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16. Abstract Results of a direct observation study of safety belt use in Michigan conducted in May 1990 were compared with results of twelve previous surveys (December 1984; April, July, and December 1985; April, July, and December 1986; April, July, and November 1987; May 1988; and April 1989). In the current survey, 16,572 occupants in 11,705 cars and light trucks were observed between April 30 and May 24, 1990. Restraint use among all motorists observed increased from 44% in April 1989 to 49.6% in May 1990 (the estimates have a margin of error of $\pm 1.8\%$ ). By age group, use rates were as follows in May 1990 (all standard seating positions): 78.4% among occupants age 0-3; 39.3% among occupants age 4-15; 38.5% among occupants age 16-29; 52.5% among occupants age 30-59; and 59.2% among occupants age 60 and older. Females continued to exhibit higher restraint use than males, 55.1% versus 44.8% in the current survey. As in previous surveys, restraint use varied by region of the state. Information on two types of automatic belt systems was collected during this survey. Use of nonmotorized detachable three-point lap and shoulder belt systems was 74.3%. Lap belt use of motorized shoulder and manual lap belt systems was 79.2%. Finally, the trend in belt use among front-seat adult occupants throughout the series of surveys has been similar to that of overall restraint use. Safety belt use among front-seat occupants age 16 and over increased from 45.2% in April 1989 to 50.5% in May 1990 and remains significantly higher than it was before Michigan's mandatory use law took effect (18.3% in December 1984).					
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# CONTENTS

1 INTRODUCTION .....	1
2 METHODS .....	3
3 RESULTS .....	9
3.1 Overall Restraint Use .....	9
3.2 Adult Restraint Use .....	10
3.3 Restraint Use by Seat Location .....	10
3.4 Restraint Use by Seating Position .....	10
3.5 Restraint Use by Age .....	17
3.6 Restraint Use by Gender .....	21
3.7 Restraint Use by Type of Vehicle .....	21
3.8 Restraint Use by Type of Site .....	21
3.9 Restraint Use by Weather Conditions, Time of Day, and Day of Week .....	21
3.10 Restraint Use by Region .....	26
3.11 Occupants in Nonstandard Seating Positions .....	30
3.12 Incorrect Use of Safety Belts .....	31
3.13 Automatic Belt Use .....	32
4 DISCUSSION .....	33
5 REFERENCES .....	35
APPENDIX A .....	39
APPENDIX B .....	43



## LIST OF FIGURES

Figure 3.1 Overall Restraint Use . . . . .	9
Figure 3.2 Restraint Use by Seat Location: Occupants Age 16 and Over . . . . .	11
Figure 3.3 Restraint Use by Seating Position . . . . .	15
Figure 3.4 Restraint Use by Age . . . . .	18
Figure 3.5 Driver Restraint Use by Age . . . . .	20
Figure 3.6 Restraint Use by Vehicle Type . . . . .	23
Figure 3.7 Restraint Use by Region . . . . .	27
Figure 3.8 Percent of Belted Occupants with Incorrect Use . . . . .	31



## LIST OF TABLES

Table 2.1	Descriptive Statistics for the 240 Observation Sites . . . . .	5
Table 2.2	Sample Distributions for Major Variables by Seating Position . . . . .	6
Table 3.1	Percent Restrained by Major Variables and Seat Location . . . . .	12
Table 3.2	Restraint Use by Age and Seating Position . . . . .	14
Table 3.3	Percent Restraint Use by Gender, Type of Vehicle, Observation Site, and Weather Conditions . . . . .	22
Table 3.4	Percent Restraint Use by Time of Day and Day of Week . . . . .	25
Table 3.5	Percent Restraint Use by Michigan Department of Transportation Regions . .	26
Table 3.6	Number of Occupants in Nonstandard Seating Positions by Age . . . . .	30
Table 3.7	Automatic Belt Use by Type of Belt System and Seating Position . . . . .	32





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# 1 INTRODUCTION

Michigan's mandatory safety belt law, implemented in July of 1985, is one of 34 similar laws in the United States intended to reduce motor vehicle crash-related deaths and injuries (National Highway Traffic Safety Administration, 1990a). Belt use has typically increased sharply following implementation of such laws and then partially declined over time. Although the magnitude of these increases and subsequent declines has varied from state to state, post-law belt use levels have remained higher than pre-law levels.

To measure compliance with Michigan's mandatory safety belt law, The University of Michigan Transportation Research Institute is conducting a series of direct-observation surveys of safety belt use among motor vehicle occupants throughout the state. Two survey waves were conducted prior to implementation of the law (December 1984 and April 1985) and provide a base against which effects of the law are assessed. The third wave was conducted in July 1985 immediately following implementation of the law. The fourth through eleventh waves were conducted at roughly four to six-month intervals from 1986 to 1988 (December 1985; April, July, and December 1986; April, July, and November 1987; and May 1988). The twelfth wave was conducted in April 1989. The thirteenth survey wave reported here was conducted from April 30 to May 24, 1990, fifty-eight months after the Michigan law first took effect. Each of the surveys examined restraint use by age, sex, seating position, time of day, day of week, type of roadway, weather conditions, vehicle type and size, and region of the state. Readers are referred to earlier reports for complete results of the previous surveys (see Section 5 for full citations). In the current report, restraint use in May 1990 is compared with the results of previous survey waves.

Because compliance with Michigan's mandatory belt law may be affected by the increasing presence of automatic restraint systems in passenger cars, we examined use of automatic belt systems in this survey wave. U.S. federal requirements stipulate that automobile manufacturers install automatic restraints (airbags or automatic safety belts) in new cars beginning with 10 percent in 1987 model years, 25 percent in 1988, 40 percent in 1989, and 100 percent in 1990 model year cars. Few observational studies of automatic belt use have been conducted but findings indicate that use rates of automatic belt systems are considerably higher than manual systems, although rates vary across types of automatic belt systems. Williams,

Wells, Lund, and Teed (1989) observed use of automatic belt systems supplied by Ford and Toyota (motorized, nondetachable automatic shoulder belt), Nissan (motorized, detachable shoulder belt), Volkswagen and Chrysler (nonmotorized, detachable shoulder belt), and General Motors (nonmotorized, detachable lap and shoulder belt). The authors found use of automatic belts to be higher than manual belts in otherwise comparable late-model cars for all manufacturers except Chrysler. Automatic shoulder belts in Ford, Toyota, Nissan, and Volkswagen cars increased belt use rates to around 90%. Lap belt use was highest in General Motors cars. For other manufacturers, manual lap belt use was about half that of automatic shoulder belt use. However, these other automatic belt systems also provided knee bolsters to supplement shoulder belt protection.

Bowman and Rounds (1989) observed belt use in 19 U.S. cities in 1988 and found overall automatic belt use of drivers to be 88%. Use was highest for motorized shoulder belt systems that could not be disconnected (98%). Automatic belt use was lowest for combination lap and shoulder belt systems with disconnect mechanisms (77%). While the authors presented use rates by manufacturer, they cautioned that in many cases the numbers of observations were too small for reliable estimates. Follow-up observations of belt use in the same 19 U.S. cities in 1989 indicated that automatic belt use of drivers had declined from 88% in 1988 to 85% (National Highway Traffic Safety Administration, 1990b). Observed driver belt use in 1989 was 96% for motorized shoulder belt systems (98% for those without disconnects and 89% for those with disconnects), 75% for nonmotorized three point systems, and 71% for nonmotorized shoulder belt systems. Comparable figures for 1988 were 97% for motorized shoulder belt systems (98% for those without disconnects and 92% for those with disconnects), 77% for nonmotorized three point systems, and 80% for nonmotorized shoulder belt systems.

In the current survey, we measured use of the two most common types of automatic belt systems: the nonmotorized detachable three-point lap and shoulder belt system and the motorized shoulder belt and manual lap belt system. We also examined overall restraint use (of both automatic and manual belt systems) by several variables and compared use rates in May 1990 with those in previous surveys.

## 2 METHODS

To ensure comparability across all survey waves in this series, essentially the same methods were used in each wave. A few minor differences in the current wave are noted in this section. For a detailed discussion of the sample design, data collection procedures, and analytic procedures used throughout the series of surveys, see the first report of this series (Wagenaar and Wiviott, 1985a).

As in previous survey waves, motor vehicle occupants at a carefully selected probability sample of 240 intersections throughout the State of Michigan were observed by trained field observers. Observers recorded restraint use, seating position, estimated age, and sex for occupants in each sampled vehicle. The size and type of vehicle were also recorded.

Detailed information on the seating positions of all occupants was recorded, including those in nonstandard seating positions. Specifically, observers noted whether passengers were sitting, standing, kneeling, or lying on the seat, floor, or cargo area of the vehicle. Passengers sitting on the lap of another occupant were also recorded. We collected data on the full complement of restraint use and related information for all occupants of vehicles in the sample except occupants in nonstandard seating positions (i.e., extra seats, cargo area, sitting on lap, and standing on floor). So few occupants in nonstandard seating positions are observed in each wave that restraint use estimates have limited usefulness. Therefore, we did not collect data on gender and restraint use of occupants in nonstandard seating positions during the current wave. Minor changes were made to the data collection form to simplify the recording of occupants in nonstandard seating positions.

Beginning in July 1985, observers were instructed to record incorrect use of safety belts. Examples of incorrect belt use include: positioning the shoulder harness under the outboard arm, behind the back, or over the inside shoulder; and restraining two occupants with one safety belt. The category of incorrect belt use did not include occupants (typically in the 4-15 age group) who were too short to wear a shoulder belt in the correct position across the chest. Often such occupants placed the belt behind the back. These occupants were coded as correctly belted.<sup>1</sup>

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<sup>1</sup>Some of these cases were difficult to determine, in the sense that many occupant protection researchers argue that school-age children should be restrained by a shoulder belt along with the lap belt.

Occupants incorrectly using safety belts were coded as "belted" and, therefore, appear in the tables and figures below as restrained.

Observers limited the number of vehicles recorded during any given traffic signal cycle to three. This procedure was adopted during the July 1985 wave. After the mandatory use law took effect, occupants in long traffic queues buckled up after noticing the observer examined vehicles ahead of them in the queue. Recording data on only the first three vehicles prevented inclusion of these occupants in the survey.

Data on automatic belt use were collected for the first time during the current survey wave. Because automatic restraint systems have been mandated only recently, we expected only a small portion of all vehicles observed to have automatic belt systems. We therefore focused observation of automatic belt use on general types of systems rather than specific automobile manufacturers supplying the systems. Observers were trained to recognize and record information for the two most common types of automatic belt systems: the nonmotorized detachable three-point lap and shoulder belt system, and the motorized shoulder belt and manual lap belt. Minor changes were made to the data collection form to include information on automatic belt use. For the nonmotorized detachable three-point lap and shoulder belt system, observers recorded in pre-coded categories whether the automatic system was attached or not attached. For the motorized shoulder belt and manual lap belt, observers recorded in pre-coded categories whether the lap belt was attached or not attached. If the motorized shoulder belt was disconnected, observers recorded this information in the comments section of the observation form. At the data analysis stage of the study, occupants observed with a motorized shoulder belt system in which the lap belt was not attached were considered unbelted (for calculating overall restraint use rates) even if the motorized shoulder belt was being used. This was done because we consider the lap belt to be an important part of the overall system even though knee bolsters are also provided. Because relatively few motorized shoulder belt with manual lap belt systems were observed compared to all restraint systems, designating these cases as unbelted had only an insignificant effect on overall use rates.

The sample of 240 sites was identical to previous survey waves except that three alternative sites were selected (from the pool of sites selected in the original sample design) to replace sites at which construction was occurring or at which a yellow flashing rather than

cycling traffic signal was in operation. Within each sampling area, the first site observed for each day and city was selected using a random number table, with the remaining sites observed in an order determined by proximity, to minimize amount of travel required between sites. All field personnel were spot checked in the field by the field supervisor. Field personnel attended extensive training sessions in which data collection policies and procedures were reviewed and practice field observations were conducted (the training program was described in greater detail in the first report of this series; Wagenaar and Wiviott, 1985a). Observers also visited several automobile dealerships to learn to recognize automatic belt systems.

Descriptive statistics for the 240 observation sites are shown in Table 2.1. The distribution of site observations by day of week and time of day was similar to previous survey waves conducted during the same season of the year. Actual numbers of cases observed across categories of the major variables are shown in Table 2.2 as well as the extent of missing data for each variable. As in previous surveys, cases of missing data did not constitute a problem. The key restraint item was missing for 0.1% of all occupants observed. These were cases in which the observer could not accurately identify whether the occupant was restrained (see Table 2.2). N's contained in Table 2.2 may differ from subsequent tables because of varying rates of missing data.

**Table 2.1 Descriptive Statistics for the 240 Observation Sites**

Day of Week		Start Time		Site Choice	Weather		Observer
Monday	13.8%	7-9 AM	10.9%	Primary 98.8%	Sunny	46.7%	(A) 34.2%
Tuesday	14.6%	9-11 AM	20.0%	Alternate 1.3%	Cloudy	41.3%	(B) 35.0%
Wednesday	14.2%	11-1 PM	20.9%		Rain	12.1%	(C) 25.8%
Thursday	14.6%	1-3 PM	19.6%		Snow	0.0%	(D) 5.0%
Friday	16.7%	3-5 PM	20.1%				
Saturday	13.8%	5-7 PM	8.7%				
Sunday	12.5%						
<b>TOTALS</b>	<b>100%</b>		<b>100%</b>	<b>100%</b>		<b>100%</b>	<b>100%</b>

Table 2.2 Sample Distributions for Major Variables by Seating Position

	Seating Position									
	Driver	Front Center	Front Right	Rear Left	Rear Center	Rear Right	Extra Seats	Cargo Area	Held in Lap	All <sup>1</sup>
<b>Restraint Use</b>										
None	5,616	113	1,864	241	131	261	NA <sup>2</sup>	NA	NA	8,226
Belted	6,087	8	1,711	96	36	87	NA	NA	NA	8,025
CRD Correct	--	10	42	60	31	31	NA	NA	NA	174
CRD Wrong	--	2	7	11	4	7	NA	NA	NA	31
Missing	2	1	6	3	3	7	--	--	--	22
% Missing	0.0	0.7	0.2	0.7	1.5	1.8	--	--	--	0.1
<b>Gender</b>										
Male	7,011	68	1,178	208	100	172	NA	NA	NA	8,737
Female	4,689	63	2,449	200	104	215	NA	NA	NA	7,720
Missing	5	3	3	3	1	6	--	--	--	21
% Missing	0.0	2.2	0.1	0.7	0.5	1.5	--	--	--	0.1
<b>Age</b>										
0-3	--	34	65	74	43	38	1	0	32	287
4-15	4	61	496	221	125	206	8	20	8	1,167
16-29	2,723	26	943	50	26	77	0	4	0	3,849
30-59	7,288	10	1,490	37	9	39	0	1	0	8,874
60+	1,680	0	632	28	1	30	0	0	0	2,371
Missing	10	3	4	1	1	3	0	1	0	24
% Missing	0.1	2.2	0.1	0.2	0.5	0.8	5.3	3.8	0.0	0.1
<b>Vehicle Type</b>										
Small Car	2,650	6	733	92	39	75	0	2	5	3,604
Midsize Car	4,075	27	1,343	184	84	184	3	10	19	5,932
Large Car	2,285	24	763	97	57	95	2	0	9	3,333
Pickup	1,268	57	335	2	2	4	5	10	3	1,687
Van	802	7	265	27	17	27	8	4	1	1,159
Other	614	13	186	7	6	6	1	0	3	837
Missing	11	0	5	2	0	2	0	0	0	20
% Missing	0.1	0.0	0.1	0.5	0.0	0.5	0.0	0.0	0.0	0.1
<b>Site Type</b>										
Intersection	9,395	109	2,947	337	160	319	18	23	36	13,350
Freeway Exit	2,310	25	683	74	45	74	1	3	4	3,222
<b>Day of Week</b>										
Monday	1,503	6	333	33	11	35	0	1	6	1,928
Tuesday	1,732	13	472	40	23	41	0	10	4	2,335
Wednesday	1,707	23	431	47	17	42	1	3	10	2,282
Thursday	1,715	16	510	44	21	33	3	6	7	2,358
Friday	1,992	20	518	60	40	61	1	0	5	2,699
Saturday	1,618	26	654	85	41	72	2	1	3	2,503
Sunday	1,438	30	712	102	52	109	12	5	5	2,467



Table 2.2 Sample Distributions for Major Variables by Seating Position

	Seating Position									
	Driver	Front Center	Front Right	Rear Left	Rear Center	Rear Right	Extra Seats	Cargo Area	Held in Lap	All <sup>1</sup>
<b><u>Time of Day</u></b>										
7-8 AM	325	3	65	6	4	5	1	2	1	412
8-9 AM	693	8	155	13	13	17	0	1	1	901
9-10 AM	968	7	214	14	11	17	0	0	1	1,232
10-11 AM	1,266	11	331	26	16	24	2	1	5	1,683
11-12 PM	1,377	11	409	44	18	36	2	4	4	1,906
12-1 PM	1,029	12	340	37	23	27	0	3	3	1,474
1-2 PM	1,114	15	369	39	11	38	1	1	3	1,591
2-3 PM	1,296	13	449	48	25	48	1	0	10	1,891
3-4 PM	1,346	23	487	61	41	76	4	5	8	2,054
4-5 PM	1,084	18	397	57	24	54	4	2	2	1,643
5-6 PM	1,109	13	375	58	18	43	1	7	2	1,628
6-7 PM	98	0	39	8	1	8	3	0	0	157
<b><u>Weather</u></b>										
Sunny	5,439	63	1,764	218	123	238	12	14	17	7,891
Cloudy	4,862	52	1,363	130	58	107	6	9	18	6,610
Rain	1,404	19	503	63	24	48	1	3	5	2,071
<b><u>MDOT Region</u></b>										
Western U.P.	537	5	127	6	3	10	0	4	4	697
Eastern U.P.	318	0	75	4	0	1	0	0	0	398
Northwest	570	3	153	9	6	14	4	0	0	759
Northeast	411	1	119	10	7	7	0	0	0	555
West Central	1,385	14	469	39	21	36	5	0	3	1,972
East Central	1,434	23	417	51	20	29	1	3	8	1,987
Southwest	1,354	34	532	84	41	91	5	2	8	2,153
Southeast	1,210	13	435	52	30	42	0	3	0	1,786
Metro Detroit	4,486	41	1,303	156	77	163	4	14	17	6,265
<b>TOTAL N</b>	<b>11,705</b>	<b>134</b>	<b>3,630</b>	<b>411</b>	<b>205</b>	<b>393</b>	<b>19</b>	<b>26</b>	<b>40</b>	<b>16,572</b>

<sup>1</sup>Includes 9 occupants standing<sup>2</sup>NA = Data not available

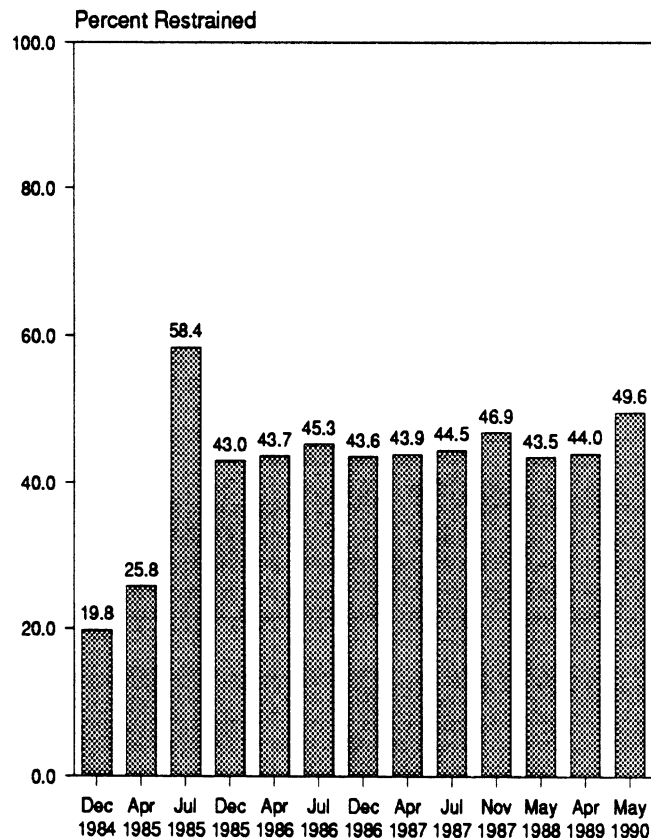


## 3 RESULTS

### 3.1 Overall Restraint Use

A total of 49.6% of all motor vehicle occupants observed during May 1990 were restrained with safety belts or child restraint devices, compared to 44.0% in April 1989 (Figure 3.1). This statistically significant increase from the previous survey represents the first change in restraint use since December 1985 ( $Z=3.37$ ).<sup>2,3</sup> In December 1985, five months after the mandatory safety belt law took effect, overall restraint use had declined to 43.0% from 58.4% in July 1985, immediately after the law took effect. It remained at that level until the current survey. While restraint use in May 1990 is below the 58.4% peak rate observed in July 1985, it is higher than it has been since the July 1985 survey.

**Figure 3.1 Overall Restraint Use**



<sup>2</sup>These numbers include both correct and incorrect use of safety belts and child restraint devices.

<sup>3</sup>Calculation of Z-statistics takes into account the design effect resulting from the multi-stage sampling procedure used. Z-scores greater than 1.96 are statistically significant,  $p < .05$  two tailed test. The design effect of the May 1990 wave was 5.3.

### **3.2 Adult Restraint Use**

Effects of the adult mandatory safety belt law on restraint use can be seen most clearly by including only motor vehicle occupants 16 years and older in the analyses. Young children have particularly high rates of restraint use as a result of mandatory child restraint legislation implemented in 1982 and exert an upward influence on overall use rates (Wagenaar, 1984; Wagenaar and Webster, 1986). In the current survey, restraint use for adults (16 and over) was 50.5% among front-seat occupants and 20.5% among rear-seat occupants (Figure 3.2). Although both rates appear higher than those observed in April 1989, only the change among front-seat adult occupants was statistically significant ( $Z=2.99$  for front-seat adult occupants and  $Z=1.76$  for rear-seat adult occupants). The trend in belt use among front-seat adult occupants throughout the series of surveys has been similar to that of overall restraint use. Immediately after implementation of the law, belt use among front-seat adult occupants increased sharply to 60.5%. Belt use declined in December 1985 to 44% and remained stable until the current wave.

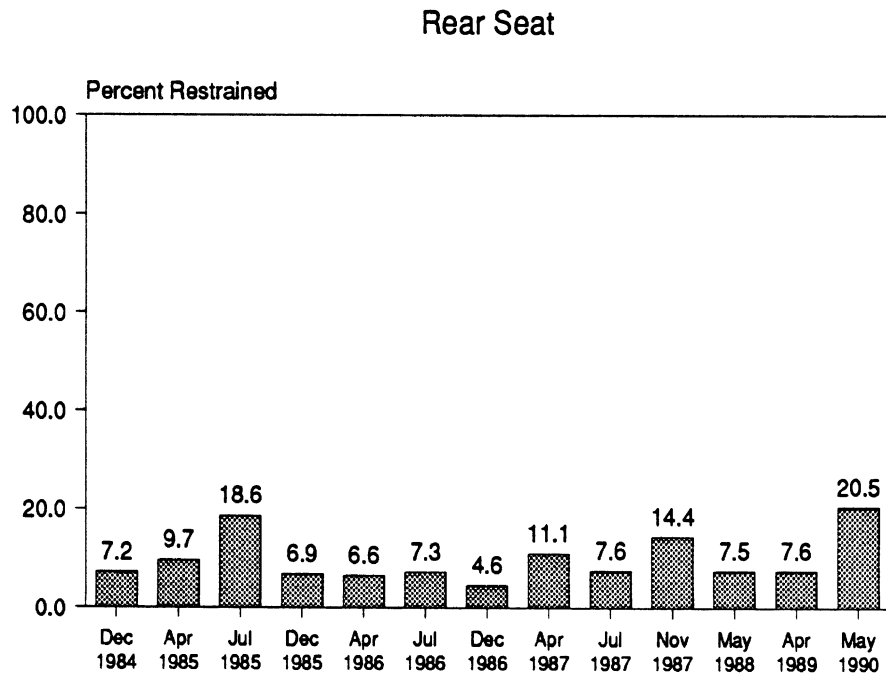
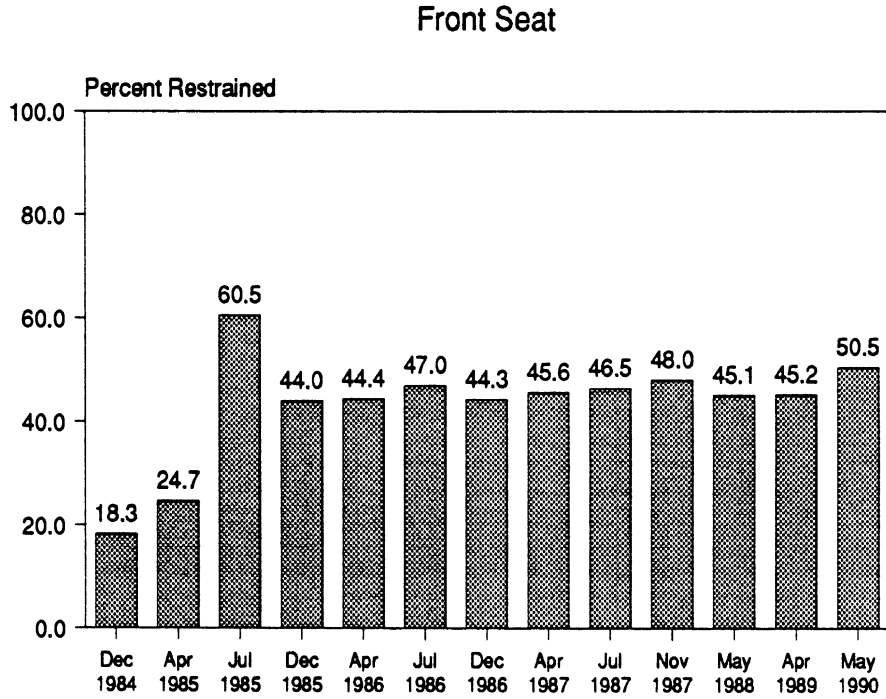
### **3.3 Restraint Use by Seat Location**

Table 3.1 provides summary information on restraint use by seat location (front and rear) for each major variable, including gender, age, type of vehicle, site type, day of week, time of day, weather, and region. In the current survey, restraint use continued to be higher among front-seat occupants than rear-seat occupants (50.6% versus 35.6%).

### **3.4 Restraint Use by Seating Position**

As in previous surveys, restraint use in the current survey was higher among drivers than occupants of other seating positions (Table 3.2). Only drivers exhibited a statistically significant increase in restraint use from April 1989 (Figure 3.3). Apparent changes in restraint use among occupants of other seating positions did not achieve statistical significance ( $Z$ -statistics were as follows: 2.51 for drivers, 1.33 for front-center, 1.65 for front-right, 0.70 for rear left, 0.50 for rear-center, and 0.32 for rear-right). Drivers and front-right passengers continued to be the only groups with restraint use rates notably higher than pre-law levels. No long-term change in rear seat use might be expected, given that the law applies only to front-seat occupants.

**Figure 3.2 Restraint Use by Seat Location: Occupants Age 16 and Over**



**Table 3.1 Percent Restrained by Major Variables and Seat Location<sup>1</sup>**

	Seat Location		
	Front Seat	Rear Seat	All <sup>2</sup>
<u>Gender</u>			
Male	45.1	38.9	44.8
Female	56.8	31.6	55.1
<u>Age</u>			
0-3	60.2	89.7	78.4
4-15	49.9	28.6	39.3
16-29	39.6	13.5	38.5
30-59	52.8	25.9	52.5
60+	60.0	31.8	59.2
<u>Type of Vehicle</u>			
Small car	51.3	34.6	50.3
Mid-sized car	57.0	37.8	55.5
Large car	46.2	32.1	45.1
Pickup truck	34.3	29.7	34.2
Van	50.7	30.8	49.6
Other	51.6	50.3	51.6
<u>Site Type</u>			
Intersection	49.0	37.1	48.3
Freeway exit	56.3	29.7	54.7
<u>Day of Week</u>			
Monday	51.5	36.0	50.8
Tuesday	52.9	50.1	52.7
Wednesday	46.2	29.0	45.4
Thursday	46.2	31.8	45.6
Friday	49.2	37.7	48.5
Saturday	51.6	35.4	50.3
Sunday	56.7	33.1	54.1

**Table 3.1 Percent Restrained by Major Variables and Seat Location<sup>1</sup>**

	Seat Location		
	Front Seat	Rear Seat	All <sup>2</sup>
<u>Time of Day</u>			
7-8 AM	51.2	31.9	50.5
8-9 AM	47.5	38.2	47.0
9-10 AM	48.5	35.4	48.0
10-11 AM	49.5	42.8	49.2
11-12 PM	52.5	45.3	52.1
12-1 PM	52.2	41.1	51.5
1-2 PM	48.4	32.8	47.6
2-3 PM	45.8	32.8	45.0
3-4 PM	53.0	30.1	51.0
4-5 PM	51.6	28.3	49.5
5-6 PM	54.4	39.6	53.3
6-7 PM	60.7	48.5	59.4
<u>Weather</u>			
Sunny	51.9	36.3	50.7
Cloudy	50.4	34.6	49.6
Rain	46.4	34.6	45.6
<u>MDOT Region</u>			
Western U.P.	53.6	53.1	53.6
Eastern U.P.	43.1	92.0	44.2
Northwest	50.9	57.6	51.2
Northeast	55.2	58.6	55.3
West Central	51.2	58.6	51.5
East Central	49.8	38.4	49.2
Southwest	59.6	23.8	55.9
Southeast	53.1	48.5	52.8
Metro Detroit	47.2	29.6	46.1
<b>TOTAL</b>	<b>50.6</b>	<b>35.6</b>	<b>49.6</b>

<sup>1</sup>All percents are based on analyses weighed according to the sample design to accurately represent the entire state. Restraint use includes correct and incorrect use of child restraint devices and seat belts.

<sup>2</sup>Excludes occupants riding in extra seats and in nonstandard seat positions (i.e., on laps, in cargo area, on floor).

Table 3.2 Restraint Use by Age and Seating Position<sup>1</sup>

Age Group	Seating Position						
	Driver	Front Center	Front Right	Rear Left	Rear Center	Rear Right	All <sup>2</sup>
<u>Age 0-3</u>							
% Belted	--	3.1	6.5	2.6	13.5	2.5	5.5
% Correct CRD	--	19.5	60.6	74.4	60.1	71.0	60.5
% Incorrect CRD	--	6.5	9.9	17.6	5.7	19.1	12.3
% Restrained <sup>3</sup>	--	29.1	77.0	94.5	79.3	92.6	78.4
Unweighted N	0	34	65	73	43	38	253
<u>Age 4-15</u>							
% Restrained	74.3	15.7	54.0	30.7	23.7	29.3	39.3
Unweighted N	4	61	495	220	122	202	1,104
<u>Age 16-29</u>							
% Restrained	41.2	0.0	36.1	20.2	7.1	11.5	38.5
Unweighted N	2,723	26	939	49	26	76	3,839
<u>Age 30-59</u>							
% Restrained	53.8	9.3	48.2	23.7	36.2	25.9	52.5
Unweighted N	7,286	10	1,489	37	9	38	8,869
<u>Age 60+</u>							
% Restrained	60.1	--	59.6	34.1	100.0	27.1	59.2
Unweighted N	1,680	0	632	28	1	29	2,370
<u>All Ages</u>							
% Restrained	51.7	15.3	48.2	40.3	34.6	31.2	49.6
Unweighted N	11,703	133	3,624	408	202	386	16,456

<sup>1</sup>All percents are based on analyses weighted according to the sample design to accurately represent the entire state. Unweighted Ns indicate the actual number of occupants observed in a given group.

<sup>2</sup>Restraint use for all positions excludes extra seats, cargo areas, passengers held in laps, and passengers standing.

<sup>3</sup>Percent restrained includes correct and incorrect CRD use.



**Figure 3.3 Restraint Use by Seating Position**

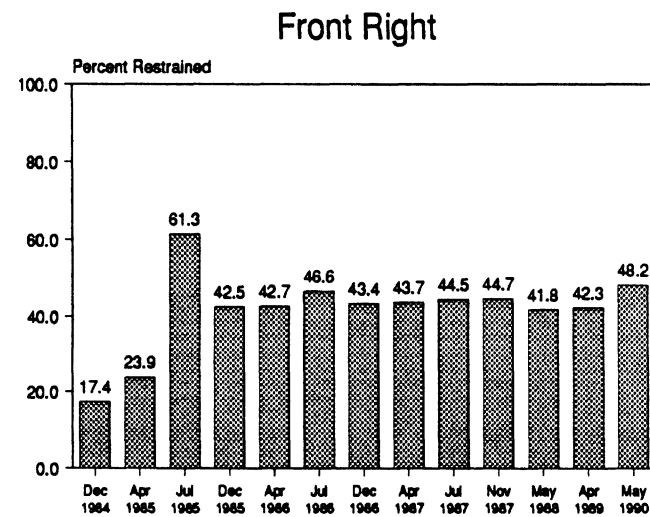
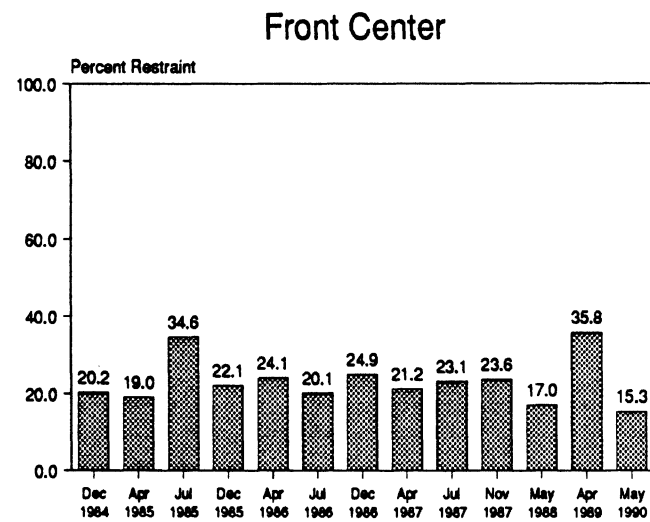
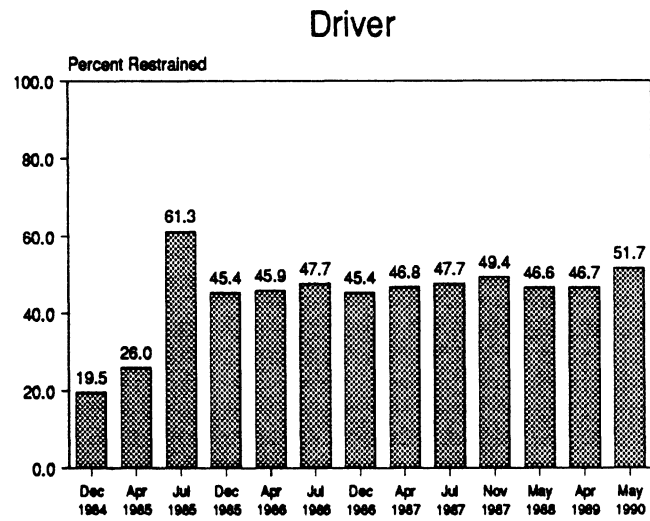
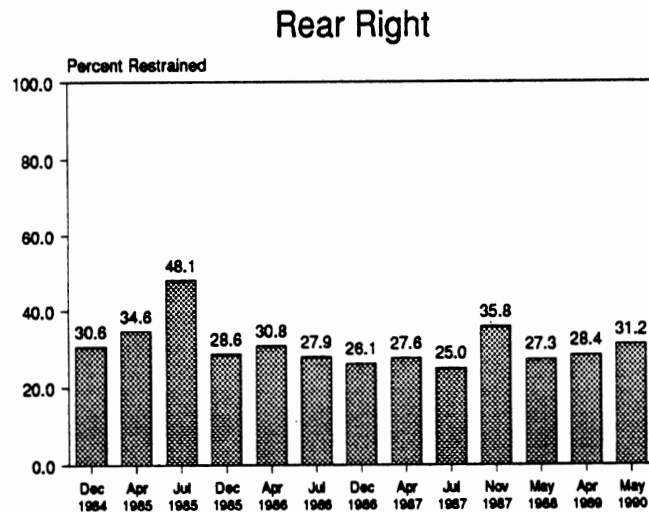
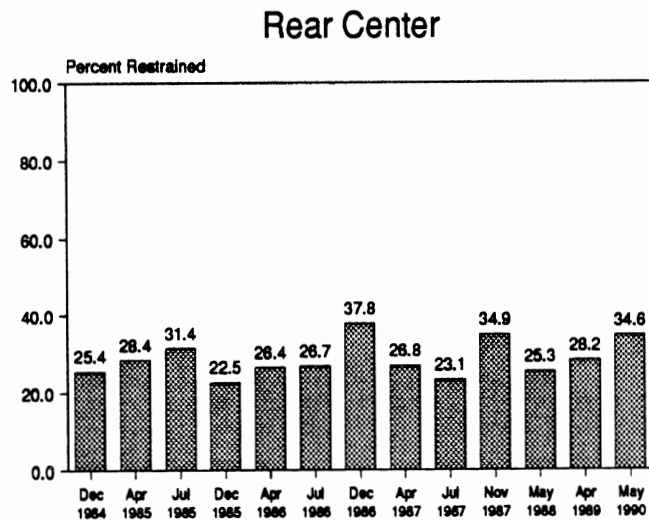
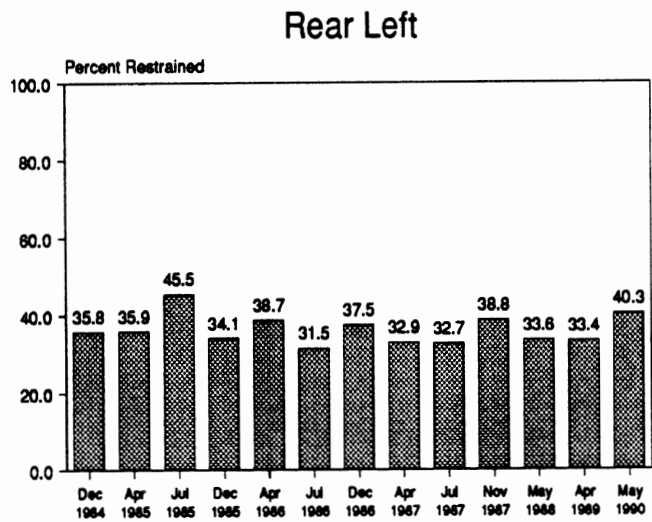


Figure 3.3 Restraint Use by Seating Position (cont'd)



### 3.5 Restraint Use by Age

Restraint use remained highest among occupants age 0-3, who have been required to be restrained when traveling in motor vehicles in Michigan since 1982. A total of 78.4% of occupants age 0-3 years were restrained, compared to 39.3% of occupants age 4-15 years, 38.5% of occupants age 16-29 years, 52.5% of occupants age 30-59 years, and 59.2% of occupants age 60 years and older (Table 3.2). While restraint use within each age group appeared higher than April 1989 levels, only 30-59 year olds exhibited a statistically significant increase in belt use (Figure 3.4; Z-statistics were as follows: 1.46 for age 0-3 years, 0.52 for age 4-15 years, 0.60 for age 16-29 years, 2.52 for age 30-59 years, and 1.69 for 60 and older).

Occupants age 60 years and older continued to have a restraint use rate higher than any other age group except occupants age 0-3. Prior to enactment of the mandatory safety belt law, the 60 and older age group had the lowest rate of use. Since December 1984, however, the increase in restraint use among those age 60 years and older (305%) has been greater than all other age groups (0-3 increased 29%, 4-15 increased 64%, 16-29 increased 108%, and 30-59 increased 185%). The pattern of driver restraint use by age was similar to that of total occupants by age (Figure 3.5).

A total of 16.9% of child restraint devices were observed to be incorrectly used in May 1990. The numbers of child restraint devices observed in each survey are relatively small, making comparisons across surveys difficult. Also, because incorrect use was limited only to cases obvious to the observer (noting the data collection process used), data presented here should be considered a conservative estimate. A more detailed study of restraint use among Michigan children under the age of four found that 62.9% of child restraint devices were incorrectly used (Margolis, Wagenaar, and Molnar, 1988).

**Figure 3.4 Restraint Use by Age**

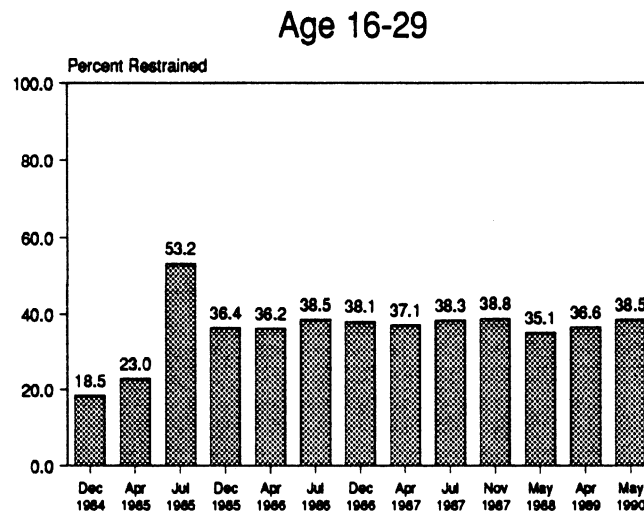
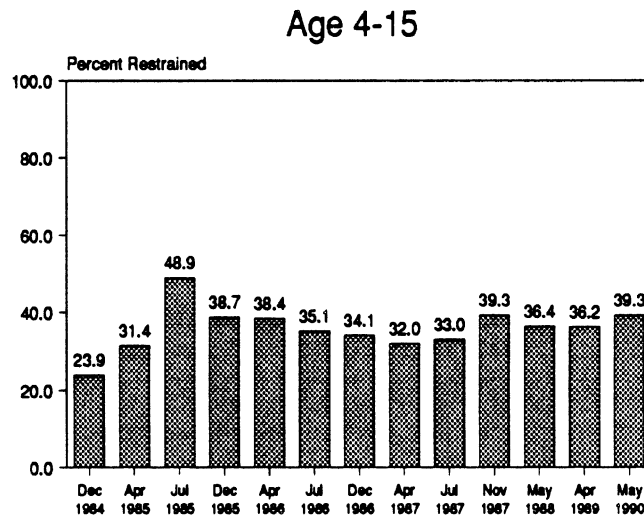
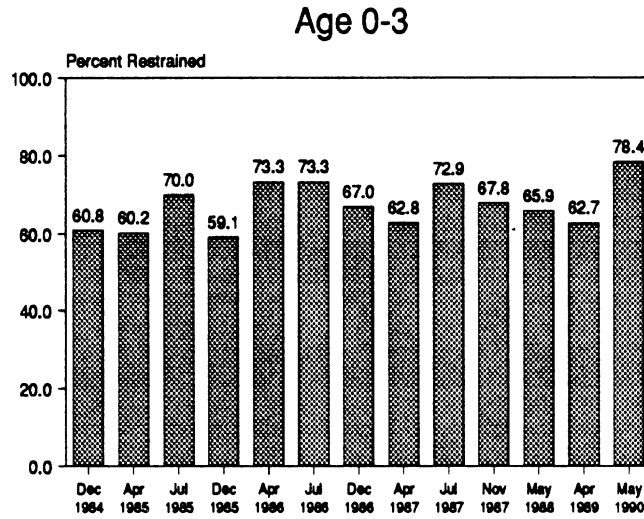


Figure 3.4 Restraint Use by Age (cont'd)

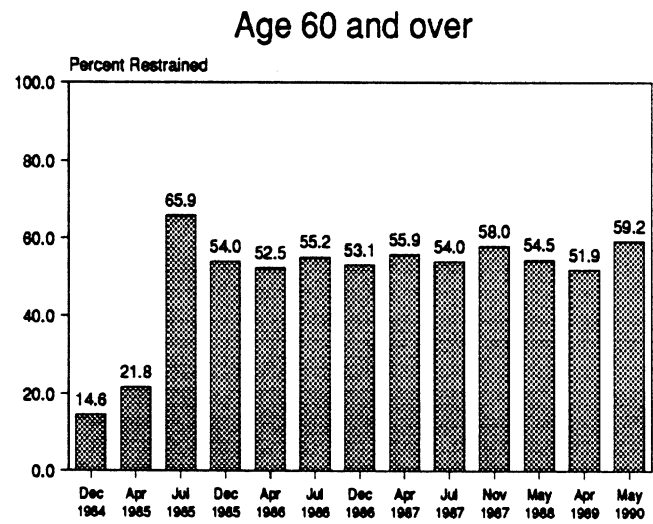
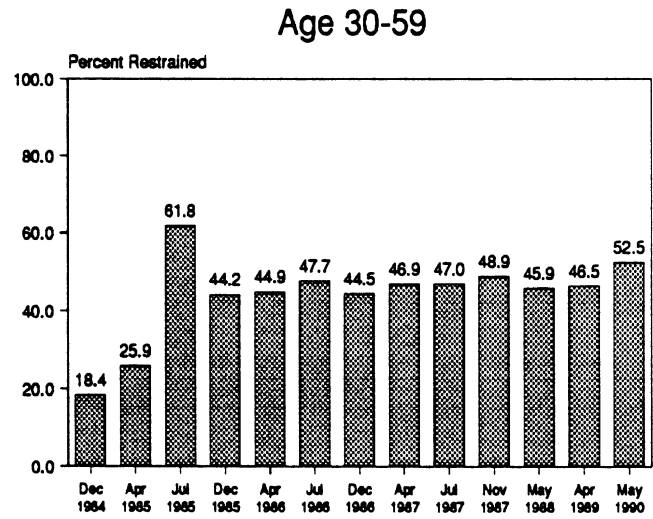
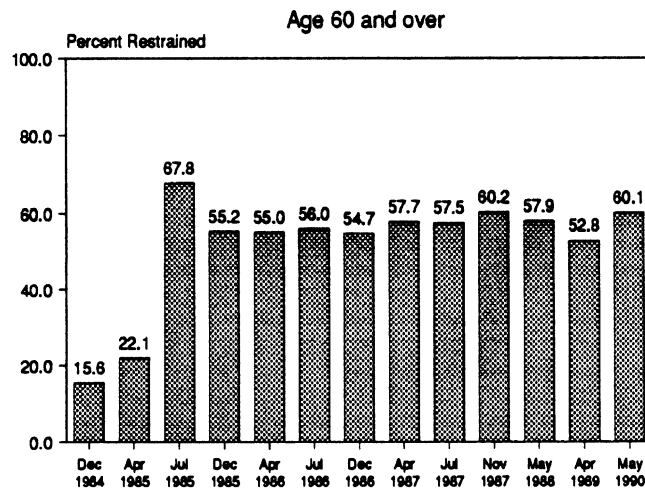
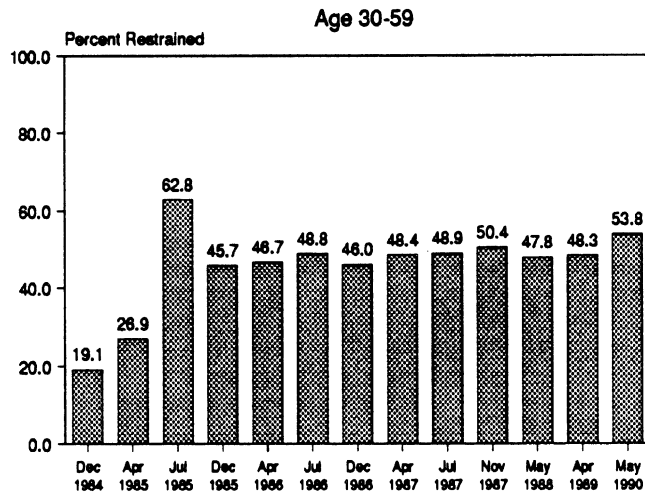
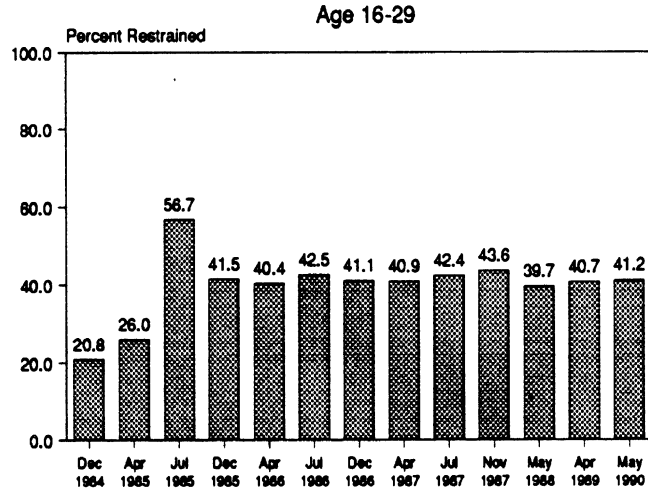


Figure 3.5 Driver Restraint Use by Age



### **3.6 Restraint Use by Gender**

Female occupants exhibited a higher rate of restraint use than male occupants in May 1990, consistent with previous surveys (55.1% versus 44.8%; Table 3.3). Restraint use among both females and males increased from April 1989 levels of 50.1% and 38.8%, respectively ( $Z=2.05$  for females and  $Z=2.68$  for males).

### **3.7 Restraint Use by Type of Vehicle**

The pattern of restraint use by type of vehicle has been similar throughout the series of surveys (Figure 3.6). Occupants of mid-sized cars had the highest rate of restraint use in the current wave (55.5%; Table 3.3). Use rates for occupants of other types of vehicles were: small cars, 50.3%; vans, 49.6%; large cars, 45.1%; pickup trucks, 34.2%; and other vehicles, 51.6%. Only occupants of mid-sized cars exhibited a statistically significant increase in restraint use from the previous survey ( $Z$ -statistics were as follows: small cars, 0.77; mid-sized cars, 2.32; large cars, 1.92; pickup trucks, 0.70; vans, 0.35; and other vehicles, 0.71).

### **3.8 Restraint Use by Type of Site**

As in previous survey waves, occupants in vehicles observed at freeway exits had a higher rate of restraint use than those observed at local intersections (54.7% versus 48.3%; Table 3.3). Changes in restraint use from April 1989 achieved statistical significance only among occupants of vehicles observed at local intersections ( $Z=2.95$  for local intersections and  $Z=1.79$  for freeway exits).

### **3.9 Restraint Use by Weather Conditions, Time of Day, and Day of Week**

Restraint use rates in the current survey were similar across weather conditions (Table 3.3). Comparisons with previous waves continue to indicate no consistent pattern of restraint use by weather conditions. Similarly, there was no consistent pattern of restraint use across time of day and day of week (Table 3.4; note that data were collected only during daylight hours).

**Table 3.3 Percent Restraint Use by Gender, Type of Vehicle, Observation Site, and Weather Conditions<sup>1</sup>**

	Seating Position						
	Driver	Front Center	Front Right	Rear Left	Rear Center	Rear Right	All <sup>2</sup>
<b><u>Gender</u></b>							
Male	46.6	18.6	37.7	47.7	36.6	29.3	44.8
Female	59.4	12.6	53.2	31.5	32.0	31.5	55.1
<b><u>Type of Vehicle</u></b>							
Small car	52.3	27.4	47.7	41.3	24.4	31.4	50.3
Mid-sized car	58.5	3.9	53.7	41.9	38.5	33.5	55.5
Large car	47.4	19.6	43.7	35.7	40.5	23.3	45.1
Pickup Truck <sup>3</sup>	35.8	14.3	32.0	40.2	40.2	19.5	34.2
Van	50.8	15.3	51.3	30.4	16.6	41.2	49.6
Other	52.0	30.4	51.7	62.2	35.3	45.6	51.6
<b><u>Observation Site</u></b>							
Intersection	50.1	15.1	46.9	41.2	37.6	32.6	48.3
Freeway Exit	57.6	16.1	53.2	36.4	25.0	25.3	54.7
<b><u>Weather Conditions</u></b>							
Mostly Sunny	52.9	16.8	50.0	38.8	35.7	34.4	50.7
Mostly Cloudy	51.8	17.0	46.6	44.2	34.5	23.0	49.6
Raining	47.0	5.7	46.1	37.9	29.8	32.7	45.6
<b>TOTAL</b>	<b>51.7</b>	<b>15.3</b>	<b>48.2</b>	<b>40.3</b>	<b>34.6</b>	<b>31.2</b>	<b>49.6</b>

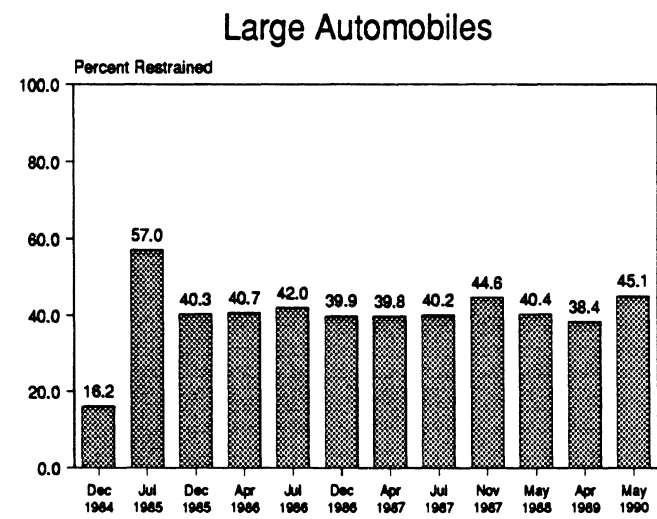
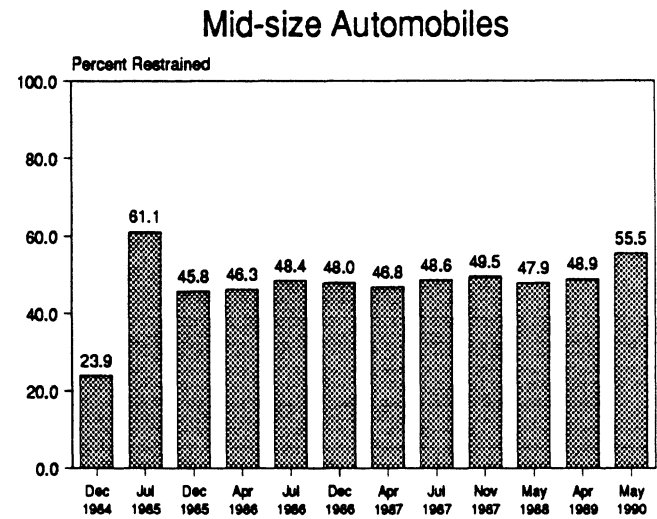
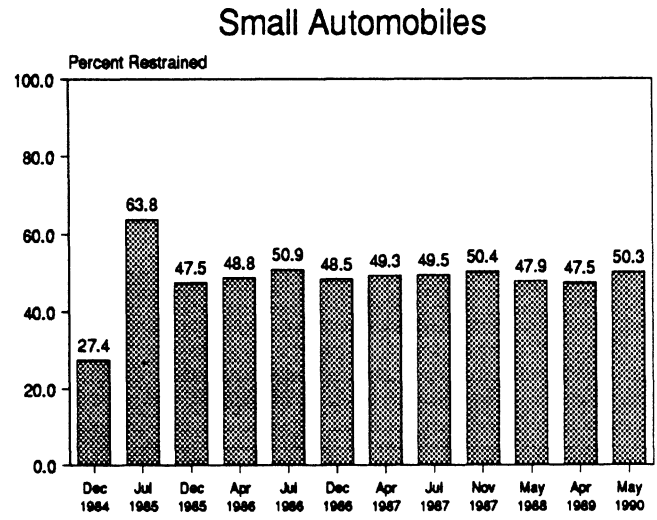
<sup>1</sup>All percents are based on analyses weighted according to the sample design to accurately represent the entire state. Restraint use includes correct and incorrect use of child restraint devices.

<sup>2</sup>Restraint use for all positions excludes extra seats, cargo areas, passengers held in laps, and passengers standing.

<sup>3</sup>Data on rear seat passengers includes 8 occupants, riding in crew cab.

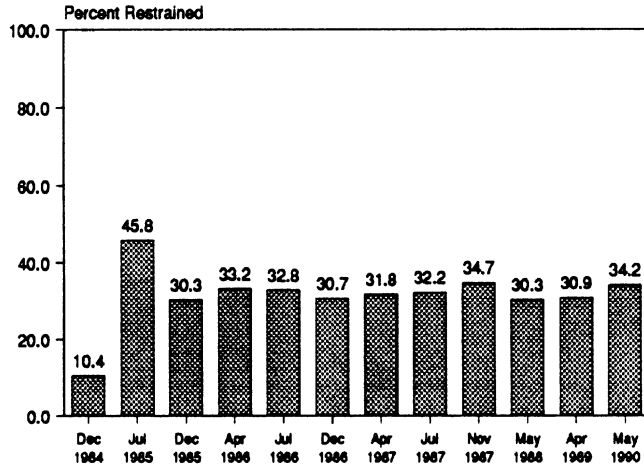


**Figure 3.6 Restraint Use by Vehicle Type**

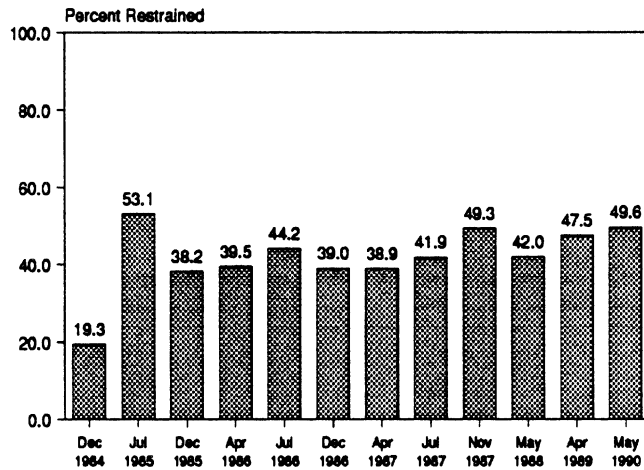


**Figure 3.6 Restraint Use by Vehicle Type (cont'd)**

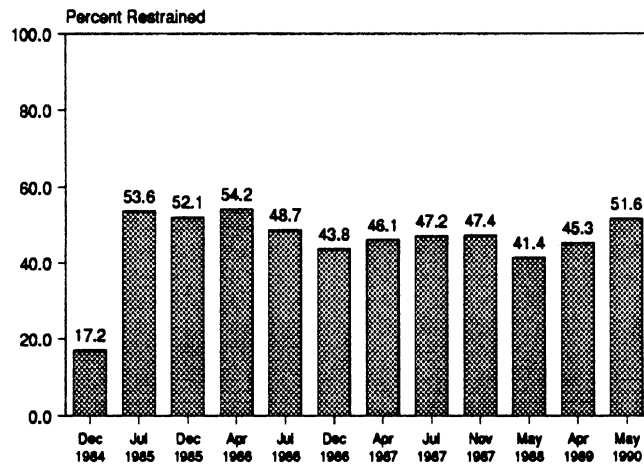
**Pickup Trucks**



**Vans**



**Other Vehicles**



**Table 3.4 Percent Restraint Use by Time of Day and Day of Week<sup>1</sup>**

	Seating Position						
	Driver	Front Center	Front Right	Rear Left	Rear Center	Rear Right	All <sup>2</sup>
<u>Time of Day</u>							
7-8 AM	52.9	0.0	44.8	65.7	22.0	0.0	50.5
8-9 AM	48.2	0.0	46.6	29.4	51.6	34.6	47.0
9-10 AM	49.6	27.5	44.1	48.0	43.6	19.3	48.0
10-11 AM	50.2	21.5	48.0	46.3	37.9	42.0	49.2
11-12 PM	52.4	5.2	54.0	56.8	40.6	35.5	52.1
12-1 PM	53.8	14.8	48.7	44.5	33.5	43.1	51.5
1-2 PM	49.0	6.5	48.3	40.9	42.1	21.5	47.6
2-3 PM	47.9	0.0	41.0	42.0	30.5	24.7	45.0
3-4 PM	55.6	22.1	47.5	31.4	31.1	28.5	51.0
4-5 PM	53.7	24.3	47.4	25.2	31.1	30.5	49.5
5-6 PM	54.9	23.8	54.0	42.7	23.3	42.1	53.3
6-7 PM	57.8	--	68.1	56.5	100.0	34.4	59.4
<u>Day of Week</u>							
Monday	52.0	40.6	49.5	39.7	54.1	26.4	50.8
Tuesday	54.0	9.9	50.0	56.1	39.2	50.7	52.7
Wednesday	48.8	8.6	38.2	36.7	41.6	14.1	45.4
Thursday	46.7	13.9	45.4	48.1	17.2	19.5	45.6
Friday	51.6	10.4	41.6	40.4	41.7	32.6	48.5
Saturday	53.1	12.0	49.4	37.4	29.4	36.3	50.3
Sunday	56.8	23.3	57.8	35.3	32.2	31.4	54.1
TOTAL	51.7	15.3	48.2	40.3	34.6	31.2	49.6

<sup>1</sup>All percents are based on analyses weighted according to the sample design to accurately represent the entire state. Restraint use includes correct and incorrect use of child restraint devices.

<sup>2</sup>Restraint use for all positions excludes extra seats, cargo areas, passengers held in laps, and passengers standing.

### 3.10 Restraint Use by Region

Restraint use varied by region of the state (Table 3.5 and Figure 3.7). As in the previous survey, use rates were highest in the Southeast region (55.9%) and lowest in the Eastern upper peninsula (44.2%). The Eastern upper peninsula region has had the lowest rate of restraint use in every wave except April 1986. Changes in restraint use by region are presented in Figure 3.7. Interpretation of apparent regional differences and changes from the previous survey are complicated because our study design does not permit calculation of sampling error estimates for subareas of the state. It is likely that some regional changes are due to sampling error.

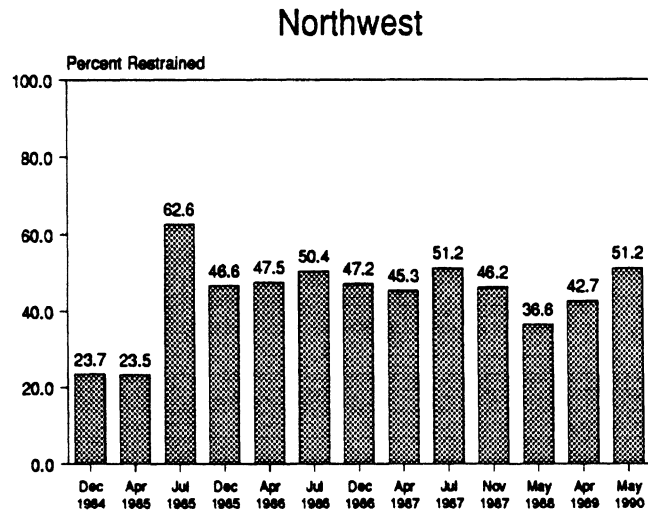
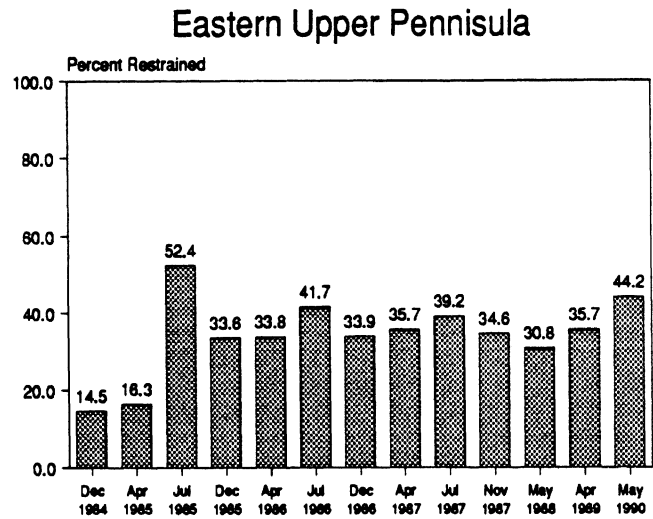
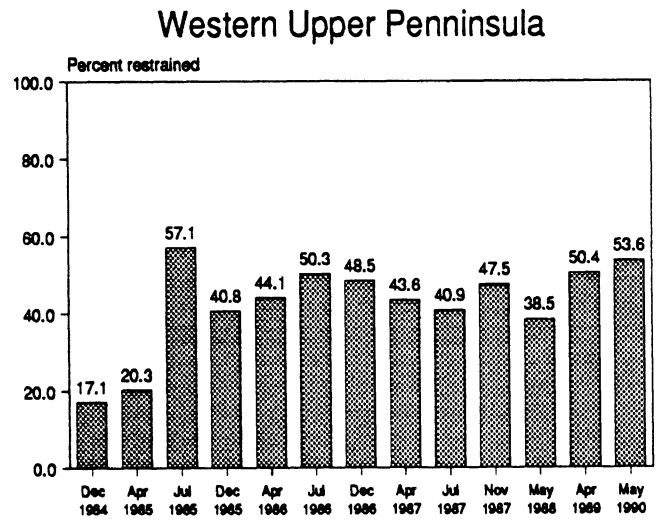
**Table 3.5 Percent Restraint Use by Michigan Department of Transportation Regions<sup>1</sup>**

	Seating Position						All <sup>2</sup>
	Driver	Front Center	Front Right	Rear Left	Rear Center	Rear Right	
1. Western U.P.	55.2	40.6	47.5	59.0	35.6	56.0	53.6
2. Eastern U.P.	42.6	--	44.6	91.2	--	100.0	44.2
3. Northwest	50.0	0.0	55.3	74.7	81.9	36.0	51.2
4. Northeast	54.2	0.0	58.8	60.2	71.7	43.2	55.3
5. West Central	50.8	13.8	53.3	55.6	57.8	62.5	51.5
6. East Central	50.9	13.4	47.9	51.9	34.4	17.1	49.2
7. Southwest	62.6	18.6	54.9	24.6	26.2	22.0	55.9
8. Southeast	54.2	7.5	51.3	52.3	33.0	54.5	52.8
Metro Detroit	48.8	15.9	42.4	34.1	30.2	25.0	46.1
<b>TOTAL</b>	<b>51.7</b>	<b>15.3</b>	<b>48.2</b>	<b>40.3</b>	<b>34.6</b>	<b>31.2</b>	<b>49.6</b>

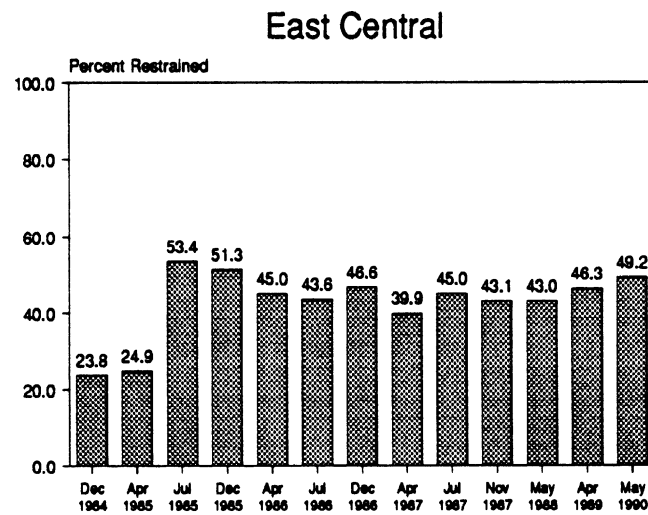
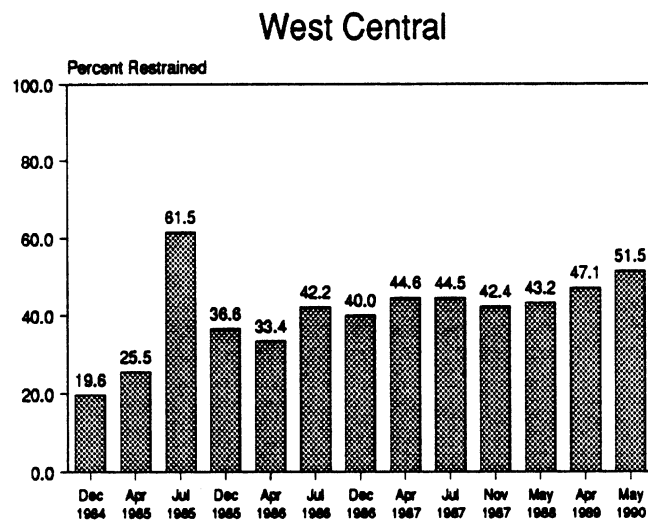
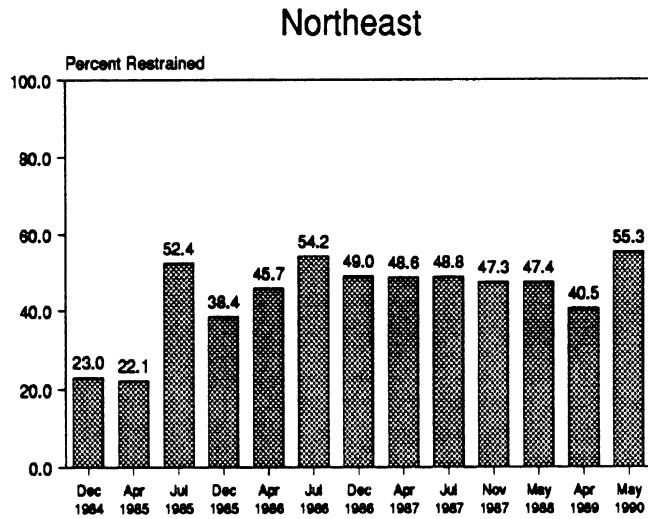
<sup>1</sup>All percents are based on analyses weighted according to the sample design to accurately represent the entire state. Restraint use includes correct and incorrect use of child restraint devices.

<sup>2</sup>Restraint use for all positions excludes extra seats, cargo areas, passengers held in laps, and passengers standing.

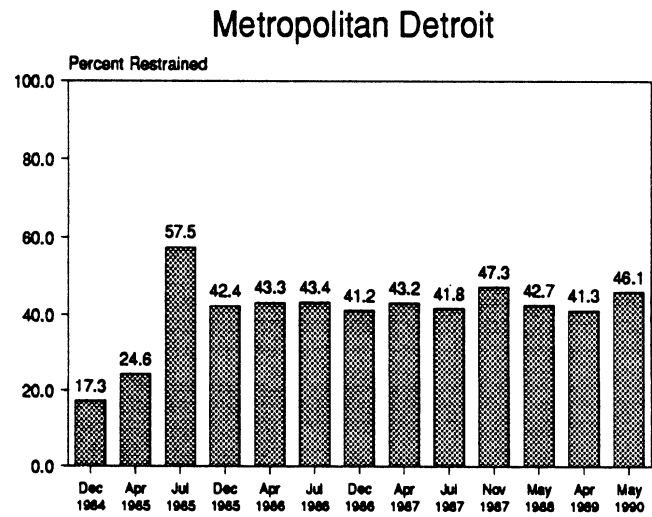
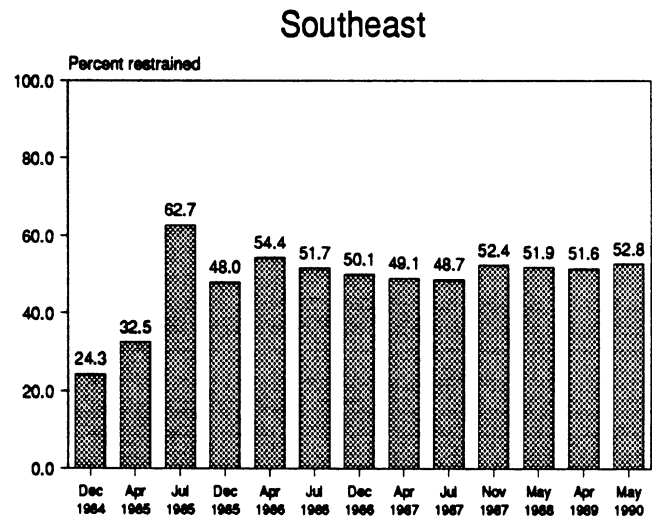
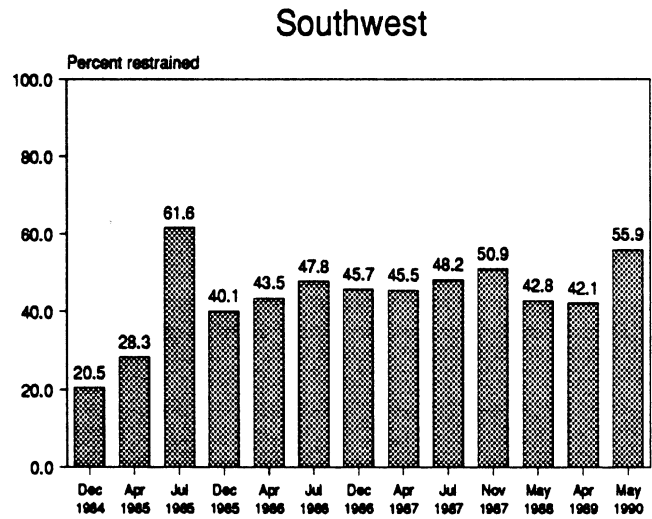
**Figure 3.7 Restraint Use by Region**



**Figure 3.7 Restraint Use by Region (cont'd)**



**Figure 3.7 Restraint Use by Region (cont'd)**



### 3.11 Occupants in Nonstandard Seating Positions

Occupants riding in nonstandard positions were tallied separately (Table 3.6). Nonstandard positions included: lying, standing, sitting or kneeling on the floor, seat, or cargo area, or sitting on the lap of another occupant. Occupants in nonstandard seating positions were typically under 16 years of age, as might be expected. A total of 19.2% of occupants 0-3 years and 9.3% of occupants 4-15 years were observed in nonstandard seating positions. Within the 0-3 age group, the most common nonstandard seating position was sitting on the lap of another occupant. Within the 4-15 age group, the most common positions were standing on the rear seat or sitting in the cargo area.

**Table 3.6 Number of Occupants in Nonstandard Seating Positions by Age<sup>1</sup>**

Position	Age of Occupant		
	0-3	4-15	16+
<u>Lying</u>			
Front seat	0	2	0
Rear seat	1	5	0
<u>Standing</u>			
Front seat	15	10	0
Rear seat	4	39	1
On floor	1	8	0
<u>Kneeling</u>			
Front seat	2	5	0
Rear seat	0	12	0
<u>Sitting</u>			
On lap	32	8	0
Cargo area	0	20	5
Total occupants in nonstandard positions	55	109	6
Total occupants in all positions	287	1,167	15,094

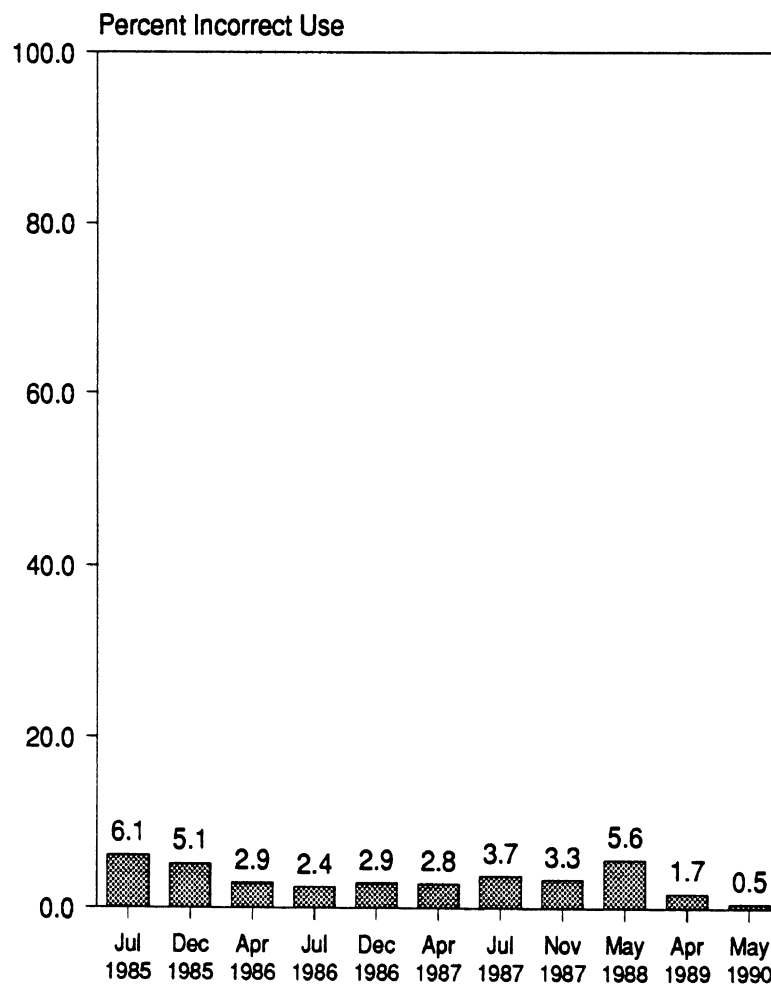
<sup>1</sup>Data are not weighted



### 3.12 Incorrect Use of Safety Belts

Incorrect use of safety belts has been recorded since July 1985. Because incorrect use does not typically include belt slack unless it is obvious to the observer, our measure of incorrect use should be considered a conservative estimate. Incorrect belt use in May 1990 appeared lower than previous surveys although the number of cases of incorrect use of belts has been low throughout the series of survey waves (Figure 3.8; incorrect use of child restraint devices is not included here).

**Figure 3.8 Percent of Belted Occupants with Incorrect Use**



### 3.13 Automatic Belt Use

Information on use of automatic belts is presented in Table 3.7. Belt use among drivers and front-right occupants of cars with nonmotorized detachable three-point lap and shoulder belt systems was 74.3% overall. Use of lap belts among drivers and front-right occupants of cars with motorized shoulder belt and manual lap belt systems was 79.2% overall. Of the 281 motorized shoulder belt and manual lap belt systems observed, only five shoulder belts were disconnected.

**Table 3.7 Automatic Belt Use by Type of Belt System and Seating Position**

Type of Belt System	Seating Position		
	Driver	Front Right	All
Nonmotorized three-point lap and shoulder belt % attached	75.3	70.7	74.3
unweighted N	611	173	784
Motorized shoulder belt with manual lap belt % lap belt attached	79.4	78.3	79.2
unweighted N	217	64	281

Because the nonmotorized three-point lap and shoulder belt system is detachable, it is not possible to determine how many belt users were employing the system in the automatic mode and how many were using it as a manual belt. In a telephone survey of owners of cars with this type of automatic belt, Williams, Wells, and Lund (1987), found almost half of the respondents reported not knowing that the belts in their cars were automatic systems.

## 4 DISCUSSION

Findings from this survey indicate that restraint use of all motorists observed in May 1990 increased from previous year. Although this increase may have been due to the increasing availability of automatic belt systems in passenger cars, this was not the case. We examined restraint use excluding vehicles with automatic belt systems from our analyses and still found a statistically significant increase in restraint use.

The increase in restraint use in May 1990 represents the first change in restraint use in fifty-three months; however, the increase was small and dispersed. Only drivers exhibited a statistically significant increase in belt use from the previous survey. Restraint use of occupants in other seating positions remained unchanged. Statistically significant increases in restraint use were limited to the following subgroups: drivers, males and females overall, occupants age 30-59 years, occupants in mid-sized cars, and occupants observed at local intersections.

Continuing efforts to increase compliance with Michigan's mandatory safety belt law are clearly needed. The recent increase in belt use among Michigan drivers suggests a growing consensus of support for safety belt use. A variety of activities can be effective in further increasing safety belt use.

Several studies suggest that compliance with mandatory safety belt laws is tied to public perceptions of enforcement of such laws, actual enforcement efforts, and that continued efforts over time are needed to sustain high rates of use (Jonah and Grant, 1985; Rood, Kraichy, and Carman, 1987; Williams, Preusser, Blomberg, and Lund, 1987). Furthermore, specific provisions of the laws themselves affect safety belt use. A study of twenty-seven states with belt laws found that states with primary enforcement laws had higher compliance overall than states with secondary enforcement laws (Campbell, 1987).

Findings from a study of effects of local police enforcement levels on belt use in twelve Texas cities were less conclusive (Mounce, Hinshaw, and Lucas, 1988). While a relationship was found between belt use and safety belt citations issued per population, the relationship was less evident when a second indicator of enforcement and different time period were examined. The

authors concluded that, in general, enforcement data alone apparently are not sufficient to explain variations in belt use in different urban areas.

Mortimer, Goldsteen, Armstrong, and Macrina (1990) examined the effect of enforcement combined with use of incentives, as well as the effect of enforcement alone and incentives alone, on safety belt use of drivers in selected cities in Illinois. They found that enforcement alone, incentives alone, and a combination of the two were all effective in increasing belt use, although the greatest effect was due to the combination of enforcement and incentives.

Compliance with Michigan's safety belt law would be facilitated if the law permitted primary enforcement. Even without such new legislation, stricter enforcement of the current law coupled with major publicity campaigns, can be effective in increasing belt use. Issuing safety belt citations regularly to motorists being cited for another violation can be particularly effective in increasing belt use because traffic offenders are less likely to use belts than nonoffenders. Thus, even with secondary enforcement, police have many opportunities to affect the segment of the population at greatest risk for nonuse. Finally, promotional efforts by the state and local communities, such as corporate belt incentive programs, will further strengthen support for belt use and enhance the mandatory belt law's contribution to reduced injury and death.

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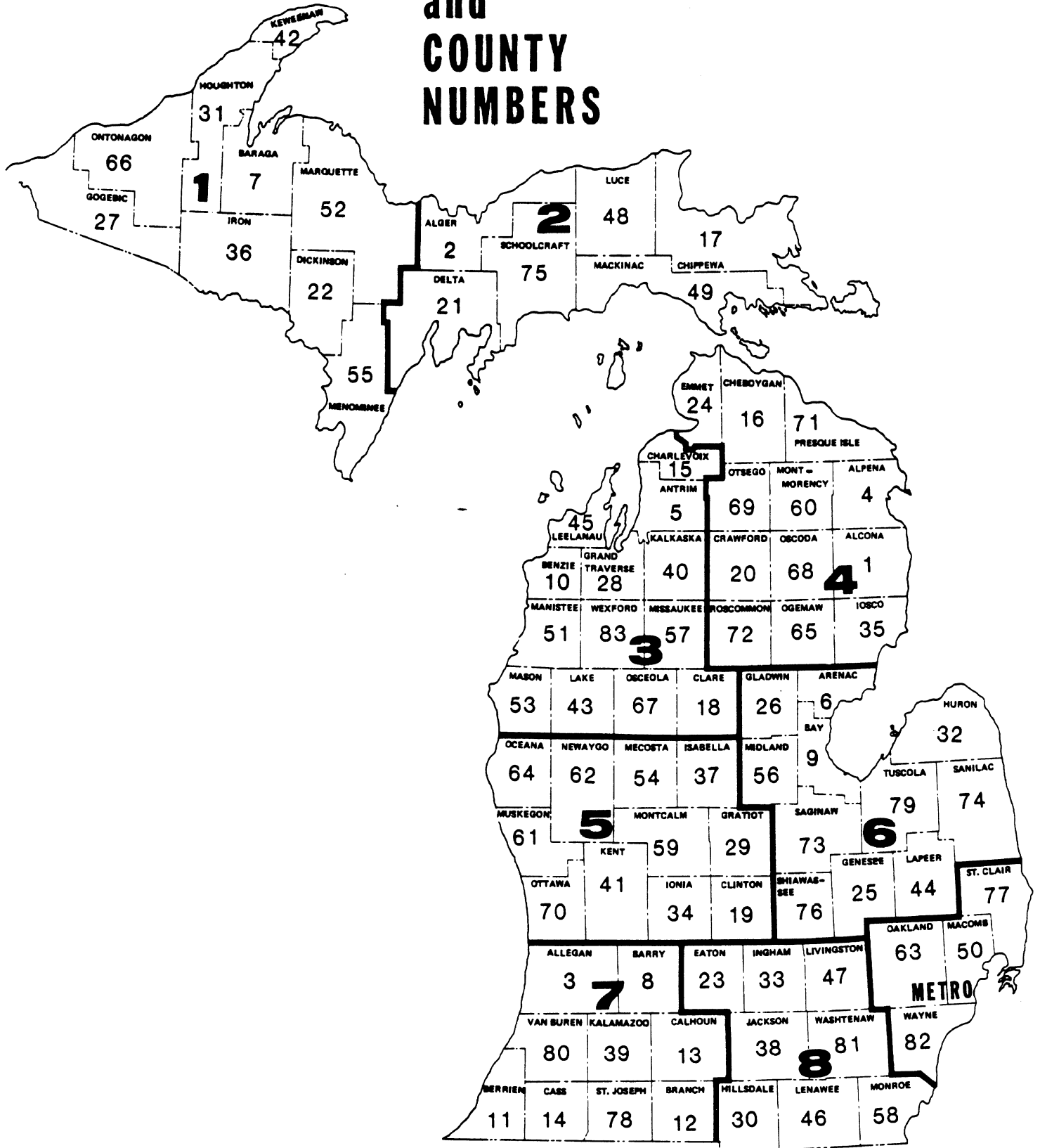




**APPENDIX A**  
**MICHIGAN DEPARTMENT OF TRANSPORTATION REGION MAP**



# DISTRICT and COUNTY NUMBERS





**APPENDIX B**  
**SEAT BELT SURVEY CODEBOOK**



MICHIGAN SEAT BELT SURVEY  
Wave 13, May 1990

Variable Number	Variable Name	Field Width	Character Type	Mult Resp	Page Number
1	SITE NUMBER	3	Numeric		1
2	SITE TYPE	1	Numeric		1
3	SITE CHOICE	1	Numeric		1
4	MONTH	2	Numeric		1
5	DAY OF MONTH	2	Numeric		1
6	START HOUR	2	Numeric		2
7	START MINUTE	2	Numeric		2
8	DAY OF WEEK	1	Numeric		2
9	WEATHER	1	Numeric		2
10	BREAK TIME (MINUTES)	2	Numeric		3
11	END HOUR	2	Numeric		3
12	END MINUTE	2	Numeric		3
13	SAMPLE REGION	1	Numeric		3
14	PSU ID	2	Numeric		4
15	MDOT REGION	1	Numeric		5
16	REGION WEIGHT	5	Numeric		5
17	ELAPSED TIME	2	Numeric		5
18	SITE OBSERVER	1	Numeric		5
19	SAMPLE ERROR COMP UNIT #	2	Numeric		5

MICHIGAN SEAT BELT SURVEY  
Wave 13, May 1990

<u>Variable Number</u>	<u>Variable Name</u>	<u>Field Width</u>	<u>Character Type</u>	<u>Mult Resp</u>	<u>Page Number</u>
20	VEHICLE OBSERVER	1	Numeric		7
21	VEHICLE TYPE	1	Numeric		7
22	SEQUENCE NUMBER	2	Numeric		7
23	SITE # COUNT	2	Numeric		7
24	OBSERVER COUNT	2	Numeric		8
25	SITE/OBSERVER SEQ #	2	Numeric		8
26	HOUR OF OBSERVATION	2	Numeric		8
27	MINUTE OF OBSERVATION	2	Numeric		8
28	SITE WEIGHT	6	Numeric		8
29	TOTAL WEIGHT	6	Numeric		8
30	WAVE	2	Numeric		9
31	DRIVER BELTED (Y/N)	1	Numeric		9
32	DRIVER RESTRAINT USE	2	Numeric		9
33	DRIVER SEX	1	Numeric		9
34	DRIVER AGE	1	Numeric		10



MICHIGAN SEAT BELT SURVEY  
Wave 13, May 1990

<u>Variable Number</u>	<u>Variable Name</u>	<u>Field Width</u>	<u>Character Type</u>	<u>Mult Resp</u>	<u>Page Number</u>
35	POSITION	2	Numeric		11
36	BELTED (Y/N)	1	Numeric		11
37	RESTRAINT USE	2	Numeric		11
38	SEX	1	Numeric		12
39	AGE	1	Numeric		12
40	SPECIAL TAG	2	Numeric		12
41	OCCUPANT # IN POSITION	1	Numeric		13

MICHIGAN SEAT BELT SURVEY  
Wave 13, May 1990

Site Variables

Variables 1 through 19 describe site level information.  
The frequencies for the site variables contain one record for  
each of the 240 sites.

Variable	1	<b>SITE NUMBER</b>	MD1: None	Field Width: 3
			MD2: None	Type: Numeric

Variable	2	<b>SITE TYPE</b>	MD1: None	Field Width: 1
			MD2: None	Type: Numeric

FREQ	Prcnt	SITE TYPE
193	80.4	1. Intersection
47	19.6	2. Freeway Exit

Variable	3	<b>SITE CHOICE</b>	MD1: None	Field Width: 1
			MD2: None	Type: Numeric

FREQ	Prcnt	SITE CHOICE
237	98.7	1. Primary
3	1.2	2. Secondary

Variable	4	<b>MONTH</b>	MD1: None	Field Width: 2
			MD2: None	Type: Numeric

FREQ	Prcnt	MONTH
14	5.8	04. April
226	94.2	05. May

Variable	5	<b>DAY OF MONTH</b>	MD1: None	Field Width: 2
			MD2: None	Type: Numeric

MICHIGAN SEAT BELT SURVEY  
Wave 13, May 1990

Variable	6	<u>START HOUR</u>	MD1: None	Field Width: 2
			MD2: None	Type: Numeric

FREQ	Prcnt	START HOUR
------	-------	------------

9	3.7	07.
17	7.1	08.
22	9.2	09.
26	10.8	10.
27	11.2	11.
23	9.6	12.
23	9.6	13.
24	10.0	14.
27	11.2	15.
21	8.7	16.
20	8.3	17.
1	0.4	18.

Variable	7	<u>START MINUTE</u>	MD1: None	Field Width: 2
			MD2: None	Type: Numeric

Variable	8	<u>DAY OF WEEK</u>	MD1: None	Field Width: 1
			MD2: None	Type: Numeric

FREQ	Prcnt	DAY OF WEEK
------	-------	-------------

33	13.7	1. Monday
35	14.6	2. Tuesday
34	14.2	3. Wednesday
35	14.6	4. Thursday
40	16.7	5. Friday
33	13.7	6. Saturday
30	12.5	7. Sunday

Variable	9	<u>WEATHER</u>	MD1: None	Field Width: 1
			MD2: None	Type: Numeric

FREQ	Prcnt	WEATHER
------	-------	---------

112	46.7	1. Mostly Sunny
99	41.2	2. Mostly Cloudy
29	12.1	3. Rain
0	0.0	4. Snow

MICHIGAN SEAT BELT SURVEY  
Wave 13, May 1990

Variable	10	<b>BREAK TIME (MINUTES)</b>	MD1: None	Field Width: 2
			MD2: None	Type: Numeric

Variable	11	<b>END HOUR</b>	MD1: None	Field Width: 2
			MD2: None	Type: Numeric

FREQ	Prct	END HOUR
------	------	----------

1	0.4	07.
13	5.4	08.
21	8.7	09.
24	10.0	10.
27	11.2	11.
26	10.8	12.
22	9.2	13.
27	11.2	14.
27	11.2	15.
22	9.2	16.
22	9.2	17.
7	2.9	18.
1	0.4	19.

Variable	12	<b>END MINUTE</b>	MD1: None	Field Width: 2
			MD2: None	Type: Numeric

Variable	13	<b>SAMPLE REGION</b>	MD1: None	Field Width: 1
			MD2: None	Type: Numeric

FREQ	Prct	SAMPLE REGION
------	------	---------------

20	8.3	1. Upper
20	8.3	2. Northern
20	8.3	3. Western
20	8.3	4. Central
20	8.3	5. South Central
20	8.3	6. Eastern
120	50.0	7. South Eastern

MICHIGAN SEAT BELT SURVEY  
Wave 13, May 1990

Variable	14	PSU ID	MD1:	None	Field Width:	2
			MD2:	None	Type:	Numeric

FREQ	Prcnt	PSU ID
4	1.7	08. BARRY
4	1.7	09. BAY
4	1.7	11. BERRIEN COUNTY
4	1.7	12. BERRIEN, NILES
4	1.7	15. CHARLEVOIX
4	1.7	17. CHIPPEWA
4	1.7	20. CRAWFORD-ROSCOMMON
4	1.7	21. DELTA
4	1.7	22. DICKINSON
4	1.7	23. EATON
12	5.0	25. GENESEE
4	1.7	28. GRAND TRAVERSE
4	1.7	33. INGHAM COUNTY
4	1.7	34. INGHAM, EAST LANSING
4	1.7	35. IOSOC-ALCONA
4	1.7	38. JACKSON
4	1.7	39. KALAMAZOO COUNTY
4	1.7	40. KALAMAZOO, CITY OF
4	1.7	41. KENT COUNTY
4	1.7	42. KENT, GRAND RAPIDS
4	1.7	43. KENT, WYOMING
4	1.7	44. LAPEER
4	1.7	46. LENAWEE
12	5.0	50. MACOMB
8	3.3	52. MARQUETTE
4	1.7	53. MASON
4	1.7	54. MECSOTA-NEWAYGO
4	1.7	58. MONROE
4	1.7	59. MONTCALM
4	1.7	61. MUSKEGON
20	8.3	63. OAKLAND COUNTY
4	1.7	64. OAKLAND, ROYAL OAK
4	1.7	70. OTTAWA
8	3.3	73. SAGINAW
4	1.7	74. ST. CLAIR
4	1.7	80. VANBUREN
4	1.7	81. WASHTENAW, ANN ARBOR
28	11.7	82. WAYNE, DETROIT
4	1.7	83. WAYNE, CANTON
4	1.7	84. WAYNE, GARDEN CITY
4	1.7	85. WAYNE, LIVONIA
4	1.7	86. WAYNE, MELVINDALE ETC.
4	1.7	87. WAYNE, TRENTON ETC.
4	1.7	88. WAYNE, WYANDOTTE

MICHIGAN SEAT BELT SURVEY  
Wave 13, May 1990

Variable	15	<u>MDOT REGION</u>	MD1: None	Field Width: 1
			MD2: None	Type: Numeric
FREQ	Prcnt	MDOT REGION		
12	5.0	1. Western U.P.		
8	3.3	2. Eastern U.P.		
12	5.0	3. Northwest		
8	3.3	4. Northeast		
28	11.7	5. West Central		
28	11.7	6. East Central		
28	11.7	7. Southwest		
24	10.0	8. Southeast		
92	38.3	9. Metro Detroit		
Variable	16	<u>REGION WEIGHT</u>	MD1: None	Field Width: 5
			MD2: None	Type: Numeric
			Implied Dec Places: 4	
Variable	17	<u>ELAPSED TIME</u>	MD1: None	Field Width: 2
			MD2: None	Type: Numeric
Variable	18	<u>SITE OBSERVER</u>	MD1: None	Field Width: 1
			MD2: None	Type: Numeric
FREQ	Prcnt	PRIMARY OBSERVER FOR THIS SITE		
82	34.2	1. Observer #1		
84	35.0	2. Observer #2		
62	25.8	3. Observer #3		
12	5.0	4. Observer #4		
Variable	19	<u>SAMPLE ERROR COMP UNIT #</u>	MD1: None	Field Width: 2
			MD2: None	Type: Numeric

MICHIGAN SEAT BELT SURVEY  
Wave 13, May 1990

Vehicle variables

Variables 20 through 34 describe the vehicle and driver.  
The frequencies for the vehicle variables reflect one record  
for each vehicle observed.

Variable	20	<b>VEHICLE OBSERVER</b>	MD1: None	Field Width: 1
			MD2: None	Type: Numeric

FREQ	Prcnt	ACTUAL OBSERVER FOR THIS VEHICLE
------	-------	----------------------------------

3838	32.8	1. Observer #1
4283	36.6	2. Observer #2
3028	25.9	3. Observer #3
556	4.8	4. Observer #4

Variable	21	<b>VEHICLE TYPE</b>	MD1: 8	Field Width: 1
			MD2: None	Type: Numeric

FREQ	Prcnt	VEHICLE TYPE
------	-------	--------------

2650	22.6	1. Small Car
4075	34.8	2. Midsize Car
2285	19.5	3. Large Car
1268	10.8	4. Pickup
802	6.9	5. Van
614	5.2	6. Other
11	0.1	8. Missing Data

Variable	22	<b>SEQUENCE NUMBER</b>	MD1: None	Field Width: 2
			MD2: None	Type: Numeric

Variable	23	<b>SITE # COUNT</b>	MD1: None	Field Width: 2
			MD2: None	Type: Numeric

MICHIGAN SEAT BELT SURVEY  
Wave 13, May 1990

Variable	24	<b>OBSERVER COUNT</b>	MD1: None	Field Width: 2
			MD2: None	Type: Numeric

Variable	25	<b>SITE/OBSERVER SEQ #</b>	MD1: None	Field Width: 2
			MD2: None	Type: Numeric

Variable	26	<b>HOUR OF OBSERVATION</b>	MD1: 88	Field Width: 2
			MD2: None	Type: Numeric

FREQ Prcnt      HOUR OF THE DAY THIS VEHICLE WAS OBSERVED

325	2.8	07.
693	5.9	08.
968	8.3	09.
1266	10.8	10.
1377	11.8	11.
1029	8.8	12.
1114	9.5	13.
1296	11.1	14.
1346	11.5	15.
1084	9.3	16.
1109	9.5	17.
98	0.8	18.

Variable	27	<b>MINUTE OF OBSERVATION</b>	MD1: 88	Field Width: 2
			MD2: None	Type: Numeric

Variable	28	<b>SITE WEIGHT</b>	MD1: None	Field Width: 6
			MD2: None	Type: Numeric
			Implied Dec Places: 4	

Variable	29	<b>TOTAL WEIGHT</b>	MD1: None	Field Width: 6
			MD2: None	Type: Numeric
			Implied Dec Places: 4	



MICHIGAN SEAT BELT SURVEY  
Wave 13, May 1990

Variable	30	<b>WAVE</b>	MD1: None	Field Width: 2
			MD2: None	Type: Numeric

FREQ	Prct	WAVE
11705	100.0	13. Wave 13

Variable	31	<b>DRIVER BELTED (Y/N)</b>	MD1: 8	Field Width: 1
			MD2: None	Type: Numeric

FREQ	Prct	DRIVER BELTED (Y/N)
5616	48.0	1. Not Belted
6087	52.0	2. Belted
2	0.0	8. Missing data

Variable	32	<b>DRIVER RESTRAINT USE</b>	MD1: 88	Field Width: 2
			MD2: None	Type: Numeric

FREQ	Prct	DRIVER RESTRAINT USE
5425	46.3	01. Not Belted
5450	46.6	02. Belted
44	0.4	05. Motor Lap No
173	1.5	06. Motor Lap Yes
147	1.3	07. Auto No
464	4.0	08. Auto Yes
2	0.0	88. Missing Data

Variable	33	<b>DRIVER SEX</b>	MD1: 8	Field Width: 1
			MD2: None	Type: Numeric

FREQ	Prct	DRIVER SEX
7011	59.9	1. Male
4689	40.1	2. Female
5	0.0	8. Missing Data

MICHIGAN SEAT BELT SURVEY  
Wave 13, May 1990

Variable	34	<u>DRIVER AGE</u>	MD1:	8	Field Width:	1
			MD2:	None	Type:	Numeric

FREQ	Prct	DRIVER AGE
4	0.0	2. 4-15
2723	23.3	3. 16-29
7288	62.3	4. 30-59
1680	14.4	5. 60+
10	0.1	8. Missing Data

MICHIGAN SEAT BELT SURVEY  
Wave 13, May 1990

Variables 35 through 37 describe the occupants.  
The frequencies for the occupant variables contain  
one record for each occupied occupant position.

Variable	35	POSITION	MD1:	88	Field Width:	2
				MD2:	None	Type: Numeric
	FREQ Prct	POSITION				
	11705 70.6	01. Front Left				
	134 0.8	02. Front Center				
	3630 21.9	03. Front Right				
	411 2.5	04. Rear Left				
	205 1.2	05. Rear Center				
	393 2.4	06. Rear Right				
	40 0.2	07. On Lap				
	9 0.1	08. Standing floor				
	19 0.1	09. Extra Seat				
	26 0.2	10. Cargo Area				
	0 0.0	88. Missing Data				

Variable	36	BELTED (Y/N)	MD1:	8	Field Width:	1
				MD2:	7	Type: Numeric
	FREQ Prct	BELTED (Y/N)				
	8226 49.6	1. Not Belted				
	8230 49.7	2. Belted (any type)				
	94 0.6	7. Not collected				
	22 0.1	8. Missing Data				

Variable	37	RESTRAINT USE	MD1:	88	Field Width:	2
				MD2:	77	Type: Numeric
	FREQ Prct	RESTRAINT USE				
	7875 47.5	01. Not Belted				
	7215 43.5	02. Belted				
	174 1.0	03. CRD OK				
	31 0.2	04. CRD Wrong				
	59 0.4	05. Motor Lap No				
	222 1.3	06. Motor Lap Yes				
	196 1.2	07. Auto No				

MICHIGAN SEAT BELT SURVEY  
Wave 13, May 1990

FREQ Prcnt    Var 37    RESTRAINT USE

588	3.5	08. Auto Yes
8	0.0	09. Lying
69	0.4	10. Standing
19	0.1	11. Kneeling
94	0.6	77. Not collected
22	0.1	88. Missing Data

---

Variable	38	SEX	MD1:	8	Field Width:	1
			MD2:	7	Type:	Numeric

---

FREQ Prcnt	SEX	
8737	52.7	1. Male
7720	46.6	2. Female
94	0.6	7. Not collected
21	0.1	8. Missing Data

---

Variable	39	AGE	MD1:	8	Field Width:	1
			MD2:	None	Type:	Numeric

---

FREQ Prcnt	AGE	
287	1.7	1. 0-3
1167	7.0	2. 4-15
3849	23.2	3. 16-29
8874	53.5	4. 30-59
2371	14.3	5. 60+
24	0.1	8. Missing Data

---

Variable	40	SPECIAL TAG	MD1:	None	Field Width:	2
			MD2:	None	Type:	Numeric

---

FREQ Prcnt	SPECIAL TAG	
16536	99.8	00. None
33	0.2	01. Shoulder Belt Misused
3	0.0	02. Lap Belt Misused

MICHIGAN SEAT BELT SURVEY  
Wave 13, May 1990

<u>Variable</u>	<u>41</u>	<u>OCCUPANT # IN POSITION</u>	MD1:	8	Field Width:	1
			MD2:	None	Type:	Numeric

Sequence number for occupants in same seat position.  
(Includes cargo areas and extra seats)

FREQ	Prcnt	OCCUPANT # IN POSITION
16556	99.9	1. First Occupant
10	0.1	2. Second Occupant

