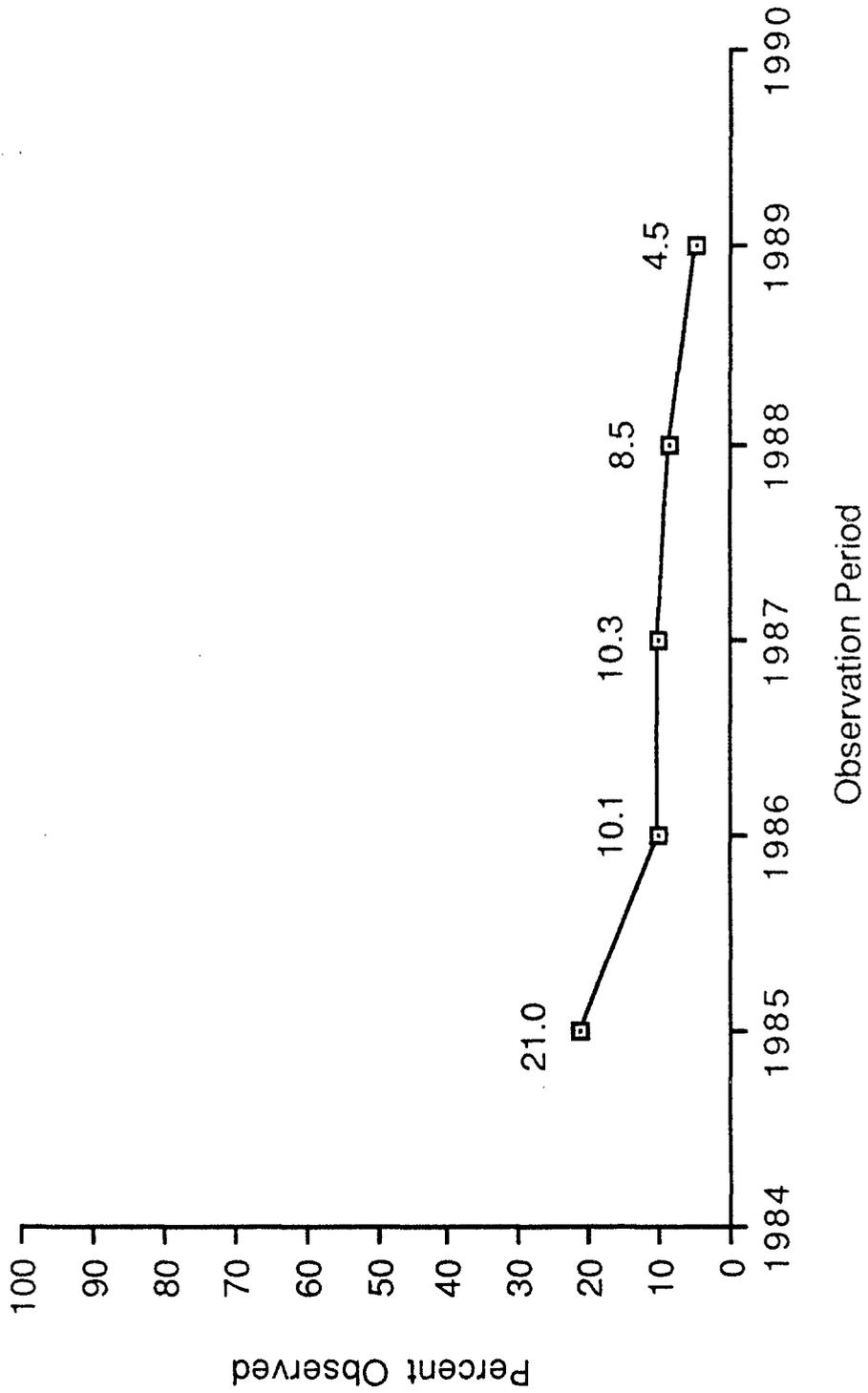


Figure 7. Percent of toddler safety seats observed needing a tether strap for correct installation.

MOTORCYCLE/MOPED OBSERVATION FINDINGS

In 1989, observations were collected on operators and passengers of motorcycles and mopeds regarding helmet use. Of the 16,821 motorcycle and 1,396 moped observations made, the percentage of operators wearing helmets was 56.6 percent and 37.7 percent, respectively. Table 22 presents the helmet use rate for motorcycle operators and passengers by city and by the existence of a MUL (mandatory helmet use law).

Figure 8 illustrates the trend of motorcycle operator helmet use for the past five observation periods for the cities with and without a MUL. The state of Texas on September 4, 1989 passed a law requiring the correct and mandatory use of helmets. Adoption of this law has given the cities of Dallas and Houston their highest percent of helmet use over the past five years.

Table 23 presents helmet use rates by city for operators and passengers on mopeds (motorized bicycles).

Table 22. Motorcycle helmet use in 1989.

City	Driver Base	Percent Helmet On	Passenger Base	Percent Helmet On
Atlanta*	508	97.6	84	96.4
Baltimore	284	46.8	38	42.1
Birmingham*	739	99.7	128	100.0
Boston*	274	91.6	41	95.1
Chicago	1,476	22.3	254	11.4
Dallas ¹	533	58.0	45	37.8
Fargo/Moorhead	1,161	34.9	172	29.7
Houston ¹	1,088	62.8	109	64.2
Los Angeles	1,923	32.4	198	13.6
Miami*	767	99.9	141	98.6
Minneapolis/St. Paul	576	39.9	61	34.4
New Orleans*	691	98.0	62	96.8
New York*	356	98.6	52	98.1
Phoenix	1,021	45.7	108	30.6
Pittsburgh*	574	95.6	93	97.8
Providence	360	62.5	41	95.1
San Diego	2,361	49.1	332	31.6
San Francisco	1,029	46.8	145	37.2
Seattle	1,100	59.5	148	34.5
MUL Cities*	3,909	97.9	601	98.0
Non-MUL Cities	12,912	44.2	1,651	31.1
Total	16,821	56.6	2,252	48.9

* Mandatory Helmet Use Law (MUL)

¹ MUL into effect on September 4, 1989.

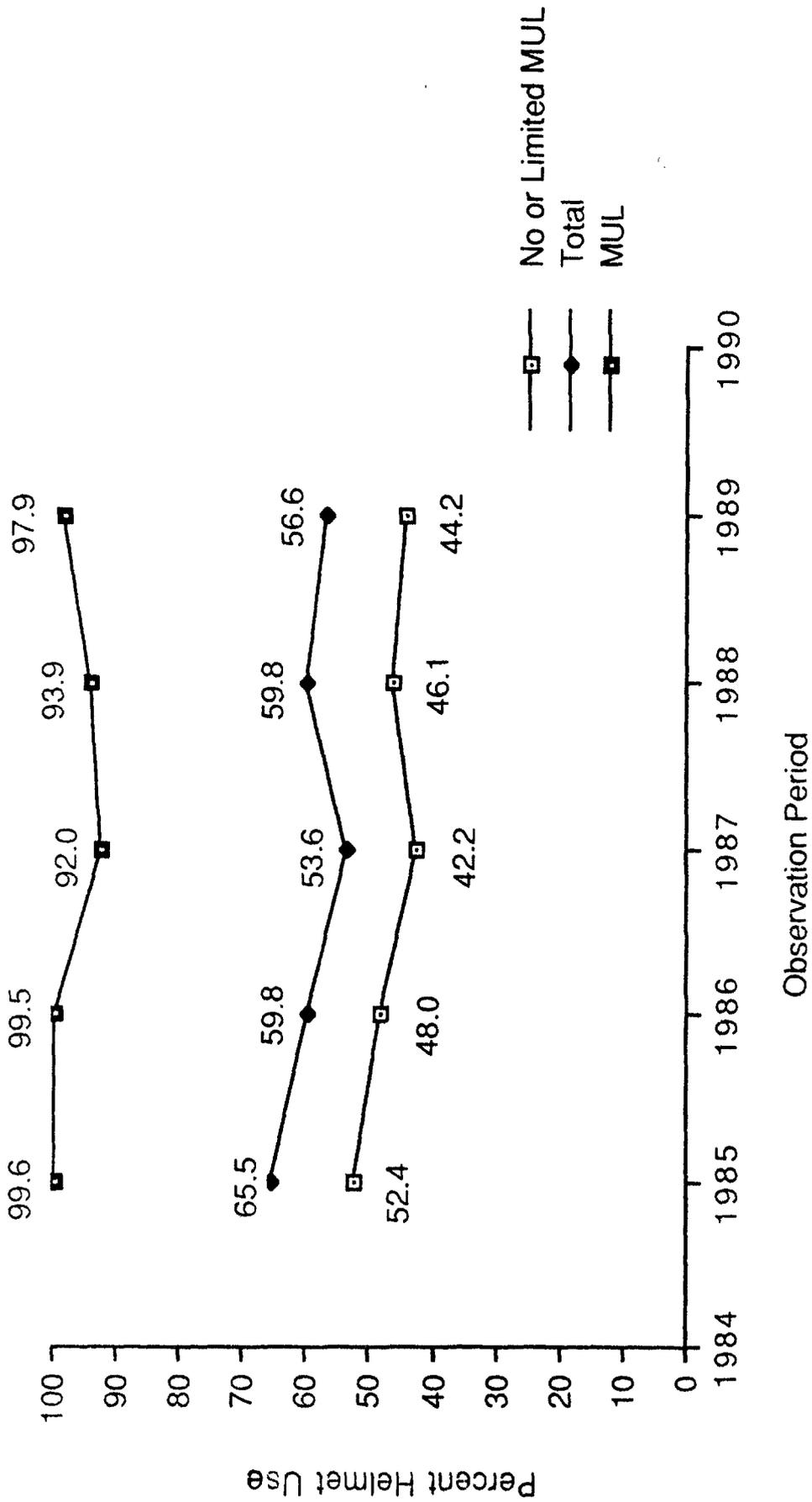


Figure 8. Motorcycle helmet use trend for operators by the existence of mandatory helmet use law.

Table 23. Moped helmet use in 1989.

City	Driver Base	Percent Helmet On	Passenger Base	Percent Helmet On
Atlanta	14	92.9	0	--
Baltimore	3	33.3	0	--
Birmingham	40	95.0	1	100.0
Boston	3	100.0	0	--
Chicago	119	17.6	10	0.0
Dallas ¹	16	50.0	1	0.0
Fargo/Moorhead	11	63.6	0	--
Houston ¹	69	56.5	3	66.7
Los Angeles	198	14.6	13	0.0
Miami	68	79.4	2	100.0
Minneapolis/St. Paul	29	41.4	3	33.3
New Orleans	35	97.1	0	--
New York	23	87.0	0	--
Phoenix	136	29.4	8	0.0
Pittsburgh	16	62.5	4	50.0
Providence	14	35.7	0	--
San Diego	225	25.8	15	6.7
San Francisco	239	30.5	17	29.4
Seattle	138	44.2	8	25.0
Total	1,396	37.7	85	18.8

¹ MUL into effect on September 4, 1989.

OBSERVATIONS OF CARS WITH AUTOMATIC SAFETY BELTS

Beginning with the 1987 model year vehicles, United States auto-makers were required to equip 10 percent of their passenger vehicles with a passive restraint system. This percentage has increased each year to 100 percent of the 1990 model year passenger vehicles. Manufacturers may provide either an automatic safety belt system or an air bag system. There are three basic designs for automatic safety belt systems which are in use: (1) a motorized shoulder belt system; (2) a non-motorized shoulder belt system; and (3) a non-motorized shoulder and lap belt combination. A manual lap belt is provided on most vehicles that have an automatic shoulder belt system.

During the past three years, the number of vehicles observed with automatic safety belt systems has risen from 1.5 percent in 1987 to 6.1 percent in 1989. These percentages were extracted from study 1, the passenger vehicle all restraint study. During study 1, vehicles identified as having an automatic restraint system were coded by make and model.

Because of the increasing number of automatic safety belt systems on the road, a special study to observe the use rate of automatic systems was conducted. The methodology for collecting data in this study was similar to the passenger all restraint study, except observations were taken for two hours at each of the thirty sites. Also, identification of lap belt use was attempted in the automatic restraint system study, whereas only shoulder belt use was recorded in the all restraint study. Vehicles with automatic safety belts are relatively easy to spot due to the position of the shoulder belt. The observers were also given a list of vehicles that may possess an automatic restraint system.

During the 1990 model year, some vehicle lines switched from an automatic safety belt to an air bag system. This did not cause any problems with the field observations. But, some vehicles went from a motorized belting system to a non-motorized system. As a result of belt system changes, certain models were categorized as an "unknown" type.

Figure 9 presents the driver use of automatic seat belts by vehicle manufacturer. The highest use rate (98.4 percent) was observed in Toyota vehicles; and the lowest use rate (65.3 percent) was observed in Chrysler vehicles.

Table 24 shows a comparison between various types of shoulder belt systems. In this study, vehicles equipped with motorized shoulder belts without belt disconnect have the highest rate of use and non-motorized shoulder belt systems having the lowest use rate. Figure 10 exhibits the bar graphs of the various types of safety belt systems and their respective use rates.

Table 25 shows the use rate amongst the drivers by various types of restraint systems including air bags.

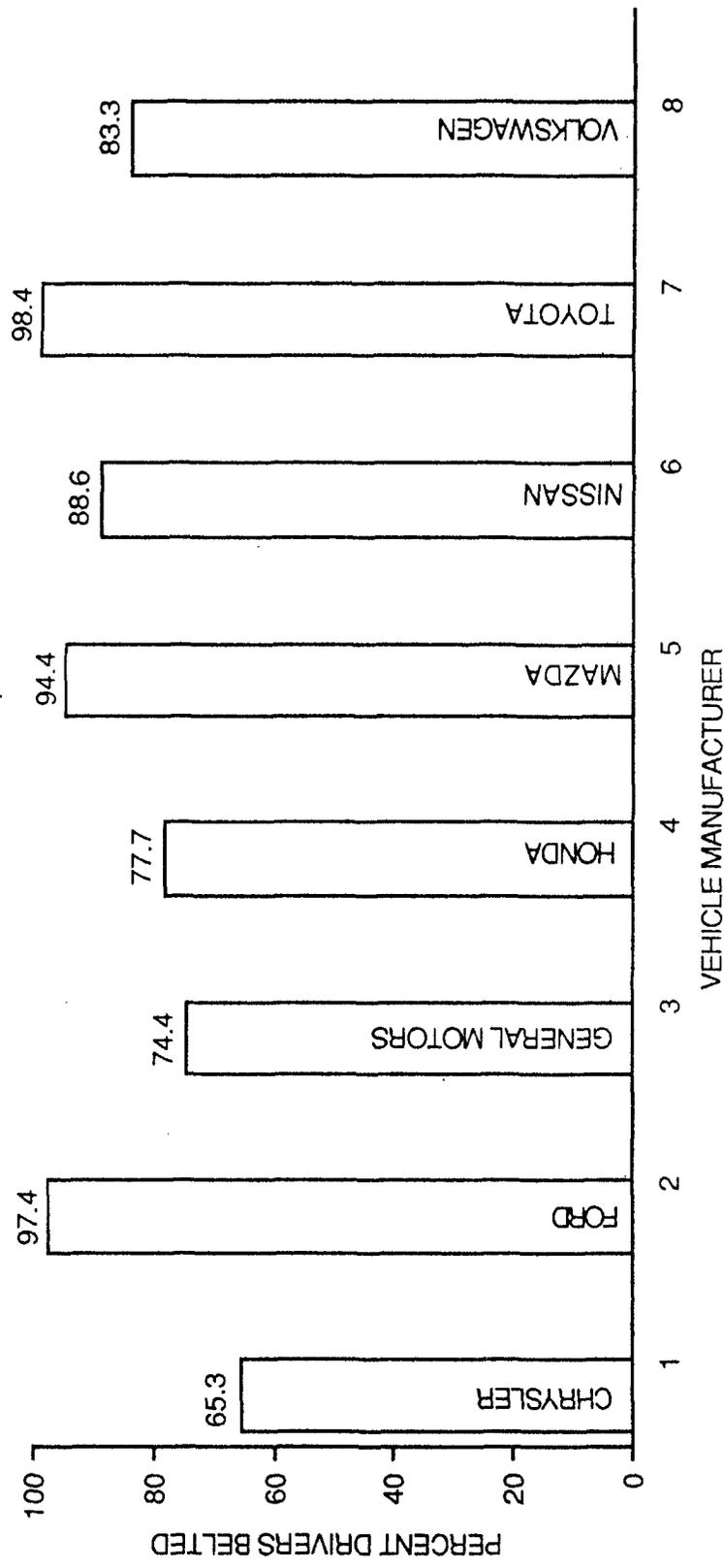


Figure 9. Driver seat belt use by vehicle manufacturer (Automatic Restraint System Study).

Table 24. Automatic safety belt system comparisons.

Vehicle Manufacturer	Base	Total Percent Belted
<u>Non-Motorized Three-Point Belt System Shoulder & Lap</u>		
AMC Alliance	3	66.7
Buick Total	1,993	73.8
Chevrolet Total	1,870	76.5
Oldmobile Total	2,220	75.6
Pontiac Total (Except LeMans)	3,336	75.9
Cadillac Brougham	2	0.0
Honda Prelude	435	75.2
Honda CRX	77	75.3
Nissan 300 ZX	5	100.0
Nissan Axxes	46	91.3
Total	9,987	74.7
<u>Non-Motorized Shoulder Belt System</u>		
Chrysler LeBaron	386	48.4
Dodge Daytona	141	44.0
Mitsubishi Precis	34	82.4
Subaru Justy	2	100.0
Toyota Corolla	18	72.2
Daihatsu CLS	4	100.0
Volkswagen Total	1,014	83.3
Pougeot	16	100.0
Yugo	7	57.1
Total	1,622	71.6

Table 24. Automatic safety belt system comparisons (continued).

Vehicle Manufacturer	Base	Total Percent Belted
<u>Motorized Shoulder Belt With Belt Disconnect</u>		
Eagle Medallion	9	100.0
Eagle Premier	77	84.4
Eagle Summit	42	83.3
Eagle Talon	1	0.0
Chrysler Conquest	8	75.0
Dodge Shadow	152	79.6
Dodge Colt	142	88.7
Plymouth Total	164	73.2
Alfa Romeo Spider	3	100.0
Acura Integra	52	94.2
Nissan Maxima	1,142	89.2
Jaguar Total	35	100.0
Mazda Total	497	94.4
Mitsubishi Eclipse	26	84.6
Mitsubishi Mirage	63	96.8
Mitsubishi Starion	7	100.0
Saab 900	40	97.5
Sterling Total	13	92.3
Subaru XT	45	77.8
Subaru GL	37	91.9
Subaru Legacy	13	84.6
Daihatsu Hatchback	1	100.0
Total	2,569	88.7

Table 24. Automatic safety belt system comparisons (continued).

Vehicle Manufacturer	Base	Total Percent Belted
<u>Motorized Shoulder Belt Without Belt Disconnect</u>		
Ford Total	5,240	97.6
Mercury Total	631	96.4
Isuzu Total	22	95.4
Toyota Cressida	1,063	97.8
Toyota Camry	3,232	98.8
Total	10,188	97.9
<u>Unknown Vehicles or Systems that have Changed Belting System</u>		
Chrysler Unknown	1	100.0
Dodge Unknown	1	100.0
Dodge Monaco	2	50.0
Pontiac Unknown	15	66.7
Pontiac LeMans	31	83.9
Nissan Unknown	10	70.0
Nissan 240 SX	128	55.2
Nissan Sentra	8	50.0
Honda Unknown	3	66.7
Honda Accord	907	78.4
Honda Civic	97	84.5
Subaru Unknown	27	88.9
Toyota Unknown	8	87.5
Hyundai Total	957	70.6
Mitsubishi Unknown	35	90.3
Other Unknown	14	42.8
Total	2,244	75.7
Total All Automatic Vehicles	26,610	84.8

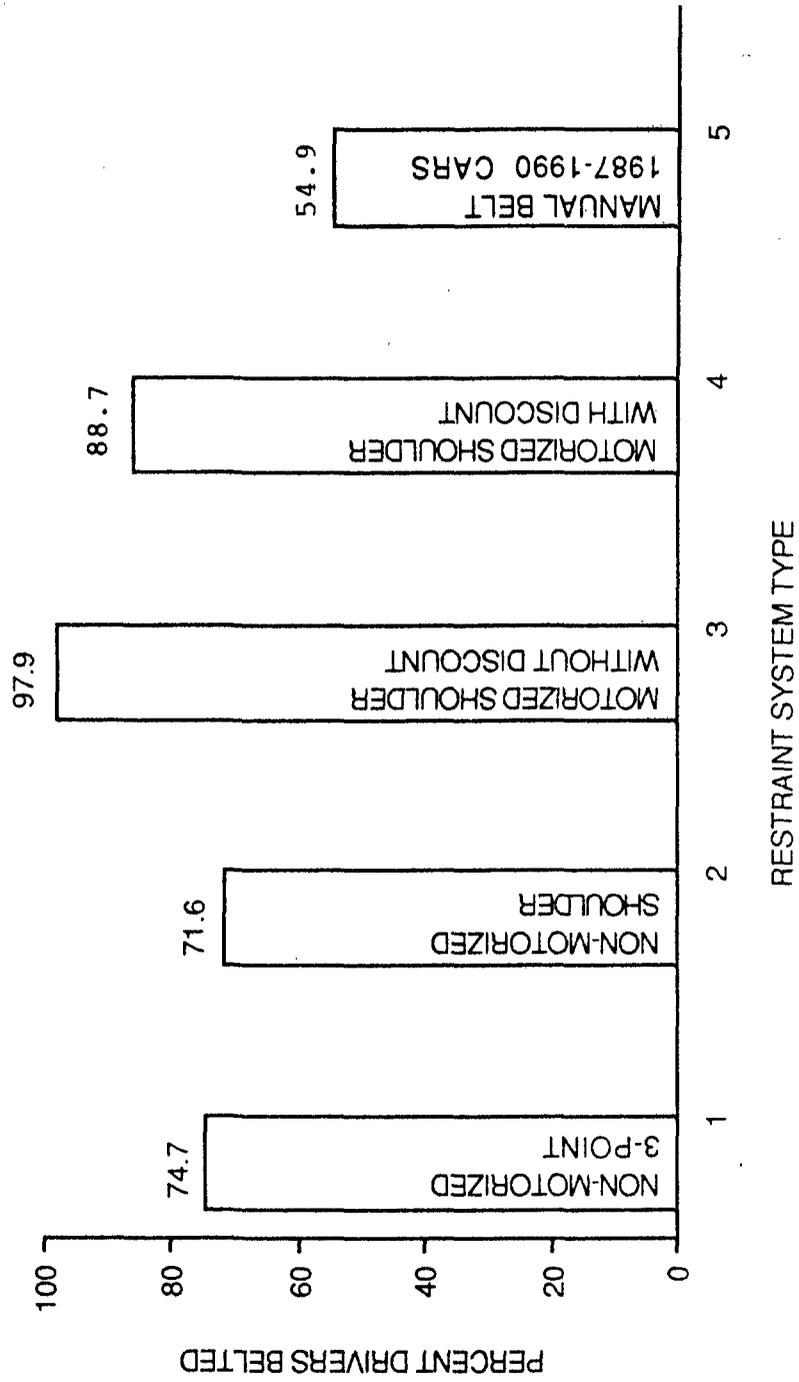


Figure 10. Comparison of automatic restraint types and manual belt systems (Automatic Restraint System Study).

Table 25. Driver shoulder belt use by restraint type (Vindicator).

Restraint Type	Base	Percent of Shoulder Belt Usage
Manual	21,102	52.8
Automatic	2,086	78.1
Air Bag - Driver Only	276	58.0
Air Bag - Driver & Passenger	13	53.8
No Information	8,646	35.2
Total	32,123	49.8

APPENDIX A - DATA FORMS AND PROCEDURES

Driver Study Data Form

Printed data forms entitled "Study 1 - All Safety Belt Systems" will be used in the all passenger vehicle restraint study to identify shoulder belt use for drivers and front-outboard passengers (Figure 11). 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 study period for that city.

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 11/15/89 for November 15, 1989.
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.

STUDY 3 - ALL SAFETY BELT SYSTEMS

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 Condition: Dry Wet Snowy/Icy
 10. Start Time: _____ AM PM 11. End Time: _____ AM PM

No.	License Number	√ Auto. Belt	Make Non-Auto. Model Automatic	Make/ Model Code	Driver Data			Driver & Passenger Position by Age Group*			Passenger Data	
					Sex 1. M 2. F	Shoulder Belt Use 1. On 2. Off	Misuse 1. Under Arm 2. Behind Back 3. Loose	Driver	Center	Outboard	Sex 1. M 2. F	Shoulder Belt Use 1. On 2. Off
1.												
2.												
3.												
4.												
5.												
6.												
7.												
8.												
9.												
10.												
11.												
12.												
13.												
14.												
15.												
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 11. 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.

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. Automatic Belt System: Place a check mark in the column if the automobile identified make use of an automatic shoulder belting system.

3. 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.

4. Make/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. If you placed a check mark in column two identifying an automobile with an automatic restraint system, place the appropriate model code for that make and place in next to the 2-digit make/model code.

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

6. Driver Shoulder Belt Use: There are two restraint codes. Place a "1" in the column if the driver is observed using the shoulder harness (correctly or incorrectly). Place a "2" in the column if the shoulder harness is not in use.

7. 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.

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

Examples:

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

5	////	6	(Front)
////	////	////	(Back)

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 Shoulder Belt Usage: There are two front-outboard passenger restraint codes. Place a "1" in the column for passengers wearing a shoulder belt, and a "2" in the column if the front-outboard passengers are not wearing a shoulder belt.

Passenger Study Data Form (Study 1)

Printed data forms entitled "Passenger Observations: Shopping Centers" will be used in this study (Figure 12). 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 6 and 7. For item 6, write in the name of the shopping center shown on your list of locations. For item 7, 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 OBSERVATIONS - SHOPPING CENTERS

1. Observer: _____ 2. City: _____
 3. Day: Su M Tu W Th F Sa 4. Date: ____ / ____ / ____
 5. Location No.: _____ 6. Shopping Center: _____
 7. Exit To: _____
 8. Start Time: _____ AM/PM 9. End Time: _____ AM/PM

No.	Total Passengers	Age Group	Seat	Position	Restraint Use	Correct Child Seat Use
			1. Front 2. Back 3. Rear	1. Driver Side 2. Center 3. Outboard	1. Shoulder Belt 2. Lap Only 3. Infant/Toddler Seat 4. Booster Seat 5. None 6. None - Unused Child Seat 7. Or Lap	1. Correct 2. Incorrect 3. Infant Wrong Direction
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
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 12. 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.

Shoulder Belt (Code 1)

This means that a positive observation has been made 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 5 if the passenger is not belted. You will never use Code 1 if the car contains only a lap belt.

Infant/Toddler 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.

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).

Booster Seats (Code 4)

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.

None (Code 5)

If the passenger is not wearing either the lap belt, shoulder harness or not placed in a safety seat, record Code 5.

None/Unused Child Seat (Code 6)

If an infant or toddler is observed not using a child safety seat and one or more child seats are present in the vehicle, then for each child that could be occupying a safety seat, record Code 6.

Child on Lap (Code 7)

If an infant, toddler or subteen is observed being held in the arms of another passenger use a code 7 signifying child on lap. Do not use a code 7 for the adult holding the child, instead use code 1, 2 or 5 depending on the adults restraint usage.

6. Correct Child 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 indicates that an infant or child is being transported in a NHTSA approved infant-only (Code 3) or booster (Code 4) safety seat.

Infant-Only Seat

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

Correct (Code 1)

Use this code if the infant or toddler is restrained correctly in the child safety seat.

Incorrect (Code 2)

If the infant or toddler is not restrained properly in a child safety seat, use Code 2.

Infant Wrong Direction (Code 3)

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

Special Study Data Form (Study 1)

Printed data forms entitled "Special Toddler Seat Study - Toddler Seat Only" will be used in study 1 (Figure 13). 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.

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 7, "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 toddler safety seat observed. If a vehicle has two child safety seats in it, two lines of data will be coded for the observation.

1. Frame Type: Write in the proper code identifying the toddler seat frame type.

Molded Plastic (Code 1):

Use this code if the toddler seat and seat base is totally made out of molded plastic.

Metal Type (Code 2):

Use this code if any part of the seat or base incorporates the use of metal tubing.

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

SPECIAL TODDLER SEAT STUDY

(Toddler Seat Only)

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 Condition: Dry Wet Snowy/Icy
 9. Start Time: _____ AM PM 10. End Time: _____ AM PM

No.	Frame Type	Belting Attached to Seat	Tether (If Required)	Make Note Comments
	1. Metal 2. Plastic 3. Metal Tube	1. Correct 2. Incorrect 3. No	1. Used 2. Not Used	
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
20.				

Figure 13. Child safety seat study data form.

Correct (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.

Incorrect (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 use of the vehicle belt system. The most common misuse 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. This observation would receive a Code 3.

3. **Tether (If Required):** This column is for toddler seats that require the secure attaching of a tether strap.

Used (Code 1)

Write this code if the observed toddler seat is one that requires the use of a tether and that tether strap is being used.

Not Used (Code 2)

Write this code if the toddler seat is identified as requiring the use of a tether strap but that strap is not being used.

4. Make/Model: Write in the brand name make and model of the identified toddler seat. Model names can usually be read directly off of seat, if not, consult your child safety identification guide as to the correct seat being observed.

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.

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.			
14.			
15.			
16.			
17.			
18.			
19.			
20.			
21.			
22.			
23.			
24.			
25.			

Figure 14. Helmet study data form.

Automatic Safety Belt Data Form

Printed data forms entitled "Study 2 - Automatic Belts Only" will be used in the automatic passenger vehicle restraint study to identify safety belt use for drivers and front-outboard passengers (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 study period for that city.

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 11/15/89 for November 15, 1989.
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.

STUDY 2 - AUTOMATIC BELTS ONLY

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 Condition: Dry Wet Snowy/Icy
 10. Start Time: _____ AM PM 11. End Time: _____ AM PM

No.	Licence Number	Model	Make Code	Driver Data			Driver & Passenger Position by Age Group*			Passenger Data	
				Sex 1. M 2. F	Automatic Belt Use 1. Shor. & Lap 2. Shor. Only 3. None 4. Shld. (Nc See Lap) 5. None (Nc See Lap)	Misuse 1. Under arm 2. Behind back 3. Loose	Driver	Center	Outboard	Sex 1. M 2. F	Automatic Belt Use 1. Shor. & Lap 2. Shor. Only 3. None 4. Shor. (Nc See Lap) 5. None (Nc See Lap)
1.											
2.											
3.											
4.											
5.											
6.											
7.											
8.											
9.											
10.											
11.											
12.											
13.											
14.											
15.											
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. Automatic safety belt data form.

Observation Data

Complete one line on the form for each automatic restraint vehicle observed. In Study 2, start with the second car stopped for the traffic light. Obtain additional observations during the red light if time permits. If only one car stops at the light and its an automatic restraint vehicle, observe that car.

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. Model: We are interested in the specific model of the vehicle. 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 you will have to settle for the general car make (domestic or foreign). Where possible, we prefer a specific make category.

3. Make Code: At the end of the observation period or day, for each make name recorded, insert the appropriate two-digit make and model identification code in the space provided. You will be provided with a list of model names and codes to assist you in the coding task.

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

5. Driver Shoulder Belt Use: There are five restraint codes, as follows:

Shoulder and Lap (Code 1)

Place a "1" in the space provided if positive identification of the shoulder and lap belt are in use.

Shoulder Only (Code 2)

Place a "2" in the space provided if only the shoulder belt is being used and the lap belt is positively identified not being used.

None (Code 3)

Place a "3" in the space provided if the safety belt system is not being used.

Shoulder, No See Lap (Code 4)

Place a "4" in the space provided if the shoulder belt is being used but identification of lap belt use is not positive (for appropriate vehicles).

None, No See Lap (Code 5)

Place a "5" in the space provided if the shoulder belt is not being used but identification of lap belt use is not positive (for appropriate vehicles).

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.

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

Examples:

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

5	////	6	(Front)
////	////	////	(Back)

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)

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

9. Front-Outboard Passenger Shoulder Belt Usage: There are five restraint codes. These five codes are identical to the driver shoulder belt codes.