

SEAT BELT OBSERVATIONS IN MICHIGAN--
AUGUST/SEPTEMBER 1983

James O'Day
Arthur C. Wolfe

August 1984

Project MDE-83-006A

Office of Highway Safety Planning,
Lansing, Michigan
National Highway Traffic Safety Administration
U.S. Department of Transportation
Washington, D.C.

Report No. UMTRI-84-3

The University of Michigan
TRANSPORTATION RESEARCH INSTITUTE
Ann Arbor, Michigan

ACKNOWLEDGEMENTS

The research reported here was conducted with the support and cooperation of the Michigan Office of Highway Safety Planning. The assistance of that office, and of Bonnie Powell in particular, is gratefully acknowledged.

We are also appreciative of UMTRI staff members Rollin Davis and Wendell Young, the two field investigators on this study; Kenneth Campbell, who assisted in the design of the survey sampling plan and observational procedures; and Michelle Shepherd, who entered the survey data and this report into the computer.

The opinions, findings, and conclusions expressed in this publication are those of the authors and not necessarily those of the Michigan Office of Highway Safety Planning or the U.S. Department of Transportation National Highway Traffic Safety Administration.

Technical Report Documentation Page

1. Report No. UMTRI-84-3	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle Seat Belt Observations in Michigan - August/September 1983		5. Report Date August 1984	6. Performing Organization Code
		8. Performing Organization Report No. UMTRI-84-3	
7. Author(s) James O'Day and Arthur C. Wolfe		10. Work Unit No. (TRAIS)	11. Contract or Grant No. MDE-83-006A
9. Performing Organization Name and Address The University of Michigan Transportation Research Institute Ann Arbor, Michigan 48109-2150		13. Type of Report and Period Covered Final 7/6/83-7/5/84	
		14. Sponsoring Agency Code	
12. Sponsoring Agency Name and Address Office of Highway Safety Planning 111 South Capitol Avenue, Lower Level Lansing, Michigan 48913		15. Supplementary Notes	
16. Abstract <p>To measure the extent of restraint usage by occupants of vehicles using Michigan roads, a state-wide observation survey was carried out at 217 signalized intersections in 32 of Michigan's 83 counties. Over 30 days in August and September of 1983 two field investigators observed 13,812 vehicles containing almost 20,000 occupants. The survey was conducted on all seven days of the week and during the twelve daylight hours from 8:00 a.m. to 8:00 p.m. In addition to observing seat belt usage for each occupant, the field investigators recorded the vehicle type and license number and the sex and estimated age of each occupant.</p> <p>Overall the data showed that 14.4 percent of drivers and 13.8 percent of all occupants were restrained. About 55 percent of the children under four were using child restraint devices (although not always correctly), indicating considerable compliance with Michigan's mandatory child restraint law. A supplementary survey of child restraint devices in 60 parking lots did not obtain sufficient numbers of observations for meaningful analysis. Therefore these data are not included in the report.</p>			
17. Key Words Seat belts, child restraint devices, vehicle occupancy, exposure		18. Distribution Statement	
19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages 73	22. Price

TABLE OF CONTENTS

ACKNOWLEDGEMENTS ii

ABSTRACT iii

LIST OF TABLES v

LIST OF FIGURES vi

1.0 INTRODUCTION 1

 1.1 General Findings of Study 1

 1.2 Data Requirements 2

 1.3 Report Organization 4

2.0 RESULTS 5

 2.1 Usage Rates From the Intersection Observations 5

 2.2 Demographic and Other Factors in Restraint Use 8

 2.3 Restraint Usage by Children Under Four 16

 2.4 Exposure Inferences 19

3.0 METHODOLOGICAL CONCLUSIONS 21

 3.1 The Street Intersections Survey 21

 3.2 The Parking Lot Survey 21

4.0 REFERENCES 23

APPENDIX A - BACKGROUND DATA FOR SURVEY PLANNING 25

APPENDIX B - THE SURVEY METHODOLOGY 31

APPENDIX C - EXPLANATION OF THE SAMPLING AND OPERATIONAL
PROCEDURES FOR TRAINING THE FIELD INVESTIGATORS 34

APPENDIX D - DATA PROCESSING AND WEIGHTING 41

APPENDIX E - THE TWELVE WEEKLY SCHEDULES 43

APPENDIX F - FIELD FORMS 56

APPENDIX G - INDIVIDUAL SITE STATISTICS 57

APPENDIX H - INTERIM REPORT 61

APPENDIX I - MICHIGAN DEPARTMENT OF TRANSPORTATION DISTRICT MAP 68

LIST OF TABLES

1. Restraint Usage by Seat Location	5
2. Passenger Restraint Use in Relation to Driver Restraint Use by Age of Passengers Over Three, in Percent	7
3. Restraint Usage by Seat Location and Occupant Sex, Occupant Age, Road Type, and Geographic Region, in Percent	9
4. Restraint Usage by Seat Location and Vehicle Type, Day of Week, and Weather Conditions, in Percent	12
5. Restraint Usage by Seat Position and Time of Day, in Percent	14
6. Restraint Usage for Drivers, Right-Front Passengers, Rear Passengers, and All Occupants, by PSU, in Percent	15
7. Restraint Usage by Infants and Children Under Four, by Seat Position	18
8. Occupant Count by Day of Week and Seat Position	20
A.1. 1981 Distribution of Travel by Road Class in Michigan . .	28
A.2. National Distribution of Driver Travel by Age and Sex, NPTS, 1977-78.	29
A.3. Estimated Change Required for Statistical Significance From One Survey to a Second Survey in Comparing Two Samples of Given Size for Different Beginning Percentages	30
G.1 Belt Usage and Other Factors by Observation Site	61

LIST OF FIGURES

1. Restraint Usage by Seat Location	6
2. Restraint Usage by Seat Location and Road Type	10
3. Restraint Usage by Vehicle Type for Drivers and All Occupants	13
4. Restraint Usage by Time of Day for All Occupants	13
5. Small Child Restraint Usage by Age Group	17

1.0 INTRODUCTION

This is a report on seat belt usage observations carried out in Michigan during August and September of 1983. Restraint usage among drivers and other occupants of passenger vehicles was observed at a statewide representative sample of 217 locations in 32 of Michigan's 83 counties. To the extent possible the size and/or type of vehicle, the occupant age and sex, and a number of environmental factors (weather, road class, time, etc.) were recorded. During thirty days of field work a total of 13,812 vehicles containing nearly 20,000 occupants were observed. In addition, a supplemental survey concerned with child restraint devices was carried out in 60 shopping center parking lots and freeway rest areas in the same 32 counties. The surveys were sponsored by the Michigan Office of Highway Safety Planning (OHSP).

1.1 General Findings of Study

There was much variability in belt usage across many of the measured factors. For example, usage by male drivers was somewhat lower than that of females. Usage by occupants of small cars was substantially higher than that of occupants of large cars or pickup trucks. Usage in the suburban areas was generally higher than in Detroit or in predominantly rural areas.

The average belt usage by all drivers in this survey was 14.4 percent. For all occupants the restraint usage was 13.8 percent. Among infants and young children (those under four years of age) about 55 percent were observed to be in approved child restraint devices. Belt usage for passengers other than young children was lower than that of drivers, especially in the rear seats. In the supplementary survey of the correctness of installation and usage of child restraint devices (CRDs) in parking lots, the observers were unable to collect an adequate number of observations. The collected data were intended to determine correct usage, but the small numbers precluded a meaningful analysis. For this reason the data are not included in this report.

This survey was the first of a proposed series of quarterly studies designed to monitor occupant restraint usage in Michigan as changes occur in mandatory restraint legislation and other policies or programs.

Presently only occupants under four years of age are required to be restrained. At the outset of this program it was anticipated that there might be an adult seat belt mandate in force in the fall of 1983, but this has not occurred.

We believe this was the first statewide survey of seat belt usage conducted in any American state which used a stratified random sample design for selecting observation sites. We feel confident that the findings reported here provide reliable information on the extent of occupant restraint usage on main roads with signalized intersections throughout Michigan during the summer of 1983.

One of the fringe benefits of this study has been the acquisition of on-road exposure information in a form which permits comparison with accident data. Such relationships as car size versus driver age, number of car occupants by day of the week, etc., may be estimated from these data. An example of these exposure measurements is presented in Section 2.5.

1.2 Data Requirements

The Office of Highway Safety Planning defined the minimum data requirements for this observation study. These were divided into three classes:

A. Vehicle Data

1. Type and Size of Vehicle
2. License Plate Number of Vehicle
3. Identification of commercial/public vehicle

B. Observation Site

1. Location of observation site
2. Number of observations at each site
3. Weather conditions at time of observation
4. Day of week of observation
5. Time of day of observation

C. Occupant Data

1. Number of persons in vehicle
2. Location of every occupant, including those in cargo areas of a vehicle
3. Individual restraint usage of all occupants in a vehicle
4. Sex and estimated age of every occupant in a vehicle
5. Type of restraint used by each occupant

6. Child restraint usage should be listed as whether usage is correct or incorrect. Method of incorrect usage should be identified.

These requirements were addressed in the following ways. Vehicle type and size were recorded as passenger car (small, medium, large), pickup truck, passenger van, and utility/on-off road vehicle. License plate numbers were recorded; commercial vehicles were identifiable by their unique license plates. Michigan-registered vehicles could similarly be differentiated from out-of-state vehicles.

Observation sites were selected by a stratified random sampling process explained in Appendix B. In some cases final selection of the exact intersection and corner was made by the investigator on the basis of traffic flow observed on that day. Weather conditions, day of the week, starting and ending times of the observation, and traffic flow were recorded on the forms.

Data forms provided for recording age, sex, and type of belt usage by occupant location for each occupant of a vehicle. Age was estimated in one of five categories: less than one, 1 to 3, 4 to 15, 16 to 34, and over 34. Restraint usage for adults was coded (1) none, (2) shoulder belt, or (3) lap belt only. For children several categories of child restraint were also used. There was no attempt to determine the correctness of usage of child seats in the street observations. The supplementary set of data collected in parking lots was intended to determine correct usage. However, as noted previously, due to inadequate numbers of observations these data are not included in this report.

In its proposal UMTRI set its goals as 8000 vehicles to be observed at the 240 selected intersections and 1500 vehicles carrying children in CRDs to be observed in the 60 selected parking lots. In the main survey of street intersections the 8000 goal was substantially exceeded with a total of 13,812 vehicles observed at the 217 used intersections. These additional observations considerably enhanced the statistical reliability of the results. However, the 60 hours of observation in the supplementary parking lot survey were much less productive than expected. Only 348 CRDs were observed, and only half of them contained children at the time of observation.

1.3 Report Organization

The major findings of this report are presented in Section 2. Methodological conclusions are discussed in Section 3. References are found in Section 4, and supporting material is contained in a series of appendices. Appendix A provides background information relative to the survey. Appendix B describes the survey methodology. Appendix C describes the sampling and operational procedures. Appendix D contains information on the data processing and statistical weighting considerations. Appendix E contains the 12 weekly schedules of the two field investigators. Appendix F contains copies of the various field forms for reference. Appendix G contains the detailed results from each of the 217 observation sites. Appendix H is a copy of an interim report provided halfway through the field operations. Appendix I is a map of the nine Michigan Department of Transportation districts. It is provided as reference for the data in Table 3.

2.0 RESULTS

2.1 Usage Rates From the Intersection Observations

Observations taken at signalized intersections and freeway exits resulted in a computerized file of 13,812 cases (19,767 occupants) which contains detail on both personal and environmental factors. In this section of the report a number of one- and two-way tabulations of these data are presented. Most of the data presented are weighted to adjust for the sampling design, which is explained more fully in Appendices C and D. Basically, the upper peninsula and northern lower peninsula areas were oversampled because of the low population densities there, while the Detroit metropolitan area was undersampled. Also the observations at each site were weighted up or down by a factor to make each site equal to the statewide average of 63.6 vehicles observed per site. These adjustments have been made in the working files. Thus most of the tables contain estimates based on non-integer values in the cells which are the best estimates of the cell values after weighting.

TABLE 1
Restraint Usage by Seat Location

Seat Location	Percent	Total Observed
Front Left	14.4	13,795
Front Center	17.0	180
Front Right	12.8	4,802
Total Front	14.1	18,777
Rear Left	11.2	319
Rear Center	14.2	209
Rear Right	9.9	462
Total Rear	11.3	990
All Occupants	13.8	19,767

NOTE: Belt usage was undetermined for 19 drivers.

Overall the weighted estimate of belt usage for all drivers is 14.40 percent. The estimate for all vehicle occupants, weighted, is

13.84 percent restrained. The driver estimate is slightly higher than the NHTSA national urban area estimate for the summer of 1983 of 13.8 percent (Ziegler 1983). Driver restraint usage tends to be somewhat higher than passenger usage, especially rear seat passenger usage. Table 1 and Figure 1 show the restraint usage rates for each of the six usual seat locations in a passenger car. These rates are based on the first occupants in these positions. The 54 children who were second occupants of one seating position are not included, because they were not entered into the computer file, which had to be set up for one occupant per seat position. However, adding these 54 children would make little difference in the overall seat position rates in Table 1.

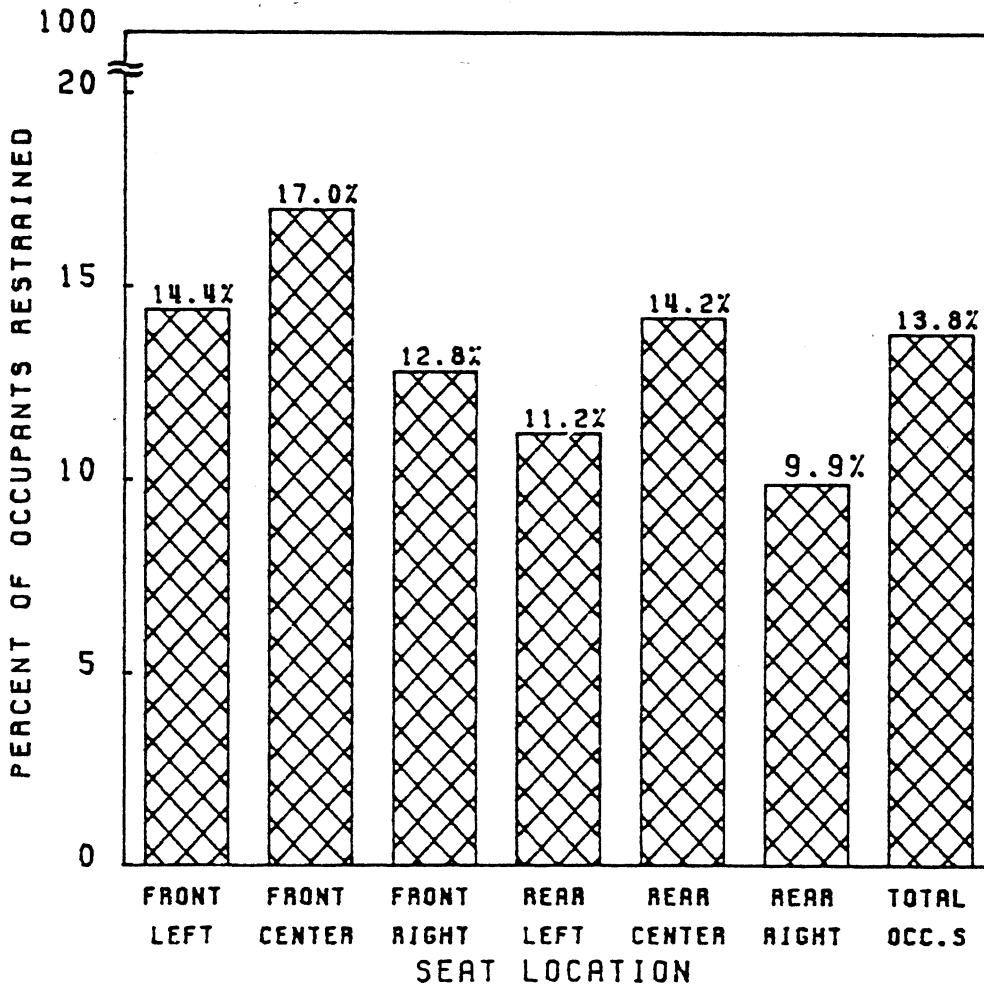


Figure 1. Restraint Usage by Seat Location

Note that 260 of the 13,812 observed vehicles had non-Michigan license plates. Two-thirds of these were from neighboring Great Lakes states and Ontario, and, as would be expected, they were observed disproportionately in Michigan's border counties. The non-Michigan

vehicles had somewhat higher belt usage rates than the Michigan vehicles. Many motorists report wearing seat belts more on long trips than on short trips, and presumably these non-Michigan vehicles tended to be on longer trips than the Michigan vehicles observed at the same locations. Since these vehicles comprise only 1.9 percent of the total sample, their removal from the data tabulations would make no significant difference in the overall survey results. Besides, any mandatory seat belt usage law in Michigan would probably apply to all drivers on public roads, as do the Ontario and New York laws.

TABLE 2
Passenger Restraint Use in Relation to Driver Restraint Use by
Passengers Over Age Three, in Percent (with Unweighted Total Ns)

		Right Front	All Rear	Total Passengers
<u>Driver Restrained</u>		N=2,071		
Passengers 4-15	Total N	70	78	152
	Percent Restrained	71.3	23.7	42.8
Passengers 16-34	Total N	231	33	266
	Percent Restrained	72.9	30.4	68.0
Passengers Over 34	Total N	376	11	388
	Percent Restrained	71.7	0.0	69.7
Total	N	677	122	806
	Percent Restrained	72.2	24.1	63.2
<u>Driver Not Restrained</u>		N=11,724		
Passengers 4-15	Total N	471	431	978
	Percent Restrained	4.7	1.0	2.5
Passengers 16-34	Total N	1,578	162	1,788
	Percent Restrained	2.7	0.0	2.3
Passengers Over 34	Total N	2,032	152	2,198
	Percent Restrained	3.9	0.0	3.6
Total	N	4,081	745	4,964
	Percent Restrained	3.9	0.6	2.8

Table 2 shows passenger restraint usage in relation to whether or not the driver was restrained. In general there is a substantial relationship between driver and passenger restraint usage. When the driver was restrained over 60 percent of the over-three passengers were restrained, but when the driver was not restrained only 2.8 percent of

the over-three passengers were restrained. Infants and children under four are not included in this table because, as mentioned on Page 6, the 54 children who were second occupants of one seat position (almost all small children held on a lap) are not included in the computer file. Data for these children are presented in Table 7 in Section 2.3.

Rear seat restraint use was particularly low for passengers over three. Even when the driver was restrained, less than one-quarter of the rear seat passengers over three were restrained, compared to almost three-quarters of the right-front passengers over three. When the driver was not restrained, only 0.6 percent of the rear passengers over three were restrained, and only 3.9 percent of the right-front passengers over three were restrained.

2.2 Demographic and Other Factors in Restraint Use

Table 3 presents the restraint usage data by sex and age, by road type, and by region of the state. In agreement with previous studies (Phillips 1980), females were somewhat more likely to be restrained than males, both as drivers and right-front passengers. In the rear seats, however, females were less likely to be restrained than males. In regard to age, younger drivers (under 35) were somewhat more likely to be restrained than older drivers, but this was reversed for right-front passengers--probably because right-front passengers are much more often female than male (74 percent in this survey). Very few adults sat in the rear seats, but when they did they were even less likely to be restrained than children 4-15 who were also rarely restrained in the rear.

As explained more fully in Appendix B, 50 of the 217 observation sites were freeway exits intersecting at a major road with a traffic signal or stop sign. Table 3 and Figure 2 show a dramatic difference in restraint use between vehicle occupants at freeway exits and vehicle occupants at other intersections. Almost one-fifth (19.6 percent) of the drivers leaving freeways were wearing belts, compared to 12.9 percent of the drivers at other intersections. This difference was substantially more than Opinion Research Corporation (ORC) found in its national surveys (Phillips 1980). In general, freeway drivers are on longer trips than non-freeway drivers, and this observed difference in

TABLE 3

Restraint Usage by Seat Location and Occupant Sex, Occupant Age, Road Type, and Geographic Region, in Percent (with Unweighted Total Ns)*

		Driver	Right Front	All Rear	Total Occupants
<u>Sex</u>					
Male	Total N	8,557	1,251	449	10,332
	Percent Restrained	13.9	11.1	8.6	13.2
Female	Total N	5,237	3,518	476	9,315
	Percent Restrained	15.2	13.0	6.2	13.6
Undetermined	Total N	1	33	65	120
	Percent Restrained	0.0	69.6	74.9	76.3
<u>Estimated Age*</u>					
4-15	Total N	1	542	509	1,133
	Percent Restrained	0.0	12.3	4.3	7.6
16-34	Total N	6,619	1,810	195	8,674
	Percent Restrained	15.1	11.1	4.1	13.9
Over 34	Total N	7,174	2,408	163	9,760
	Percent Restrained	13.5	13.6	0.0	13.2
<u>Road Type</u>					
Freeway Exits	Total N	3,166	1,078	250	4,524
	Percent Restrained	19.6	16.7	10.6	18.3
Other Intersections	Total N	10,629	3,724	740	15,243
	Percent Restrained	12.9	11.7	11.6	12.5
<u>MDOT District</u>					
1(West U.P.)	Total N	516	206	80	815
	Percent Restrained	12.5	12.7	16.6	13.3
2(East U.P.)	Total N	282	152	76	529
	Percent Restrained	14.3	16.2	16.2	15.2
3(Northwest)	Total N	788	279	26	1,102
	Percent Restrained	12.5	19.1	0.0	14.0
4(Northeast)	Total N	606	192	18	820
	Percent Restrained	14.2	8.2	19.9	12.9
5(W. Central)	Total N	2,262	735	42	3,056
	Percent Restrained	14.2	13.6	1.8	13.9
6(E. Central)	Total N	1,627	566	92	2,309
	Percent Restrained	11.9	10.4	6.9	11.4
7(Southwest)	Total N	1,880	559	103	2,562
	Percent Restrained	13.0	11.1	10.2	12.5
8(Southeast)	Total N	1,597	556	86	2,256
	Percent Restrained	18.9	15.6	14.0	17.7
Metro Detroit	Total N	4,237	1,557	467	6,318
	Percent Restrained	14.6	12.6	11.5	13.9

*Data for ages 0-3 are not presented here because children held on laps are not included in the computer file. See Table 7.

restraint usage is in line with the results of the McGinley Michigan survey in which larger proportions of respondents said they wore seat belts on long trips than on short trips around town (McGinley 1982). A similar difference was found for right-front passengers, but for rear passengers usage was about the same for the two types of intersections.

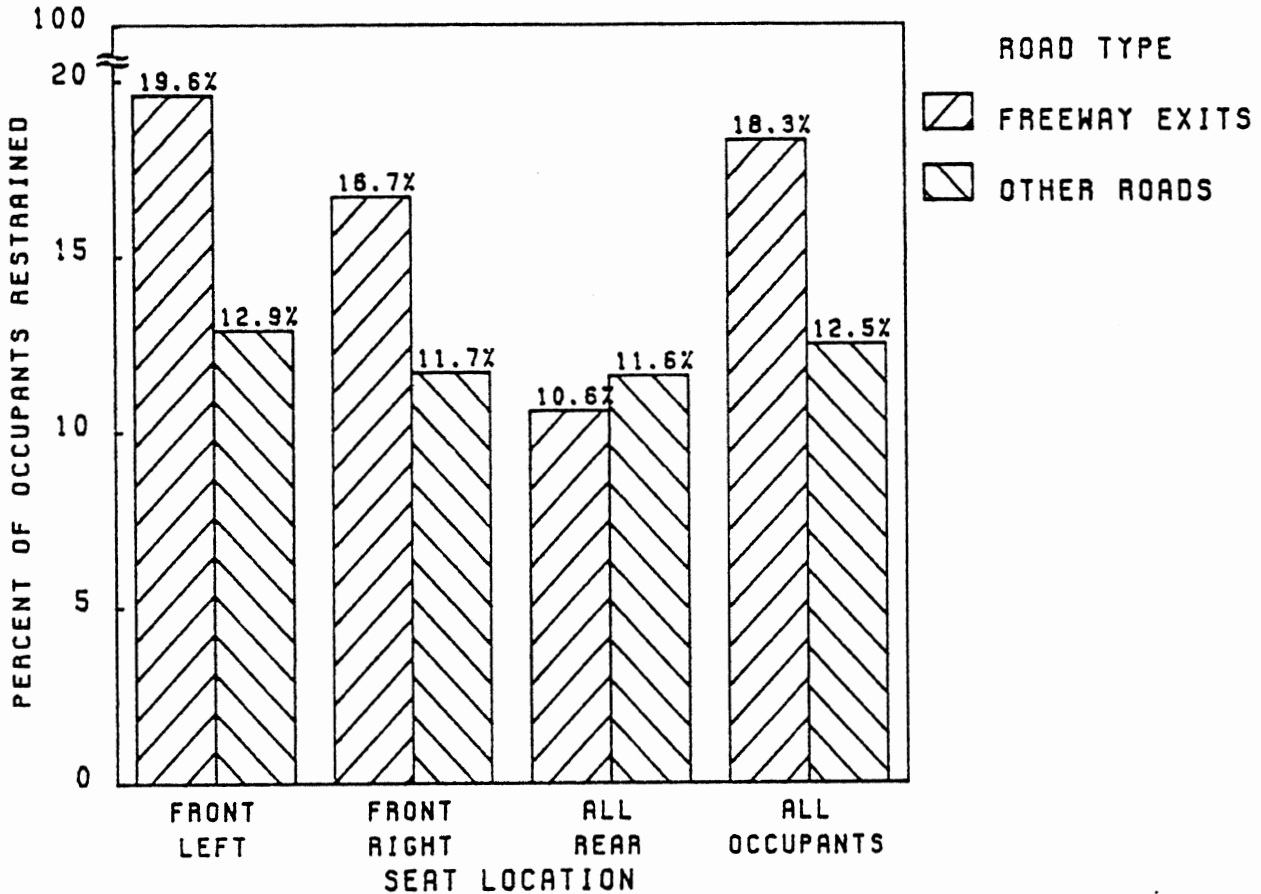


Figure 2. Restraint Usage by Seat Location and Road Type

Considering previous data on rural-urban differences in seat belt wearing (Phillips 1980; NHTSA 1982), the UMTRI survey did not find regional differences as large as might have been expected. Driver restraint usage varied from 11.9 percent in the east central area (Michigan Department of Transportation (MDOT) District 6) to 18.9 percent in the southeast (non-Metro, MDOT District 8). Driver usage in the upper peninsula and northern lower Michigan (MDOT Districts 1-4)--12.5 percent, 14.3 percent, 12.5 percent, and 14.6 percent, respectively--was quite similar to usage in western Michigan (MDOT Districts 5 and 7) and to usage in the Detroit metropolitan area--14.2 percent, 13.0 percent, and 14.6 percent, respectively. Somewhat

surprisingly, restraint usage was slightly higher for right-front passengers than for drivers in each of the four northern districts, while right front passenger usage was less than driver usage in each of the five southern districts. A Michigan map showing the nine MDOT districts is included as Appendix I.

Table 4 and Figure 3 present restraint usage data in relation to vehicle type, day of the week, and weather conditions. The differences in usage rates by vehicle type are striking. Small car drivers were wearing belts more than twice as frequently as large car drivers (22.3 percent to 9.7 percent) with medium car drivers in the middle (16.6 percent). This difference corresponds with ORC's national findings (Phillips 1980). Driver restraint usage was lowest in pickup trucks (only 8.6 percent) and was also below average in vans and utility vehicles (10.5 percent and 12.6 percent, respectively). Passenger restraint usage tended to follow the same patterns, but the vehicle differences were not as pronounced, as right-front passenger usage in large cars actually exceeded driver usage in large cars.

The data also show some substantial differences in restraint usage by day of the week, from 18.1 percent driver usage on Mondays to 12.1 percent driver usage on Fridays. However, it seems unlikely that these are genuine differences. Rather they are probably affected by the particular eight areas surveyed on a particular day of the week. The data also show restraint usage to be somewhat below average on Saturdays and Sundays, but again this may be an artificial result of the particular areas surveyed on these days.

In regard to weather, the data show slightly greater restraint usage on cloudy and rainy days than on clear days. (The 132 observations at sites where it rained the entire hour are too few to consider the low 6.8 percent driver usage rate as meaningful.) These differences may also be artificial results in relation to the particular locations surveyed, but they are consistent with the McGinley survey in Michigan in which reported usage was higher when roads are wet or snow- or ice-covered than on short trips around town (McGinley 1982).

In Table 5 and Figure 4 the restraint usage data are presented separately for the 12 hours of the day in which the survey operations

TABLE 4
 Restraint Usage by Seat Location and Vehicle Type, Day of Week, and
 Weather Conditions, in Percent (with Unweighted Total Ns)

		Driver	Right Front	All Rear	Total Occupants
<u>Vehicle Type</u>					
Small Car	Total N	2,969	863	131	3,971
	Percent Restrained	22.3	17.4	13.9	20.9
Medium Car	Total N	4,188	1,423	301	5,946
	Percent Restrained	16.6	14.3	14.4	16.0
Large Car	Total N	5,422	2,139	525	8,186
	Percent Restrained	9.7	10.5	9.4	9.9
Pickup	Total N	813	246	7	1,098
	Percent Restrained	8.6	11.5	0.0	9.5
Van	Total N	247	78	12	341
	Percent Restrained	10.5	10.1	5.1	9.9
Utility Vehicle	Total N	149	47	13	209
	Percent Restrained	12.6	3.0	11.7	10.5
<u>Day of Week</u>					
Monday	Total N	2,162	647	107	2,936
	Percent Restrained	18.1	15.8	18.4	17.5
Tuesday	Total N	2,014	525	95	2,655
	Percent Restrained	14.8	12.2	17.9	14.6
Wednesday	Total N	2,098	631	126	2,885
	Percent Restrained	13.8	11.4	13.8	13.3
Thursday	Total N	1,703	447	78	2,241
	Percent Restrained	14.9	11.8	16.8	14.3
Friday	Total N	1,650	553	106	2,327
	Percent Restrained	12.1	10.6	8.3	11.7
Saturday	Total N	2,133	922	218	3,314
	Percent Restrained	13.9	12.2	11.9	13.2
Sunday	Total N	2,035	1,077	260	3,409
	Percent Restrained	13.2	14.0	6.3	12.7
<u>Weather</u>					
Clear	Total N	7,125	2,615	632	10,477
	Percent Restrained	13.5	11.6	10.4	12.8
Cloudy	Total N	3,803	1,369	239	5,456
	Percent Restrained	16.3	15.8	16.6	16.2
Some Rain	Total N	2,734	756	112	3,630
	Percent Restrained	15.3	13.8	8.5	14.8
All Rain	Total N	132	61	7	202
	Percent Restrained	6.8	11.5	0.0	7.9

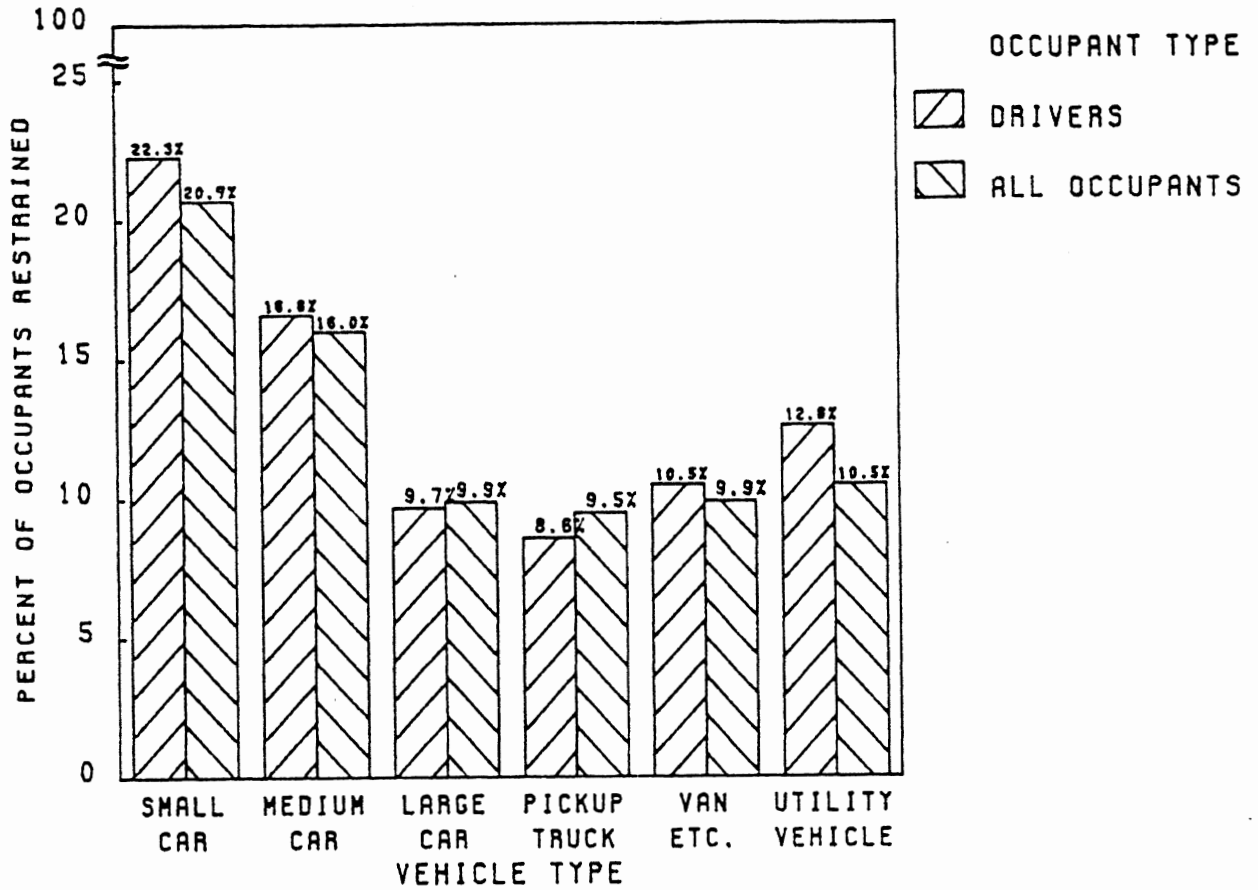


Figure 3. Restraint Usage by Vehicle Type for Drivers and All Occupants

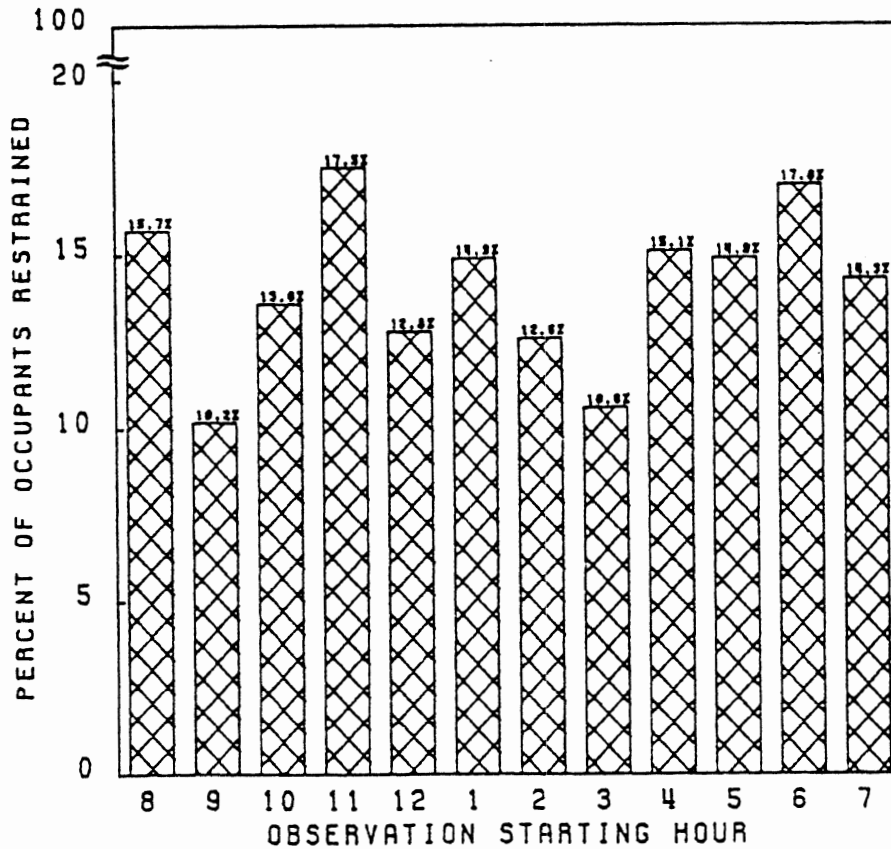


Figure 4. Restraint Usage by Time of Day for All Occupants

TABLE 5
 Restraint Usage by Seat Position and Time of Day,
 in Percent (with Unweighted Total Ns)

Approximate Hour of the Day		Vehicle Seat Location			Total Occupants
		Driver	Front Right	All Rear	
8:00-9:00	N	1,204	246	40	1,505
	Percent Restrained	16.6	10.8	16.2	15.7
9:00-10:00	N	604	186	45	842
	Percent Restrained	11.3	10.0	1.7	10.2
10:00-11:00	N	1,425	441	82	1,970
	Percent Restrained	14.1	13.9	9.7	13.6
11:00-12:00	N	1,050	356	87	1,508
	Percent Restrained	16.6	17.3	26.8	17.5
12:00-1:00	N	1,611	576	139	2,344
	Percent Restrained	12.7	12.5	13.6	12.8
1:00-2:00	N	1,070	384	100	1,578
	Percent Restrained	15.8	15.7	4.8	14.9
2:00-3:00	N	1,884	675	124	2,697
	Percent Restrained	13.6	12.0	6.7	12.6
3:00-4:00	N	1,148	433	85	1,685
	Percent Restrained	11.7	8.2	8.1	10.6
4:00-5:00	N	1,542	573	92	2,226
	Percent Restrained	14.5	13.7	20.7	15.1
5:00-6:00	N	1,050	355	63	1,478
	Percent Restrained	15.3	12.5	22.7	14.9
6:00-7:00	N	761	361	72	1,203
	Percent Restrained	18.3	15.3	12.7	17.0
7:00-8:00	N	446	216	61	731
	Percent Restrained	16.4	13.0	4.7	14.3
Total	N	13,795	4,802	990	19,767
	Percent Restrained	14.4	12.8	11.3	13.8

NOTE: Belt usage was undetermined for 19 drivers.

were carried out. There seems to be considerable variation in usage by hour of the day, but it is difficult to discern any meaningful patterns in these results.

Table 6 presents the restraint usage results separately for each of the 44 Primary Sampling Units (PSUs--explained in Appendices B and C) in the 32 sampled counties. The number of vehicles observed in one PSU varied from 147 at four sites in one day in Chippewa PSU to 1,136 at 20 sites in five days in Oakland PSU. Naturally the larger the number of observations, the more confidence one can have in the restraint usage

TABLE 6
 Restraint Usage for Drivers, Right-Front Passengers, Rear
 Passengers, and All Occupants, by PSU, in Percent

PSU	Vehicles Observed	Drivers	Right Front Passengers	Rear Seat Passengers	All Occupants
Barry	261	12.9	9.2	30.4	12.3
Bay	328	12.1	8.0	0.0	11.5
Berrien	268	11.7	6.7	23.7	11.3
Berrien-(Niles)	211	8.5	3.2	4.9	7.5
Charlevoix	393	12.0	16.6	0.0	12.9
Chippewa	147	16.2	17.0	28.0	18.5
Crawford/Roscommon	293	13.0	5.5	22.1	11.3
Delta	135	12.4	15.3	1.7	11.7
Dickinson	155	4.8	8.2	11.8	6.8
Eaton	358	19.2	18.1	0.0	18.5
Genesee	531	13.6	8.6	13.6	12.7
Grand Traverse	186	18.6	25.5	0.0	20.4
Ingham County	338	21.2	19.8	0.0	20.3
Ingham-(East Lansing)	285	21.0	16.9	20.5	19.8
Iosco/Alcona	313	15.5	11.3	18.8	14.5
Jackson	309	14.3	11.9	0.0	13.8
Kalamazoo County	254	15.0	14.0	0.0	13.4
(Kalamazoo City)	291	17.5	21.0	24.3	18.6
Kent County	396	15.9	16.5	0.0	16.0
Kent-(Grand Rapids)	261	15.2	14.7	0.0	15.0
Kent-(Wyoming)	396	14.6	12.4	0.0	14.5
Lapeer	325	12.7	11.0	3.2	11.6
Lenawee	197	17.2	15.1	8.5	15.2
Macomb	899	12.6	11.1	1.7	11.8
Marquette	361	16.4	15.0	18.5	16.5
Mason	209	6.8	14.6	0.0	8.4
Mecosta-Newaygo	264	12.4	15.2	0.0	13.2
Monroe	230	7.9	7.0	15.1	8.3
Montcalm	351	14.0	14.1	2.6	13.4
Muskegon	264	11.0	9.4	0.0	10.3
Oakland County	1136	20.1	18.1	21.6	19.7
Oakland-(Royal Oak)	242	19.8	16.3	26.9	19.6
Ottawa	330	16.3	13.9	0.0	15.9
Saginaw	443	9.0	12.4	0.0	9.5
St. Clair	282	12.8	16.5	12.5	13.9
Van Buren	237	6.2	4.5	5.0	5.7
Washtenaw-(Ann Arbor)	238	31.0	23.1	46.4	30.2
Wayne-(Detroit)	420	10.5	10.1	6.0	10.1
Wayne-(Canton)	226	16.5	16.6	17.4	16.5
Wayne-(Garden City)	212	20.0	19.8	36.3	20.7
Wayne-(Livonia)	206	20.6	15.5	6.9	17.3
Wayne-(Melvindale)	194	10.4	10.6	9.6	10.4
Wayne-(Trenton)	209	10.2	4.8	26.6	10.5
Wayne-(Wyandotte)	211	12.3	7.4	38.6	12.5
Total	13,795	14.4	12.8	11.3	13.8

NOTE: Except for the totals, these data are weighted to make each observed site equal to the statewide average of 63.6 observed vehicles per site.

percent. For example, at a 95 percent level of confidence the driver restraint usage for Chippewa PSU would be about 16.2 percent \pm 8.9 percent (about 7.3 percent to 25.1 percent), while for Oakland PSU it would be about 20.1 percent \pm 3.6 percent (about 16.5 percent to 23.7 percent).

Recognizing these limitations on the individual PSU data, it is still interesting to note the variations in restraint usage found in different PSUs. By far the highest driver usage rate was in Washtenaw (Ann Arbor) with 31.0 percent. Well above average also were Ingham County with 21.2 percent, Ingham (East Lansing) with 21.0 percent, Wayne (Livonia) with 20.6 percent, Oakland County with 20.1 percent, and Wayne (Garden City) with 20.0 percent. These are all areas with relatively high socio-economic status, while usage rates were considerably lower in places such as Detroit with 10.5 percent and Saginaw with 9.0 percent. This difference is in keeping with the results of the 1977 Lincorp observation surveys in Detroit (Motorists Information Inc., 1978) and with the results of the 1982 McGinley statewide survey which found a strong relationship between educational level and reported seat belt usage (McGinley 1982). However, the lowest rates found were in relatively rural counties such as Dickinson (4.8 percent), Van Buren (6.2 percent), and Mason (6.8 percent).

The UMTRI survey found slightly higher driver usage rates in three outstate PSUs than had been found in earlier surveys--18.6 percent in Traverse City, up from 16.0 percent in 1977 (ORC 1977); 16.4 percent in Marquette, up from 12 percent in 1977 (ORC 1977); and 11.0 percent in Muskegon, up from 8.4 percent in 1981-82 (NHTSA 1982). Midland County did not fall into the UMTRI survey sample, so no comparison with the earlier ORC survey there is possible.

2.3 Restraint Usage by Children Under Four

In April 1982 the Michigan child restraint law went into effect. This law requires that all children under four be restrained by an approved child restraint device. Alternatively, the law permits children over age one to use a seat belt in the rear seats.

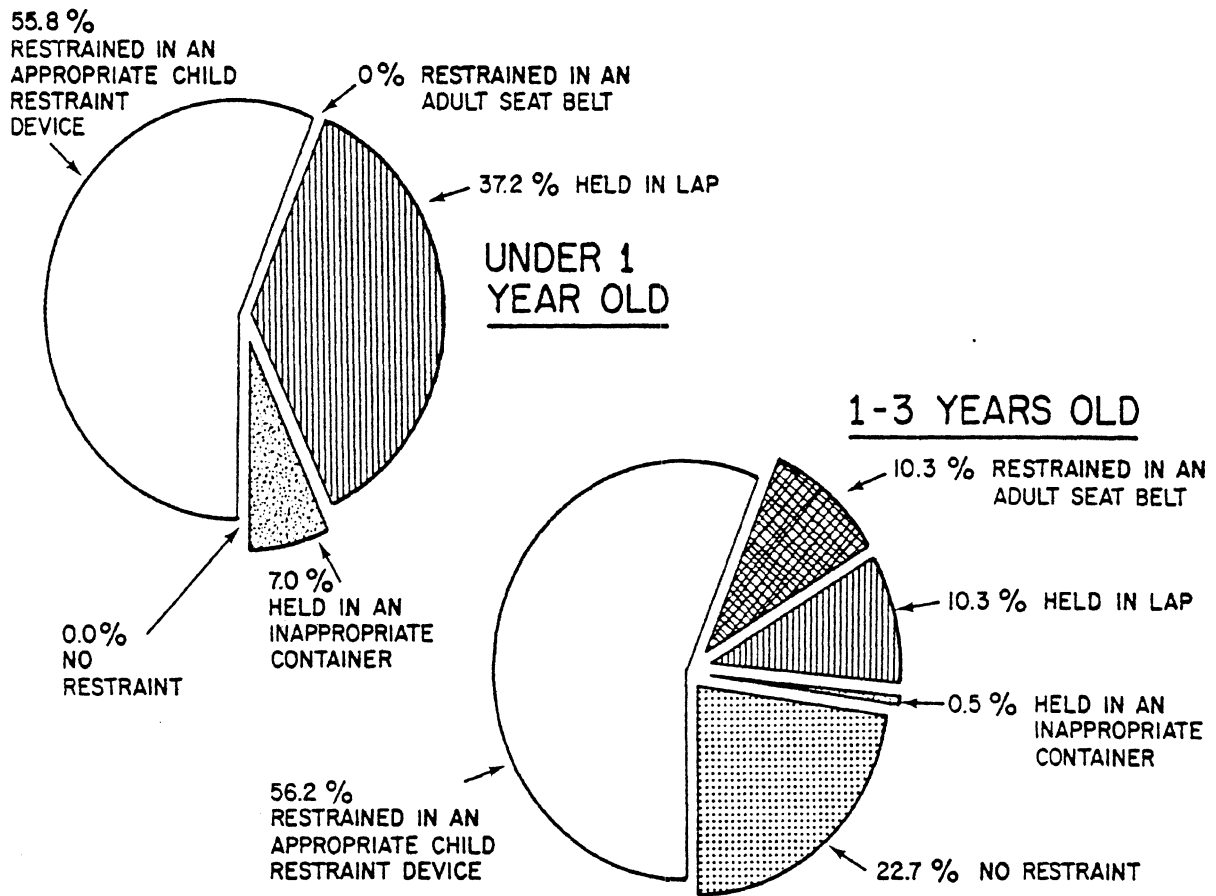


Figure 5. Small Child Restraint Usage by Age Group

This section presents the data on child restraint usage for the 228 small children observed in the street intersection survey. Table 7 and Figure 5 demonstrate that there has been substantial apparent conformity with the new child restraint law in Michigan, but they also show that there are still large numbers of young car occupants who are not being restrained in accordance with the law. Slightly over one-half (55.8 percent) of the 43 observed infants under age one were in an appropriate child restraint device. Similarly, slightly over half (56.2 percent) of the 185 children estimated to be in the 1-3 age group were sitting in appropriate child restraint devices, and a further 10 percent were using the available seat belts. Six of the 19 belt users were in front seats where such usage does not conform to the child restraint law requirements, but still it is clearly better for children to be using belts in those positions than not to be restrained at all.

TABLE 7
 Restraint Use by Infants and Children Under
 Four, by Seat Position (Unweighted)

Location/Age			Approp. CRD	Belt	Held in Lap	Inapprop. Container	None	Total
Front Left	Under 1	N			1			1
		%			100.0			100.0
1-3		N			1			1
		%			100.0			100.0
Front Center	Under 1	N	14					14
		%	100.0					100.0
1-3		N	7	1			10	18
		%	38.9	5.6			55.5	100.0
Front Right	Under 1	N	7		12			19
		%	36.8		63.2			100.0
1-3		N	22	5	15	1	5	48
		%	45.8	10.4	31.2	2.1	10.4	100.0
Rear Left	Under 1	N						
		%						
1-3		N	24	4			8	36
		%	66.7	11.1			22.2	100.0
Rear Center	Under 1	N	2			1		3
		%	66.7			33.3		100.0
1-3		N	21	5	1		12	39
		%	53.8	12.8	2.6		30.8	100.0
Rear Right	Under 1	N	1		3	2		6
		%	16.7		50.0	33.3		100.0
1-3		N	30	4	2		7	43
		%	69.8	9.3	4.7		16.3	100.0
All Seats	Under 1	N	24	0	16	3		43
		%	55.8		37.2	7.0		100.0
1-3		N	104	19	19	1	42	185
		%	56.2	10.3	10.3	0.5	22.7	100.0

NOTE: Because of difficulties in observing and recording two occupants in one seat position, these data probably underreport the holding of small children. Also since it was not feasible to include second occupants of one seat position in the computer file, these data had to be hand tallied. Therefore it was not practical to carry out the usual weighting procedures with this table.

Because of the relatively small number of young children observed in the seat belt survey at intersections--228 out of 19,921 total occupants or only 1.1 percent--it is not possible to provide meaningful data on differences in child restraint usage in different parts of the state. It is clear that far higher percentages of young children than of older children and adults are using restraints (although not always correctly), which suggests that the child restraint law has had a significant effect.

An interesting question is how much use of child restraint devices is related to driver usage of seat belts. The data show that drivers with children using a CRD are somewhat above average in their own belt use. Thirty percent of 48 male drivers and 32 percent of 73 female drivers were restrained when they had one or more children in a child restraint device. However, it is rather disappointing that this relationship is not stronger. Almost seven out of ten drivers who obeyed the law and placed their children in child safety seats still did not bother to restrain themselves.

2.4 Exposure Inferences

In addition to the reported data on occupant restraint usage in Michigan, the survey data provide a wealth of interesting information on the road exposure of Michigan drivers and passengers. The survey provides statewide representative data on the age, sex, and seating position of the occupants of different types of vehicles on Michigan roads for different days of the week and for twelve daylight hours. Thus many interesting interrelationships of the occupancy patterns of vehicles on Michigan roads could be studied for comparisons with accident data.

An example of one such bivariate analysis is given in Table 8. This shows the unweighted occupancy patterns for the different seat positions by day of the week. It demonstrates that the average number of vehicle occupants tends to be somewhat higher on Fridays than on other weekdays and that it is much higher on Saturdays and Sundays than on weekdays. The survey data file could be used to create many other informative tables of this sort.

TABLE 8

Occupant Count by
Day of week and Seat Position

Seat Position	Day of Week							Total
	Mon- day	Tues- day	Wednes- day	Thurs- day	Fri- day	Satur- day	Sun- day	
Front Left	2162	2014	2098	1703	1650	2133	2035	13,795
Front Center	20	21	30	13	18	41	31	180
Front Right	647	526	631	447	553	922	1048	4802
Rear Left	28	24	42	27	29	76	87	319
Rear Center	24	23	22	24	16	36	55	209
Rear Right	55	50	62	27	63	99	95	462
All Occupants	2936	2655	2885	2241	2327	3314	3409	19,767
Average Occupancy	1.36	1.32	1.38.	1.32	1.41	1.55	1.68	1.45

3.0 METHODOLOGICAL CONCLUSIONS

While UMTRI staff have developed other complex sampling designs and have carried out more limited seat belt usage surveys, the magnitude of this project and the lack of time for a pilot survey resulted in a number of operational problems. This section will briefly evaluate the survey procedures and present suggestions for improved procedures in a future survey.

3.1 The Street Intersections Survey

The basic statewide sample of intersections was well designed to provide representative statewide data in sufficient numbers for reliable analysis of general restraint usage patterns in different regions of the state, on different days of the week, at different times of day, etc. Observation of all vehicle occupants and of the vehicle license plate by a single observer worked out fairly satisfactorily, although the license number was missed on 10.8 percent of the observed vehicles.

In a future survey there needs to be more attention to consistency in coding vehicle size and estimated age group and in recording second occupants of one seat position. Procedures need to be developed to include such second occupants and also cargo area occupants in the computerized data file. Also there needs to be more practice observations and more field supervision with dual observation and comparison of results. Perhaps the nine-hour workdays (plus beginning and ending driving time) of the observers should be shortened somewhat.

3.2 The Parking Lot Survey

The basic sample design of using shopping centers and freeway rest areas all over the state at various times of day and on different days of the week seemed appropriate for obtaining statewide representative data on the correctness of child restraint device usage. However, this plan turned out to be very inefficient in terms of the average number of vehicles with CRDs which were observed. In order to get an adequate number of observations for a meaningful analysis, many more parking lots would have to be utilized for many more observation hours, or the sample would have to be modified to be less representative (dropping the

freeway rest areas, utilizing mostly large shopping centers at busy times, etc.) Using such a sample of convenience would mean decreased confidence that the findings were accurate for CRD usage throughout the state, but the resulting data would be adequate for monitoring changes in the correctness of CRD usage over time at the same parking lots.

Clearly it would also be necessary to improve the accuracy of the observers' coding of CRD type and correctness of installation by increased training and field supervision. Probably it would be desirable to record the actual CRD makes.

4.0 REFERENCES

- Asin, Ruth A. Characteristics of 1977 Licensed Drivers and Their Travel, Washington: DOT, Report FHWA/PL/80/007, October 1980, Table 15.
- Federal Highway Administration, Highway Statistics 1981, Washington: DOT, 1982, Table VM-2.
- Hall, William L. and Robert B. Daniel. Effect of Educational, Distribution, and Legislative Activities on Restraint Use Rates for North Carolina Children, Chapel Hill: Highway Safety Research Center, October 1983.
- Htleko, Paul J. and Jana D. The Effect of the Michigan Child Restraint Device Law on Correct Observed Use, Kalamazoo: Borgess Medical Center (1982).
- Insurance Institute for Highway Safety, Status Report, August 15, 1977, page 1.
- McGinley Marketing Research Inc., Michigan Seat Belts, Upper Darby, Pa., October 1982.
- Motorists Information Inc., "News Release," December 6, 1977.
- Motorists Information Inc., Michigan Safety Belt Project Report, Detroit, April 1978.
- National Highway Traffic Safety Administration, unpublished tables, Washington, 1982.
- O'Day, James, unpublished tables, Ann Arbor: UMTRI, 1982.
- Opinion Research Corporation, "Safety Belt Usage in Three Michigan Cities," Princeton, December 1977.
- Phillips, Benjamin M., Safety Belt Usage Among Drivers, Princeton: Opinion Research Corp., May 1980.
- Shelness, Annemarie and Jean Jewett. Observed Misuse of Child Restraints, Warrendale, Pa.: Society of Automotive Engineers Paper 831665, November 1983.
- Wolfe, Arthur C., 1971 and 1973 ASAP Surveys: Washtenaw General Public, Ann Arbor: HSRI, November 1973.
- Wolfe, Arthur C., "Critique of the Lincorp Survey Design for the Observational Study of Seat Belt Use in the Detroit Area," Ann Arbor: HSRI, November 1977.

REFERENCES

MICHIGAN SEATBELT SURVEY

Wolfe, Arthur C., Interim (Two-Year) Evaluation Report on the Oakland County Alcohol Enforcement/Education Project, Ann Arbor: UMTRI, March 1983.

Ziegler, Peter N., Guidelines for Conducting a Survey of the Use of Safety Belts and Child Safety Seats, Washington: NHTSA, May 1983a.

Ziegler, Peter N., personal communication, 1983b.

APPENDIX A - BACKGROUND DATA FOR SURVEY PLANNING

If all motor vehicle occupants used safety belts on every trip, there would be a dramatic reduction in fatalities and personal injuries resulting from motor vehicle traffic crashes. However, studies in Michigan and elsewhere show that only a small minority of motor vehicle occupants take this precautionary step.

In April 1982, a law took effect in Michigan which requires that children under four years old be properly restrained while riding in a motor vehicle. The Michigan legislature is also giving serious consideration to a law which would require all front seat motor vehicle occupants to be restrained. It is important for evaluating the effectiveness of these laws and of efforts to promote increased voluntary use of seat belts that a continued survey of seat belt usage by Michigan motor vehicle occupants be designed and carried out at regular intervals.

Monthly observation surveys by Opinion Research Corporation (ORC) in 19 urban areas of the United States indicate that in 1978-79 only about 12.5 percent of drivers wore safety belts and that passenger usage was even lower (Phillips, 1980). Detroit is not one of these urban areas, but in 1977 a special ORC survey of 11,675 Detroit drivers at 15 locations found a 15 percent usage rate in both August and November. For the same periods, observing over 40,000 drivers at 222 locations, Lincorp found an increase from 12.4 percent to 16.8 percent (unweighted data) in driver belt use--an increase they attributed to the Motorists Information Inc. "Somebody Needs You" safety belt usage campaign (Motorists Information Inc., 1978). The Insurance Institute for Highway Safety (IIHS) has also carried out four observation surveys in the Detroit area. The most recent one took place in April, 1978, and it found a 12 percent driver usage rate (IIHS, 1978).

There have also been a few observation surveys in other Michigan cities. In 1977 ORC found a 16 percent driver usage rate in Traverse City but only a 12 percent rate in Marquette (ORC, 1977). In 1981 ORC found a 22 percent usage rate among Midland drivers and a 20 percent usage rate among Midland adult passengers. However, in the Muskegon area ORC found that only 8.4 percent of 2,534 observed drivers were

wearing a safety belt (NHTSA, 1982). An IIHS observation study in Grand Rapids in 1977 found only 13 percent of the drivers wearing safety belts, although 41 percent of the respondents to a Lincorp telephone survey conducted at about the same time had said they used their belts "always" or "most of the time" (IIHS, 1977).

Self-reported seat belt use in telephone surveys is typically higher than that found in observation studies. In the fall of 1982 McGinley Marketing Research Co., Inc. (1982) carried out a statewide telephone survey of Michigan drivers. Thirty-three percent of the respondents reported that they always wore belts on long trips, 27 percent on trips during wet or snowy weather, and 20 percent on short trips around town. Similarly, two Oakland County mail surveys of drivers revealed that 20 percent in 1980 and 23 percent in 1982 said they "always or almost always" wear safety belts when driving (Wolfe, 1983). This represents a decline from a household survey in Washtenaw County in 1973 which found 44 percent claiming "always" use on long trips and 26 percent claiming "always" use on short trips (Wolfe, 1973).

In the McGinley telephone survey special samples in both Midland and Grand Traverse Counties reported higher usage rates than the state as a whole, consistent with the relatively high usage rates which have been observed in those cities. However, the statewide sample revealed greater usage among urban residents than suburban and rural residents. For long trips the percentages were: 38% urban, 31% suburban, and 29% rural, while for short trips they were 23%, 18%, and 19% (McGinley, 1982). Significant rural-urban differences were also found in ORC's national surveys. A supplementary study of driver belt usage in small towns near the 19 urban areas reported seven percent driver belt usage (Phillips, 1980). In a survey of 1,778 drivers in five rural counties in Arkansas ORC found a usage rate of only 1.8% (NHTSA, 1982).

Corresponding to the self-reported higher usage rates on long trips than on short trips, ORC observation surveys have found slightly higher usage rates at freeway exits than on other primary roads, 13.6% compared to 11.8% (Phillips, 1980). Analysis of Michigan accident data shows even greater road class differences in seat belt usage for drivers involved in accidents: 20 percent usage on interstates, 11 percent usage on state trunklines, and six percent usage on other roads (O'Day, 1982).

The ORC survey was also conducted at three turnpike ticket gates during darkness as well as daylight, and it found a slightly higher usage rate during daytime than at night, 17.9 percent compared to 17.2 percent (Phillips, 1980). However, Michigan accident data show a much larger difference, 13 percent usage during daylight and only 8.5 percent usage during darkness. The usage rate among accident-involved drivers who had been drinking (a mostly nighttime phenomenon) was only 5.7 percent. The accident data show belt usage is greatest during the morning and evening rush hours. The ORC surveys found no significant difference between weekday and weekend belt usage, but the Michigan accident data do indicate a significant difference with 12 percent usage on weekdays and 9.8 percent usage on weekends. Both the ORC surveys and Michigan accident data agree that drivers of smaller vehicles and of foreign vehicles are more likely to wear belts than drivers of larger vehicles and of domestic models. The ORC surveys also show that drivers are slightly more likely to wear belts in wet weather (14 percent) than in dry weather (12.3 percent).

In regard to age and sex, the ORC survey, the McGinley survey, and the Michigan accident data all agree that women drivers are much more likely to wear seat belts than men drivers and also that drivers over 55 are somewhat more likely to wear belts than younger drivers. These age differences are much more dramatic in the accident data than in the two surveys. Usage is 18 percent for accident-involved drivers aged 65-74, compared to only five percent for accident-involved drivers aged 18-19.

The McGinley survey also shows substantially higher reported usage rates by drivers with higher income levels. In the 1977 Lincorp observation survey in Detroit, the vehicle license plate numbers were recorded, the owner's address was traced from the driver license records, and the community of residence was determined. This analysis agreed strongly with the McGinley results in finding a strong relationship between seat belt wearing and having a residence in a community with a high average socio-economic status (Motorists Information, Inc., 1978).

Up to now no statewide seat belt observation survey has been carried out in Michigan. However, as indicated above, a number of local observation surveys have been conducted (including some child restraint

studies in Kalamazoo and elsewhere). In conjunction with data on belt use in accidents, data from national observation surveys, and data from surveys of reported belt use, these local observation surveys show that a number of variables can be expected to have an influence on the seat belt usage patterns of Michigan motor vehicle occupants. These include the person's age, sex, and socio-economic status; type of vehicle; type of road; geographic area of the state and degree of urbanicity; time of day and day of week; trip length and trip purpose; weather conditions; and probably season of the year. Thus all of these factors need to be taken into account in designing an appropriate statewide seat belt observation survey.

Of particular relevance to designing a statewide observation study is the data from Lincorp's survey in Detroit using 222 observation sites. Observed usage rates varied from zero percent to over 40 percent. In spite of an average increase of 4.4 percent from the first survey to the second survey at the 222 sites, there were 39 of the 222 sites at which seat belt usage decreased. Oakland County typically had much higher usage rates than Detroit. The observed variation indicates the importance of using a large number of sites to obtain representative data (Motorists Information, Inc., 1977; Wolfe, 1977).

TABLE A.1
1981 Distribution of Travel by Road Class in Michigan

Road Type	Urban	Rural	Total
Interstates	11.1%	6.0%	17.1%
Other Freeways and Principal Arterials	23.9%	7.4%	31.3%
Minor Arterials	13.2%	5.6%	18.8%
Collectors	9.5%	15.6%	25.1%
Local Streets/Roads	4.1%	3.6%	7.7%
Total	61.8%	38.2%	100.0%

All of the observation studies carried out in Michigan have involved primary roads in urban areas (using the Census Bureau definition of "urban" as a census place with a population of 5,000 to 49,000 or within a designated urbanized place with a population of

50,000 or more). Every year the Federal Highway Administration publishes estimates of vehicle miles traveled by type of road in each state. The 1981 percentage estimates for Michigan are shown in Table A.1 (FHWA, 1982, Table VM-2).

Table A.1 indicates that about 62 percent of travel in Michigan is in urban areas and that about 48 percent is on urban main roads. Unfortunately, it is very difficult to devise ways of observing seat belt usage for the 52 percent of travel which is not on urban main roads and for the 14 percent of travel which is on urban freeways.

Another source of background data which has relevance to the survey design is the Nationwide Personal Transportation Study (NPTS) carried out by the Census Bureau in 20,000 households in 1977-78. This study asked respondents to recall all trips on the previous day. Based on these recall data, the NPTS found the distribution of travel by age and sex of the driver shown in Table A.2 (Asin, 1980).

TABLE A.2
National Distribution of Driver Travel by Age and Sex, NPTS, 1977-78

Age	Male	Female	Total
16-34	13.0%	5.9%	18.9%
25-34	19.9%	7.7%	27.6%
35-44	14.5%	5.6%	20.1%
45-54	12.7%	4.5%	17.2%
55-64	8.5%	2.8%	11.3%
65+	3.7%	1.3%	5.0%
Total	72.3%	27.7%	100.0%

These nationwide travel data may not be precisely representative of Michigan in 1983, but they can provide a rough indication of the type of driver age and sex distribution one might expect. This information is particularly relevant for planning the desirable sample size of a statewide survey. Table A.2 should be considered in conjunction with Table A.3 which shows the estimated minimum changes required to demonstrate statistical significance for samples of different sizes and with different beginning percentages. For example, if one had samples of 2,000 female drivers in each of two surveys and the usage rate was 15 percent on the first survey, the usage rate on the second survey would

have to increase or decrease by at least 3.39 % (i.e., an increase to 18.40 percent or more, or to 11.60% or less) in order to say that the change was statistically significant with a 95% level of confidence. Similarly, if one had samples of 1,000 males aged 16-24 in both surveys and the beginning seat belt usage was 7.5%, the usage rate on the second survey would have to increase or decrease by at least 3.54% (i.e., to 11.05% or more, or to 3.95% or less) to indicate a statistically significant change for that group. For comparing total samples of 8,000 the change required for statistical significance would be much less (from 1.04% to 2.06 percent in Table A.3 depending on the beginning percentage). However, when one starts to look at subgroups of interest on such factors as age, sex, road class, region of the state, and vehicle type, a large total sample can very quickly break down into rather small subsamples. As a result, fairly large changes would be required to attain statistical significance.

TABLE A.3
Estimated Change Required for Statistical Significance

Sample Size	Beginning Percentages					
	5%	7.5%	10%	15%	20%	25%
250	5.85%	7.08%	8.04%	9.57%	10.74%	11.61%
500	4.14%	4.71%	5.70%	6.78%	7.59%	8.22%
1,000	2.91%	3.54%	4.02%	4.80%	5.37%	5.82%
2,000	2.07%	2.49%	2.85%	3.39%	3.78%	4.11%
4,000	1.47%	1.77%	2.01%	2.40%	2.67%	2.91%
8,000	1.04%	1.25%	1.43%	1.70%	1.89%	2.06%

NOTE: These figures are three times the standard error expected in a simple random sample. Multiplication by two gives the sampling error for a simple random sample at a 95 percent level of confidence, and a further multiplication by 1.5 takes into account an estimated cluster design effect.

APPENDIX B - THE SURVEY METHODOLOGY

Measurement of the proportion of passenger vehicle occupants wearing available restraint systems may seem rather simple. One need only find a convenient place for observation, look at a random sample of passing vehicles, and record the restraint usage of the occupants in the various seated positions. Complications emerge because belt usage is not uniform across regions of the state, day of week, occupant age and sex, car size, weather, time of day, or road class. As mentioned in Appendix A, Lincorp found in 1977 that driver belt usage at different sites in the metropolitan Detroit area varied from zero to over 40%. (Motorists Information Inc., 1978). For the present study, a sampling plan was devised to represent various regions within the state, several road classes, urban rural areas, and all days of the week, and all daylight hours.

The goal of the survey was to obtain information on restraint usage by all kinds of occupants in all kinds of vehicles on all kinds of roads at all times of day and days of the week in all parts of Michigan. Unfortunately, this goal had to be compromised somewhat in the development of a cost-effective and practical survey methodology. Without obtaining police assistance for stopping moving vehicles, the only practical approach was to utilize intersections with stop-and-go traffic signals where vehicles were already required to stop long enough to permit observation of the license plate number and the age, sex, and restraint use of each occupant. But this decision meant that observations could be carried out only on non-freeway main roads rather than on all types of roads, as would be ideally desirable. Also visibility limitations precluded making observations in other than daylight hours and in other than standard-sized vehicles (thus excluding motorhomes and most cargo vehicles).

Fortunately, there is at least one signalized intersection in almost every Michigan county, and it was possible to develop a sampling plan which represented all parts of the state. The details of choosing 240 intersections in 44 PSUs in 32 different counties are explained more fully in Appendix C.

It was also possible to carry out the survey on all days of the week and, because it took place in late summer, to spread it across the hours from 8:00 a.m. to 8:00 p.m. The survey took place during 30 of the 45 days from August 9 through September 22 with each of the two Field Investigators working a cycle of five days on duty followed by three days off. This resulted in eight observation days for each week day and ten observation days for each weekend day. On each observation day they observed restraint usage for five one-hour periods over a nine-hour work day, four periods at signalized intersections, and one period at a shopping center or freeway rest area. These nine-hour periods were changed on different days, so that all daylight hours would be covered.

A further practical problem was that the field investigators could observe lap belt usage only in the lane of traffic adjacent to where they were standing. On some one-way roads and divided highways they were able to observe from the left curb, but usually they were stationed on the right curb of the intersection. Thus on major roads they often had to limit their observations to slower right-lane and right-turning traffic. How much bias may be involved in under-observing the usually faster middle and left lane traffic is not known. Because of the possibility that drivers who first stop for a red light may be unusually cautious types of drivers, the field investigators were instructed to begin with the second vehicle stopped if more than one was stopped.

While it was not possible to observe directly vehicles traveling on freeways, it was possible to observe freeway traffic which left the freeway at signalized intersections. As shown in Table A.1, about 21 percent of Michigan driving is on freeways, and it was desired to obtain about one-fifth of the observations at freeway exits. There were seven northern Michigan PSUs covering eight observation days which contained no freeways in the county or adjacent county. For two other PSUs which contained no freeways themselves signalized freeway exits were chosen in adjacent counties (Lenawee to Washtenaw and Barry to Kent). For the eight PSUs which contained freeways but no signalized freeway exits two were assigned freeway exit sites in adjacent counties (Monroe to Wayne and Montcalm to Kent); three made use of heavily traveled stop-sign freeway exits (Niles, Berrien, and Van Buren); Chippewa PSU was assigned the I-75 toll booth at Mackinac Bridge; and two did not use a freeway

exit (Crawford/Roscommon and Iosco/Alcona). In all, 50 of the 240 intersection sites, or 21 percent, were freeway exits. Unfortunately, these signalized freeway exits were concentrated in urban areas somewhat more than would have been desirable, but at least it was possible to give some appropriate representation to freeway traffic. One freeway exit was observed each day in the PSUs with selected freeway exits.

For most of the selected sites the field investigators were offered one or two randomly-chosen nearby alternatives, but in most cases they found the first-choice site satisfactory. They were instructed to stand at whichever corner of the intersection would maximize their observations, and they were permitted to change corners during the observation period. In the conduct of the survey there were some safety and other problems at some intersections, and no observations were carried out at 24 sites, while there was one additional site where observations were carried out by mistake. Prior to working at a selected site the police agency with jurisdiction over the site was sent a copy of the week's schedule with an explanatory cover letter from the Office of Highway Safety Planning (see Appendix E and F). The field observers sometimes also made direct contact with the police in an area to make sure they were informed of the survey activity.

In addition to the intersection observations the field investigators were to spend one hour each day observing child restraints in parking lots. These locations consisted of 15 freeway rest areas in the 44 PSUs and of 45 shopping centers also chosen for convenience. Unfortunately, this aspect of the survey did not work out as well as the intersection survey. Of the 15 freeway rest areas no vehicles were observed with child restraint devices in seven, and only 12 appropriate vehicles were observed in the remaining eight. Of the 45 shopping center parking lots seven had no observations, but there were 308 vehicles observed in the remaining 38, an average of 8.1 vehicles. The 320 vehicles contained 348 child seats of which 170, or just under half, were observed in actual use. This was insufficient to provide adequate information on the correctness of child seat installation and usage. Thus these data are not included in the report.

APPENDIX C - EXPLANATION OF THE SAMPLING AND OPERATIONAL
PROCEDURES FOR TRAINING THE FIELD INVESTIGATORS

This appendix contains a reproduction of the instructions prepared for the field investigators. Some of the material is repeated elsewhere in this report but is shown here to indicate the background provided in training the investigators.

Michigan Seatbelt Usage Observation Study: Background and Instructions

The purpose of this study is to obtain current information on the extent of seatbelt and child restraint usage by motor vehicle occupants on Michigan roads. This information will be obtained for different parts of the state and will be related to type of vehicle, seat position, and age and sex of the occupant.

The Sample. The 83 Michigan counties were first formed into 63 counties and county-groups each of which contains at least three intersections with three-color traffic signals. Thirty-two of these 63 counties and county-groups were then selected in a controlled probability procedure on the basis of the 1980 population, using seven geographic strata. The Upper Peninsula and Northern Michigan were purposely over-represented in relation to their populations (weights of .4143 and .6435, respectively), while Southeastern Michigan was purposely underrepresented in relation to its population (weight of 1.1584). The other four regions have weights ranging from 1.0156 to .9872. Six of these selected areas were subsequently divided into 18 subareas, making a total of 44 primary sampling units (PSUs).

The survey is to be carried out by two independent Field Observers on 30 days of the 45 days from August 9 through September 22. The six survey weeks are:

August 9-13 (Tuesday-Saturday)
August 17-21 (Wednesday-Sunday)
August 25-29 (Thursday-Monday)
September 2-6 (Friday-Tuesday)
September 10-14 (Saturday-Wednesday)
September 18-22 (Sunday-Thursday)

This procedure insures that each weekday will have eight days of field observation and each weekend day will have ten days of field observation.

A Field Observer will spend one or more of the 60 observation days in one of the 44 PSUs (up to seven days in Detroit). The general plan is to observe for five hours each day--three at regular intersections with traffic signals, one at a freeway exit with a traffic signal, and one at a shopping center or freeway rest area. However, this is not possible in nine PSUs without a freeway, so a modification is required in these PSUs. Overall there are 300 observation sites--190 normal intersections, 50 freeway exits, 45 shopping centers, and 15 freeway rest areas.

The daily schedule of survey times will vary as follows for each week:

Day 1: 11-12, 1-2, 3-4, 5-6, 7-8
Day 2: 9-10, 11-12, 1-2, 3-4, 5-6
Day 3: 8-9, 10-11, 12-1, 2-3, 4-5
Day 4: 10-11, 12-1, 2-3, 4-5, 6-7
Day 5: 8-9, 10-11, 12-1, 2-3, 4-5

Thus observation data will be available for early evening seat belt usage as well as daytime usage.

The final step in the sample development is the selection of observation sites in each PSU. The Michigan Department of Transportation provided a list of all traffic signals on state and Federal highways. This list is organized by counties. In each PSU this list was supplemented by visits or phone calls to the local city or county road commission traffic engineers to find out about locally-maintained traffic signalized intersections. In some areas all of the signalized intersections were marked on a map, and each one was given a number. In other areas the intersections were arranged on a list of some sort (usually alphabetic by the intersecting street which begins with the lower letter), and each intersection was given a number. In Detroit a random sample of square grids on a map was selected, and within each grid the traffic signalized intersections were numbered for further selection. The actual selections in each area were then made by dividing the total number of signals in the area by the number of

selections to be made, choosing a random number from a random number table between 0 and this quotient to obtain the first selection, and then incrementing the random number by the quotient for each additional selection on the list.

For each normal intersection site three possible locations were selected, if there were enough signalized intersections available in the PSU. So most sites have a Choice A, a Choice B, and a Choice C. This allows for utilizing the choice which provides the best location for the observer, adequate traffic flow, etc. It also provides substitutes in case the first choice site turns out to be on flash operation or closed for construction. A copy of the form indicating chosen sites is included in Appendix F. Only in Charlevoix PSU was it necessary to use the same intersection two times (using opposite corners).

The same basic listing and random choice procedure was followed in choosing the freeway exit sites, except that it was less often possible to choose three alternatives for each observation site because of a shortage of signalized freeway exits. In three PSUs with freeways but with no signalized freeway exits, exits with stop signs on to fairly heavily traveled roads were used instead.

For choosing the freeway rest areas the PSUs were placed in groups with four observation days (or a multiple of four), and up to three freeway rest areas were randomly selected for each group of four. The Michigan map shows a total of 45 freeway rest areas located in the original 32 selected counties and county-groups.

The above procedure provided freeway rest areas for use on 15 observation days. For the remaining 45 observation days a local shopping center was chosen for one hour's use each day. No attempt was made to define a "shopping center," to list all eligible, and to randomly choose among them. Rather the selection criteria involved having a large off-road parking area with a substantial flow of family traffic in and out. Thus a Meijer's discount store, a K-Mart discount store (preferably in conjunction with a supermarket), a large supermarket (preferably in conjunction with other large stores), or a shopping mall was usually selected. Of course in more rural areas large

shopping centers were not available, and the largest available shopping area was chosen.

Operational Procedures: Intersections. Area police agencies will be notified by a letter signed by Phil Haseltine of OHSP when the Field Observers will be in their areas (a copy of this letter is included in Appendix F). The observers are also encouraged to contact local police directly, when appropriate. They will also have a small card which they can hand to inquisitive motorists who wonder why they are peering in their windows. When observing, each Field Observer will wear a bright orange vest for safety and to provide some "official" status. They will also have a sign "TRAFFIC SURVEY" on the back of their clipboards.

A major operational difficulty in attempting to obtain observations from a random sample of motor vehicles is the practical necessity of making the observations only in the lane of traffic adjacent to where the observer is standing. For most intersections with four-way traffic this means that only right lane traffic can be observed. Many intersections have a special right turn lane or are widened at the intersection so that right-turn traffic can go to the right of the straight-through traffic. Also on major roads with two straight-through lanes and a left-turn lane, unless traffic is very heavy most straight-through vehicles use the inside straight-through lane leaving the right lane largely for right-turning vehicles. And with the Right Turn on Red law, right-turning vehicles often do not stop very long (if at all) before turning unless there is quite heavy traffic on the cross street. Similarly on a divided highway with three or four lanes of straight-through traffic where one could observe the far left lane from the median, this lane often does not have much use unless traffic is very heavy.

A second major difficulty is the fact that observations can only be made when the traffic is stopped on a red signal, and the heavier the traffic, the shorter the red signal is likely to be. Timings of 20-second red on the main road and 40-second or even 60-second red on the minor road are not uncommon, and thus if one were observing on the main road one could only be "working" one-third or one-quarter of the time. Thus if there is enough traffic on the minor road that usually two or three cars are stopped, then it is probably preferable to use the minor

road. So at many intersections there is a trade-off between extent of traffic and extent of stopped time that complicates deciding where to stand for the observations.

Probably the ideal type of intersection is one which has a right-turn cut-off lane, so that the observer can stand in the island to observe straight-through traffic. One-way roads also can be good observation sites because the observer can stand at the corner of the cross street where there is no right turn. The same is true at one "corner" of a T intersection. Also of course some intersections are posted with a No Turn on Red sign, and this can solve much of the problem with observing the right lane only. One-way roads and divided highways also offer the alternative of observing the left lane from the left side of the roadway, and in these cases it is often possible to also observe the right lane of the cross street--thus being able to "work" all of the time rather than just during the red phase on one street. Most freeway exits should be observed from the left side, observing traffic turning left onto the cross road because right-turning traffic often does not stop very long.

Unfortunately, at many intersections there is no "good" place to observe from, so the Field Observer should just use his best judgment as to the location which will maximize observed vehicles during the assigned hour. At some intersections one or more suggested observation points have been indicated on the site selection form, but the Field Observer does not have to use these. He can experiment with different observation points, and if he decides the whole site is unsatisfactory, he can move to a substitute site (if available).

The observation day has been set up with five hours of observation and four hours of break time to change sites, eat, rest, etc. However, there is nothing rigid about working exactly from 10:00 a.m. to 11:00 a.m., for example. Hopefully if the next site is not far away, it would be possible to continue to observe a little past the hour and still have time for a reasonable break before beginning at the next site. The actual beginning and ending time of observation will be recorded on the site observation form. Especially when the number of observed vehicles has been rather low (less than 30) it would be desirable to continue the observations into the break hour.

The Field Observer will also indicate on the site observation form the types of observation points used, the weather conditions, and the traffic flow characteristics on the observed road. On a separate form he will also make notes on any general problems with the site.

If it rains lightly the survey should be continued using rain gear and a plastic cover for the clipboard. If it rains heavily for a period the survey should be temporarily stopped, since visibility limitations would make observation very difficult anyway.

To help with quick right-turning motorists the bottom half of the clipboard will have a covered sign which says "PLEASE WAIT A MOMENT." The cover will be hinged at the bottom and held over the sign by velcro, so that it can be quickly dropped down when needed. For the majority of the vehicles which will have only one occupant (the driver), the sign probably would not be needed, but particularly when there are a number of occupants to be observed, the sign might be helpful.

When more than one vehicle is stopped, the observation should begin with the second vehicle. Medium and large trucks and motorhomes will be ignored, but pickups, vans, and off-road vehicles should be included if possible. The data observation form and the coding conventions are shown in Appendix F. If there are two occupants of the same seat position, the second occupant should be recorded on the second line of the data form with all other columns on that line left blank.

Operational Procedures: Shopping Centers and Rest Areas. The purpose of these observations is to obtain more detailed information on child restraint use. So the procedure will be to watch for cars entering the parking lot which contain small children and to try to observe these vehicles as they park. All occupants should be recorded just as in the main study at intersections, but there will be four additional variables on child restraints and their proper use to be recorded on a second line for each vehicle on the observation form. The observer may talk to the occupants, ask to see how the child restraint device is fastened, etc.

At each shopping center the manager, security guard, or someone similar should be contacted and informed about the survey, using a copy of the Phil Haseltine letter.

While waiting for a vehicle to come into the parking lot with a child in a child restraint device, the observers should walk around the parking lot looking for vehicles containing a CRD. For each one found the type and installation information can be filled in, and then the usage information can be added if the occupants come to the vehicle and prepare to depart. Usage and demographic information should be obtained for all occupants, if possible, just as in the intersection survey.

APPENDIX D - DATA PROCESSING AND WEIGHTING

Data were acquired in the field by having the investigators record their observations on forms on a clipboard. At each site a new form was used, and the site-specific data were entered at the top of the form. This included the week and day of the cycle (1-6), day of the week (1-7), the PSU number (generally the county number), the site number within the PSU, the time for beginning and ending of observations, and a brief description of weather and traffic conditions. The field investigator made the final choice of one of three intersections and of the specific leg of the chosen intersection. These were also recorded on this form.

Photographs were taken of nearly all sites, both to indicate the conditions at the time of the observations and to serve as a reference for future quarterly studies. The original data sheets and the photographs have been retained in a file.

Data were entered into computer form on an Apple computer which had been programmed to reject inappropriate codes. The computerized data were then transferred by telephone line to the University of Michigan's computer system for further analysis.

Computer files were built into a MIDAS¹ file each week, and checked for consistency at that time. Next the data for the latest week were added to the previous set, and initial analyses were conducted.

A preliminary report was made at the end of the first three weeks. The information in this report did not well represent the state (since a number of areas of the total statewide sample had not been visited), and thus the results were presented in raw form. A copy of the interim report is attached as Appendix H.

Two separate computer files resulted from the program. The first of these contains data on the first six seat locations only (i.e., the front and rear seats) of the 13,812 vehicles observed at the statewide sample of intersections. The second file contains data from the 348

¹MIDAS is the Michigan Digital Analysis System, a local statistical analysis package maintained at the University of Michigan.

parking lot and freeway rest area observations of child seat characteristics and usage.

Three types of weighting factors were used in developing the tables for the intersection survey. First the observations at every site were weighted up or down so that each site's weight would equal the statewide average of 63.6. Second, adjustments were made in PSUs with missing sites by weighting upward the observations at used sites to also represent the missing sites. For example, if observations were available from only three of four selected sites in a PSU, then those observations were given a missing site weight of 1.33. This was done separately for freeway and non-freeway sites. Third, there is a region weight which takes into account the planned over-sampling of the northern areas of Michigan and under-sampling of the Detroit Metropolitan area. For example, the region weight for PSUs in the Upper Peninsula is .4143 and for southeast Michigan it is 1.1584. The first weight is used for the PSU-level tables, and the product of the three weights is used for all other intersection tables except the site-level data in Table G.1 which are unweighted.

APPENDIX E - THE TWELVE WEEKLY SCHEDULES

UMTRI SEATBELT OBSERVATION SURVEY

WEEKLY SCHEDULE FOR WENDELL YOUNG, WEEK NO. 1, August 9-13

DAY # 1: Tuesday, August 9 PSU: Oakland

- 11-12: 91A. Rest area on SB I-75 south of Holly Road
- 1-2: 02A. Clarkston and Sashabaw, Independence Township
- 3-4: 03A. Pontiac Lake Road & Airport, Waterford Township
- 5-6: 51A. I-96 EB Ramp at Novi Road, Novi
- 7-8: 01C. Pontiac Trail & Milford Road, Lyon Township

DAY # 2: Wednesday, August 10 PSU: Oakland

- 9-10: 72A. A&P Parking lot, Adams and Bowers, Birmingham
- 11-12: 13A. Bowers and Adams, Birmingham
- 1-2: 54B. I-75 NB at Big Beaver, Troy
- 3-4: 10A. Wattles & Crooks, Troy
- 5-6: 11A. Big Beaver & John R., Troy

DAY # 3: Thursday, August 11 PSU: Oakland

- 8-9: 09A. Quarton & Cranbrook, Bloomfield Township
- 10-11: 08C. Square Lake & Woodward, Bloomfield Township
- 12-1: 53A. M-59 EB at Opdyke, Pontiac
- 2-3: 04A. Avon at Crooks, Avon Township
- 4-5: 92A. Rest Area, NB I-75 North of Holly Road

DAY # 4: Friday, August 12 PSU: Oakland

- 10-11: 52A. I-96 WB at Orchard Lake, Farmington Hills
- 12-1: 71A. Tel-Twelve Parking Lot, Telegraph & 12-Mile, Southfield
- 2-3: 07B. Nine-Mile & Lahser, Southfield
- 4-5: 06C. Telegraph SB Crossover at 9-Mile, Southfield
- 6-7: 05A. Grand River at Drake, Farmington Hills

DAY # 5: Saturday, August 13 PSU: Oakland

- 8-9: 55A. I-75 NB at 12-Mile, Madison Heights
- 10-11: 14A. 12-Mile & Campbell, Madison Heights
- 12-1: 15A. Meyers & John R., Hazel Park
- 2-3: 94A. Farmer Jack Parking Lot, 9-Mile & John R., Hazel Park
- 4-5: 12A. Northend and Coolidge, Oak Park

UMTRI SEATBELT OBSERVATION SURVEY

WEEKLY SCHEDULE FOR ROLLIN DAVIS, WEEK NO. 1, August 9-13

DAY # 1: Tuesday, August 9 PSU: Berrien-Niles

11-12: 02. Main at Second, Niles

1-2: 71. K-Mart Parking Lot, SE of US-33 & Bertrand, Niles Township

3-4: 03. US-33 at Bell, Niles Township

5-6: 51. US-31 NB Ramp at US-12

7-8: 01. US-12 B.R. Main/Oak at US-33 12th, Niles

DAY # 2: Wednesday, August 10 PSU: Berrien County

9-10: 03. Front and Oak, Buchanan

11-12: 01. US-12 Buffalo at Whittaker, New Buffalo

1-2: 02. US-31-33 Ferry at US-31-33 Cass, Berrien Springs

3-4: 71. Meijers Parking Lot West of Pipestone North of I-94

5-6: 51. I-94 EB Ramp at Pipestone

DAY # 3: Thursday, August 11 PSU: Van Buren County

8-9: 51. I-96 NB Ramp at Phoenix, West of South Haven

10-11: 03. Phoenix and Center, South Haven

12-1: 91. Rest Area I-94 West of Hartford (Berrien County)

2-3: 02. M-51 and Phelps, Decatur

4-5: 01. M-40 and Michigan, Paw Paw

DAY # 4: Friday, August 12 PSU: Kalamazoo City

10-11: 71. K-Mart Parking Lot, Stadium and 12th

12-1: 03. Howard and Westnedge

2-3: 51. I-94 EB at Sprinkle

4-5: 02. West South and Park

6-7: 01. East Michigan and King

DAY # 5: Saturday, August 13 PSU: Kalamazoo County

8-9: 01. Parchmount and Riverview, Parchment

10-11: 02. Comstock and Sprinkle, Comstock Township

12-1: 51. I-94 WB at 9th, Oshtemo Township

2-3: 03. West Michigan and 9th, Oshtemo Township

4-5: 71. Mall NW of Main and 12th, Oshtemo Township

UMTRI SEATBELT OBSERVATION SURVEY

WEEKLY SCHEDULE FOR Wendell Young, WEEK NO. 2, August 17-21

DAY # 1: Wednesday, August 17 PSU: 24. Delta

11-12: 01A. Third Avenue North and North Lincoln, Escanaba

1-2: 02A. Ludington and Tephenson, Escanaba

3-4: 71A. Shopping Center, Escanaba Area

5-6: 03A. Ludington and Twelfth Street, Escanaba

7-8: 04A. Fifth Avenue South and South Lincoln M-35, Escanaba

DAY # 2: Thursday, August 18 PSU: 22. Dickinson

9-10: 04A. US-2 and US-141, Breitung Township

11-12: 71A. Shopping Center, Iron Mountain Area

1-2: 01A. H Street and M-95 Carpenter, Iron Mountain

3-4: 02A. East Blvd./Nelson and M-95 Carpenter, Kingsford

5-6: 03A. Hughitt and US-2 Stephenson, Iron Mountain

DAY # 3: Friday, August 19 PSU: 52. Marquette

8-9: 01A. Cleveland and Third, Ishpeming

10-11: 02A. US-41 Maple and Baldwin, Negaunee

12-1: 71A. Shopping Center

2-3: 03A. West Fair and Lincoln, Marquette

4-5: 04A. Magnetic and South Seventh, Marquette

DAY # 4: Saturday, August 20 PSU: 52. Marquette

10-11: 72A. Marquette Mall

12-1: 05A. East Hewitt and North Third, Marquette

2-3: 06A. Washington and Lincoln, Marquette

4-5: 07A. Washington and South Front, Marquette

6-7: 08A. M-28 and US-41 Junction, Chocolay Township

DAY # 5: Sunday, August 21 PSU: 17. Chippewa

8-9: 02A. Easterday and Ashmun, Sault Ste. Marie

10-11: 01A. Easterday and Ryan, Sault Ste. Marie

12-1: 03A. Portage and Ashmun, Sault Ste. Marie

2-3: 91A. Rest Area SB on I-75 south of Bridge

4-5: 51A. I-75 International Bridge Toll Booth

UMTRI SEATBELT OBSERVATION SURVEY

WEEKLY SCHEDULE FOR Rollin Davis, WEEK NO. 2, August 17-21
15.

DAY # 1: Wednesday, August 17 PSU: Charlevoix

- 11-12: 01A. Water and Lake, Boyne City
- 1-2: 02A. Water and Park, Boyne City
- 3-4: 71A. Captains Corner, M-66 and US-31
- 5-6: 03A. Clinton and Bridge NB, Charlevoix
- 7-8: 04A. Clinton and Bridge SB, Charlevoix

DAY # 2: Thursday, August 18 PSU: 28. Grand Traverse

- 9-10: 01A. US-31 and M-37 south of Traverse City
- 11-12: 71A. Cherryland Mall, Airport and Garfield, Garfield Township
- 1-2: 04A. US-31 Front and Munson/Fair, Traverse City
- 3-4: 02A. State and Union, Traverse City
- 5-6: 03A. Eighth and Boardman, Traverse City

DAY # 3: Friday, August 19 PSU: 53. Mason

- 8-9: 01A. US-10 and US-31, Pere Marquette Township
- 10-11: 71A. K-Mart and Giantway, US-10 and Nelson, Pere Marquette Township
- 12-1: 03A. US-10 Ludington and Harrison, Ludington
- 2-3: 04A. US-10 Ludington and James, Ludington
- 4-5: 02A. US-10 State and US-31 Main, Scottville

DAY # 4: Saturday, August 20 PSU: 61. Muskegon

- 10-11: 03A. Apple and Jefferson, Muskegon
- 12-1: 51A. Laketon and NB US-31, Muskegon Township
- 2-3: 02A. Airport and Grand Haven, Norton Shores
- 4-5: 71A. K-Mart Plaza, Seminole and Henry, Norton Shores
- 6-7: 01A. Spring and Muskegon US-31 BR, Muskegon

DAY # 5: Sunday, August 21 PSU: 54. Mecosta

- 8-9: 01A. M-20 Maple and US-131 State, Big Rapids
- 10-11: 02A. Perry and US-131 State, Big Rapids
- 12-1: 03A. M-20 Maple and M-20 Third, Big Rapids
- 2-3: 71A. K-Mart etc. south of Big Rapids on US-131
- 4-5: 04A. M-20 and M-66, Remus

WEEKLY SCHEDULE FOR Wendell Young, WEEK NO. 3, August 25-29DAY # 1: Thursday, August 25 PSU: 64. Oakland - Royal Oak11-12: 18B. Fourth and Troy, Royal Oak1-2: 17B. Twelve Mile and Crooks, Royal Oak3-4: 16C. Thirteen-Mile and Crooks, Royal Oak5-6: 56A. I-75 NB Ramp at Fourteen-Mile, Troy7-8: 73A. Oakland Mall, Fourteen-Mile and I-75, TroyDAY # 2: Friday, August 26 PSU: Wayne - Detroit9-10: 08A. East Warren/Calvin and Mack, Detroit11-12: 71A. Shopping Center, NW Corner of Mack and Moross, Detroit1-2: 55A. I-94 WB Ramp at Gratiot, Detroit3-4: 05A. East Outer Drive and Gratiot, Detroit5-6: 21A. East Seven Mile and Gratiot, DetroitDAY # 3: Saturday, August 27 PSU: Wayne - Detroit8-9: 06A. East Seven Mile and Mound, Detroit10-11: 72A. Belmont Plaza, Eight-Mile and Dequindre, Detroit12-1: 54B. I-75 NB Ramp at McNichols, Detroit [Dequindre]2-3: 14A. East Eight-Mile WB Crossover at Fleming (east of Dequindre), Detroit4-5: 09B. East Seven-Mile and Van Dyke, DetroitDAY # 4: Sunday, August 28 PSU: Wayne - Detroit10-11: 3A. I-96 South Service Drive and Burt Road, Detroit12-1: 15A. Schoolcraft and St. Mary's, Detroit2-3: 10A. Lyndon and Schaefer, Detroit4-5: 75A. Shopping Center at Grand River and Greenfield, Detroit6-7: 52A. I-96 EB Ramp at Greenfield, DetroitDAY # 5: Monday, August 29 PSU: Wayne - Detroit8-9: 12A. West Eight Mile and Woodward, Detroit10-11: 56A. I-75 EB Ramp at Gratiot, Detroit12-1: 74A. Shopping Center at Lafayette and Chene, Detroit2-3: 16A. Ferry Park and Rosa Parks Blvd., Detroit4-5: 4A. West Euclid and 14th, Detroit

WEEKLY SCHEDULE FOR Rollin Davis, WEEK NO. 3, August 25-29

DAY # 1: Thursday, August 25 PSU: 08. Barry

11-12: 51A. 44th Street and NB US-131 Ramp, Wyoming

1-2: 1A. M-37 Broadway and Main, Middleville

3-4: 71A. Felpausch Supermarket, SE of State and Michigan, Hastings

5-6: 2A. Mill and Michigan, Hastings

7-8: 3A. M-37 State and Broadway, Hastings

DAY # 2: Friday, August 26 PSU: 23. Eaton

9-10: 01A. M-43 Saginaw and M-100 Clinton, Grand Ledge

11-12: 71A. Lansing Mall, NW of Saginaw and Elmwood, Delta Township

1-2: 02A. St. Joe and Creyts, Delta Township

3-4: 51A. I-496 WB Ramp at Creyts, Delta Township

5-6: 03B. Upland/Shepherd at Cochrane, Charlotte

DAY # 3: Saturday, August 27 PSU: 33. Ingham County

8-9: 01A. M-43 Saginaw and Waverly, Lansing Township

10-11: 02A. Holt and Aurelius, Delhi Township

12-1: 71A. Rest Area on EB I-96 or NB US-127 near their interchange

2-3: 51A. I-96 EB and WB Ramps at Pennsylvania, Lansing

4-5: 03A. M-43 Grand River and Putnam, Williamston

DAY # 4: Sunday, August 28 PSU: 34. Ingham - East Lansing

10-11: 03B. Lake Lansing Road and Hagedorn, East Lansing

12-1: 01A. Saginaw and Harrison, East Lansing

2-3: 51A. I-496 North Service Road (St. Joseph) at Pennsylvania, Lansing

4-5: 71B. Meridan Mall, Grand River and Marsh, Meridan Township

6-7: 02A. Michigan and Grand River, East Lansing

DAY # 5: Monday, August 29 PSU: 38. Jackson

8-9: 51A. SB US-127 and I-94 exits to Boardman and West, Blackman Township

10-11: 71A. PAKA Shopping Center, Boardman and West, Blackman Township

12-1: 01A. Wildwood and North Wisner, Jackson

2-3: 02A. Washington and South Jackson, Jackson

4-5: 03A. Monroe/Chicago and M-50 Main, Brooklyn

WEEKLY SCHEDULE FOR Wendell Young, WEEK NO. 4, September 2-6DAY # 1: Friday, September 2 PSU: 82. Wayne-Detroit11-12: 57A. I-94 EB Ramp at Grand Blvd., West1-2: 77A. Shopping Center at Grand River and Oakman Blvd.3-4: 01A. West Outer Drive and Wyoming5-6: 18A. McNichols and Greenlawn7-8: 20A. Seven-Mile and Asbury ParkDAY # 2: Saturday, September 3 PSU: 82. Wayne-Detroit9-10: 51A. NEB I-75 at Dearborn11-12: 76A. Shopping Center at Michigan and Greenfield, Dearborn1-2: 17A. West Warren and Central3-4: 19A. Joy and American5-6: 13C. Michigan and JunctionDAY # 3: Sunday, September 4 PSU: 82. Wayne-Detroit8-9: 53B. US-10 (Lodge) NB Ramp at Glendale10-11: 2A. West Eight-Mile and Greenfield12-1: 7A. West Eight-Mile WB Crossover east of Heyden2-3: 11B. West Eight-Mile and M-39 East Service Drive4-5: 73A. Northland Mall, NW of Eight-Mile and Greenfield, SouthfieldDAY # 4: Monday, September 5 PSU: 85. Wayne-Livonia10-11: 71A. Livonia Mall, NW of Seven-Mile and Middlebelt, Livonia12-1: 01C. Six-Mile and Levan2-3: 03A. Plymouth Road and Levan4-5: 02B. I-96 Schoolcraft WB Service Drive at Newburgh6-7: 51A. I-275 SB Ramp at Six-MileDAY # 5: Tuesday, September 6 PSU: 84. Wayne-Garden City8-9: 3A. Marquette and Venoy, Garden City10-11: 1A. Warren and Middlebelt12-1: 2A. Block and Middlebelt2-3: 91A. Rest Area on NB I-275 North of US-12, Canton Township4-5: 51B. I-275 SB Ramp at Ann Arbor Road, Plymouth Township

UMTRI SEATBELT OBSERVATION SURVEY

WEEKLY SCHEDULE FOR Rollin Davis, WEEK NO. 4, September 2-6

DAY # 1: Friday, September 2 PSU: 44. Lapeer
 11-12: 21A. K-Mart on M-24 North of M-21 Freeway, Lapeer Township
 1-2: 51A. M-21 EB Ramp at M-24 Lapeer Road, Lapeer Township
 3-4: 01A. East/Baldwin and M-24 Main, Lapeer
 5-6: 02A. M-21 Genesee and Saginaw, Lapeer
 7-8: 03A. Dryden Road and Mill Road, Dryden

DAY # 2: Saturday, September 3 PSU: 74. St. Clair
 9-10: 51A. M-21 Oak Street Exit at 24th Street, Port Huron
 11-12: 01A. Hancock Street and M-25 Pine Grove Avenue, Port Huron
 1-2: 02A. State Street and Stove Street, Port Huron
 3-4: 03A. Lapeer Road and Thirty-Second Street, Port Huron Township
 5-6: 91A. Rest Area on WB I-94, West of road to Adair

DAY # 3: Sunday, September 4 PSU: 50. Macomb
 8-9: 5A. M-97 Groesbeck and Kelly, Fraser
 10-11: 71A. Macomb Mall, NW of Masonic and Gratiot, Roseville
 12-1: 51B. I-94 EB Ramp at Little Mach, Roseville
 2-3: 1A. Fourteen-Mile and Bunet, Warren
 4-5: 8A. Nine-Mile and M-53 Van Dyke, Warren

DAY # 4: Monday, September 5 PSU: 50. Macomb
 10-11: 53A. M-53 NB Ramp at Hall, Sterling Heights
 12-1: 09A. 24-Mile Road and Van Dyke, Shelby Township
 2-3: 73A. Lakeside Mall, SE of Hall and Schoenherr, Sterling Heights
 4-5: 02A. M-59 Hall and Delco Blvd., Sterling Heights
 6-7: 03A. 15-Mile Road and Chrysler Drive, Sterling Heights

DAY # 5: Tuesday, September 6 PSU: 50. Macomb
 8-9: 52A. I-94 NB Ramp at Nine-Mile, St. Clair Shores
 10-11: 6A. Masonic and Hoover, Warren
 12-1: 4A. Thirteen-Mile/Chicago and General Motors Drive, Warren
 2-3: 7A. Twelve-Mile and Lorraine, Warren
 4-5: 72A. Universal Mall, SW of 12-Mile and Dequindre, Warren

UMTRI SEATBELT OBSERVATION SURVEY

WEEKLY SCHEDULE FOR Wendell Young, WEEK NO. 5, September 10-14

DAY # 1: Saturday, September 10 PSU: 83. Wayne-Canton

11-12: 91A. Rest Area on WB I-94 west of Belleville Road, Canton Township

1-2: 3B. Michigan and Canton Center, Canton Township

3-4: 51A. I-275 SB Ramp at M-153 Ford Road, Canton Township

5-6: 2B. M-153 Ford Road and Sheldon, Canton Township

7-8: 1A. Joy and Canton Center, Canton Township

DAY # 2: Sunday, September 11 PSU: 86. Wayne-Melvindale, etc.

9-10: 01A. Oakwood and Allen, Melvindale

11-12: 71A. Farmer Jack Shopping Center, NE of Oakwood and Prospect, Melvindale

1-2: 51A. I-275 NB Ramp at M-39 Southfield, Lincoln Park

3-4: 2B. Oak/Whitehead/Haltiner and West Jefferson, River Rouge

5-6: 3B. Outer Drive and Seventh, Ecorse

DAY # 3: Monday, September 12 PSU: 88. Wayne-Wyandotte

8-9: 51A. NB I-75 Ramp at Allen/North Line, Southgate

10-11: 1A. Goddard and Jefferson, Wyandotte

12-1: 2B. Walnut and Jefferson, Wyandotte

2-3: 3A. Eureka and Fort, Wyandotte

4-5: 71A. Southgate Shopping Center, SW of Eureka and Howard, Southgate

DAY # 4: Tuesday, September 13 PSU: 87. Wayne-Trenton, Riverview

10-11: 71A. A&P Shopping Center, SE of Sibley and Fort, Riverview

12-1: 1B. Fort SB Crossover, North of Williamsburg, Riverview

2-3: 2A. Sibley and Quarry, Riverview

4-5: 3C. Grosse Isle Parkway and Jefferson/River Road, Trenton

6-7: 51B. I-75 SB Ramp at West Road, Woodhaven

DAY # 5: Wednesday, September 14 PSU: 58. Monroe

8-9: 91A. Rest Area on NB I-75, south of Monroe

10-11: 3A. Second and M-125 South Monroe, Monroe

12-1: 1A. Nadeau Road and M-125 North Dixie, Monroe

2-3: 2A. Sterns and Jackman, Bedford Township

4-5: 51A. EB I-94 Ramp at Belleville Road, Van Buren Township, Wayne County

UMTRI SEATBELT OBSERVATION SURVEY

WEEKLY SCHEDULE FOR Rollin Davis, WEEK NO. 5, September 10-14

DAY # 1: Saturday, September 10 PSU: 73. Saginaw

11-12: 51A. I-75, US-23 NB Ramp at Pierson Road, Genesee County

1-2: 91A. Rest Area on NB I-75, US-23 North of road to Birch Run

3-4: 01A. Washington and North Tenth, Saginaw

5-6: 02A. East Genesee and North Baum, Saginaw

7-8: 03A. Walnut and East Genesee, Saginaw

DAY # 2: Sunday, September 11 PSU: 73. Saginaw

9-10: 04A. Ezra Rust Drive and South Washington, Saginaw

11-12: 05A. Hess and Jefferson, Saginaw

1-2: 06A. Hess and Outer Drive, Buena Vista Township

3-4: 71A. Fashion Square Mall, Saginaw Township

5-6: 52A. I-75, US-23 NB Ramp at M-57 Vienna Road, Genesee County

DAY # 3: Monday, September 12 PSU: 09. Bay

8-9: 03A. North Union and M-13 Euclid, Bay City

10-11: 51A. Thomas US-10 Exit and Euclid, Bay City

12-1: 71A. North Point Plaza, Bangor Township

2-3: 02A. Seventh and Washington, Bay City

4-5: 01A. Fremont and M-13 Broadway, Bay City

DAY # 4: Tuesday, September 13 PSU: 35. Iosco-Alcona

10-11: 04A. M-55 and US-23, Tawas City

12-1: 03A. US-23 and Newman, East Tawas

2-3: 71A. Shopping Center, Tawas Area

4-5: 02A. River Road and US-23 State Road, Oscoda

6-7: 01A. M-72 and US-23, Harrisville, Alcona County

DAY # 5: Wednesday, September 14 PSU: 20. Crawford-Roscommon

8-9: 03A. M-18 Lake and M-18 Fifth, Roscommon

10-11: 91A. Rest area on SB I-75 south of road to Hartwick Pines State Park

12-1: 04A. M-55 and Old US-27, Lake Township (Houghton Lake)

2-3: 01A. Michigan and BL-27, Grayling

4-5: 02A. M-72, M-93 and BL-75, M-72; Grayling

WEEKLY SCHEDULE FOR Wendell Young, WEEK NO. 6, September 18-22DAY # 1: Sunday, September 18 PSU: 46. Lenawee11-12: 1A. M-50 Chicago and Evans, Tecumseh1-2: 2A. Toledo and Main, Adrian3-4: 3A. Beecher and Center, Adrian5-6: 71A. Adrian Mall on South Main, north of US-223, Adrian7-8: 51A. I-94 WB Ramp at State Road, Ann ArborDAY # 2: Monday, September 19 PSU: 81. Washtenaw - Ann Arbor9-10: 3A. South University and Washtenaw, Ann Arbor11-12: 1A. Huron and Ashley, Ann Arbor1-2: 2A. William and Fifth, Ann Arbor3-4: 91A. Rest Area on EB I-94 east of road to Dexter, Scio Township5-6: 51A. EB I-94 Ramp at State Road, Ann ArborDAY # 3: Tuesday, September 20 PSU: 25. Genesee8-9: 51A. US-23, I-75 NB Ramp at Miller, Flint Township10-11: 91A. Rest Area on SB US-23 South of M-57, Vienna Township12-1: 08A. Mount Monis and Genesee, Genesee Township2-3: 09A. Clark and M-15 State, Davison4-5: 06A. Pierson and Longfellow, FlintDAY # 4: Wednesday, September 21 PSU: 25. Genesee10-11: 52A. I-69, M-21 EB Ramp at Port Highway, Flint12-1: 72A. Eastland Mall, SW of Court and Center, Burton2-3: 3A. Court and Crapo, Flint4-5: 4A. Flushing and Dupont, Flint6-7: 5A. Third Avenue and Grand Traverse, FlintDAY # 5: Thursday, September 22 PSU: 25. Genesee8-9: 7C. North and Leroy, Fenton10-11: 2B. 12th Street and Van Dyke, Flint12-1: 53A. I-69, M-21 WB Ramp at Hammerberg, Flint2-3: 01A. Second Street and Asylum, Flint4-5: 71A. Genesee Valley Shopping Center, NE of Miller and Linden, Flint Twp.

UMTRI SEATBELT OBSERVATION SURVEY

WEEKLY SCHEDULE FOR Rollin Davis, WEEK NO. 6, September 18-22

DAY # 1: Sunday, September 18 PSU: 59. Montcalm

11-12: 1A. M-46 and M-91, Cato Township

1-2: 71A. Meijers Parking Lot, Van Deirse and Lafayette, Greenville

3-4: 3A. Charles and M-91 Lafayette, Greenville

5-6: 2A. M-57 Washington and M-91 Lafayette, Greenville

7-8: 51A. I-96 WB Ramp at Plainfield, Grand Rapids

DAY # 2: Monday, September 19 PSU: 41. Kent County

9-10: 51A. US-131 NB Ramp at West River, Plainfield Township

11-12: 2A. Lamoreaux and West River, Plainfield Township

1-2: 1A. M-21 and Ada Drive, Ada Township

3-4: 3A. 44th Street and Steelcase Drive, Grand Rapids

5-6: 91A. Rest Area on EB I-96 east of Ottawa County line

DAY # 3: Tuesday, September 20 PSU: 42. Kent-Grand Rapids

8-9: 1A. Plainfield and Knapp, Grand Rapids

10-11: 71A. K-Mart Parking Lot, Alpine north or I-96, Alpine Township

12-1: 3A. Franklin and Madison, Grand Rapids

2-3: 2A. Fountain and Division, Grand Rapids

4-5: 51A. SB US-131 Ramp at Wealthy, Grand Rapids

DAY # 4: Wednesday, September 21 PSU: 43. Kent-Wyoming

10-11: 51A. US-131 SB Ramp at 28th Street, Wyoming

12-1: 1A. 36th Street and Burlingame, Wyoming

2-3: 2A. 28th Street and Clyde Park, Wyoming

4-5: 3A. 36th Street and Jefferson, Wyoming

6-7: 71A. Southland Shopping Center, SE of 28th Street and Michael, Wyoming

DAY # 5: Thursday, September 22 PSU: 70. Ottawa

8-9: 3A. Baldwin and 20th Avenue, Georgetown Township

10-11: 2A. Washington and 7th Street, Grand Haven

12-1: 51A. US-31 SB freeway end at Jackson, Grand Haven

2-3: 1A. Eighth Street and Columbia Avenue, Holland

4-5: 91A. Rest Area on EB I-196 east of Zeeland Exit

APPENDIX F - FIELD FORMS

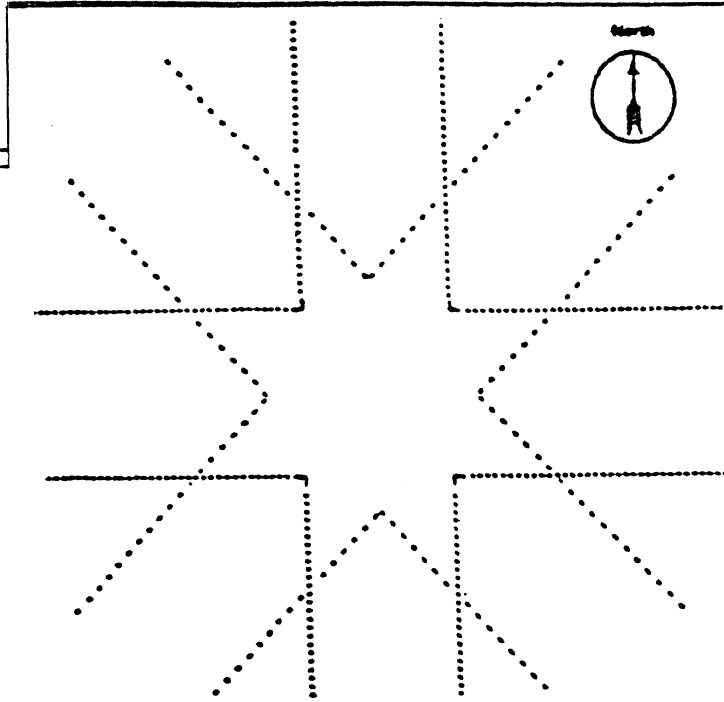
CODING REFERENCE SHEET FOR OBSERVATION FORM

VEHICLE TYPE	PERSON OBSERVATIONS (3 digits)
<ol style="list-style-type: none"> 1. Small (Chevette, Rabbit, Omni, Escort, Tercel, etc.) 2. Medium (Reliant, Citation, Century, down-sized "big" cars, old compacts and smaller mid-sized cars, etc.) 3. Large (old full-sized and large mid-sized cars, etc.) 4. Pick-up (any size) 5. Van and truck-based station wagon 6. Off-road vehicle (Jeep, Bronco, etc.) 	<p><u>A. SEX</u></p> <ol style="list-style-type: none"> 1. Male 2. Female 9. Not sure, missing data <p><u>B. AGE</u></p> <ol style="list-style-type: none"> 1. Under 1 (infant) 2. 1-3 (small child) 3. 4-15 (child) 4. 16-34 (youngish) 5. 35-54 (middle) 6. 55+ (oldish) 9. Missing data
<p><u>CRD PARKING LOT OBSERVATIONS (4 digits)</u></p>	<p><u>C. RESTRAINT USAGE</u></p>
<p><u>A. CRD TYPE</u></p>	<ol style="list-style-type: none"> 1. None 2. Shoulder belt 3. Lap belt only 4. Appropriate CRD 5. Semi-appropriate CRD (old 3-cushion type, etc.) 6. Inappropriate child container 7. Child container, not sure about appropriateness 8. Held in lap 9. Missing data
<ol style="list-style-type: none"> 1. Rear-facing (infant) 2. Rear-facing (convertible) 3. Forward-facing--harness or harness/shield 4. Forward-facing--shield only 5. Forward-facing--harness and tether (Strollee, GM Love Seat) 6. Booster with shield 7. Booster with tethered harness 8. Booster with lap/shoulder belt 9. Not sure, missing data 	
<p><u>B. CRD BELTED</u></p>	
<ol style="list-style-type: none"> 1. Yes, correctly 2. Yes, but incorrectly (including quite loose) 3. Yes, but not sure if correct 4. No 	
<p><u>C. CRD TETHERED</u></p>	
<ol style="list-style-type: none"> 1. Yes, correctly 2. Yes, but incorrectly 3. Yes, but not sure if correct 4. No 	
<p><u>D. CHILD RESTRAINED</u></p>	
<ol style="list-style-type: none"> 1. Yes, fully 2. Yes, but lap only 4. No 9. No child in seat 	

Intersection Site Selection Form for Seatbelt Survey

PSU # _____ NAME _____

INTERSECTION SITE # _____



CHOICE A

E-W: _____

ADT: EB _____ WB _____ Total _____

N-S: _____

ADT: NB _____ SB _____ Total _____

Number of Signal Phases _____

CHOICE B

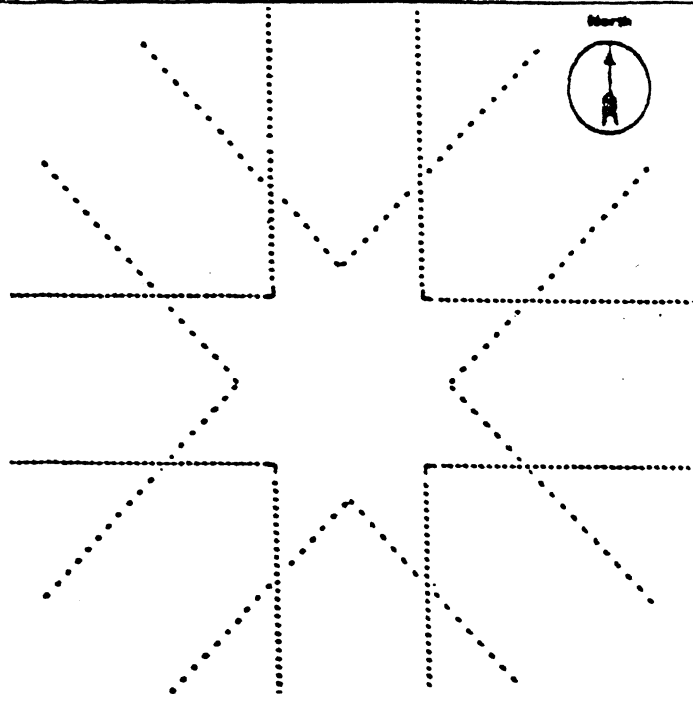
E-W: _____

ADT: EB _____ WB _____ Total _____

N-S: _____

ADT: NB _____ SB _____ Total _____

Number of Signal Phases _____



CHOICE C

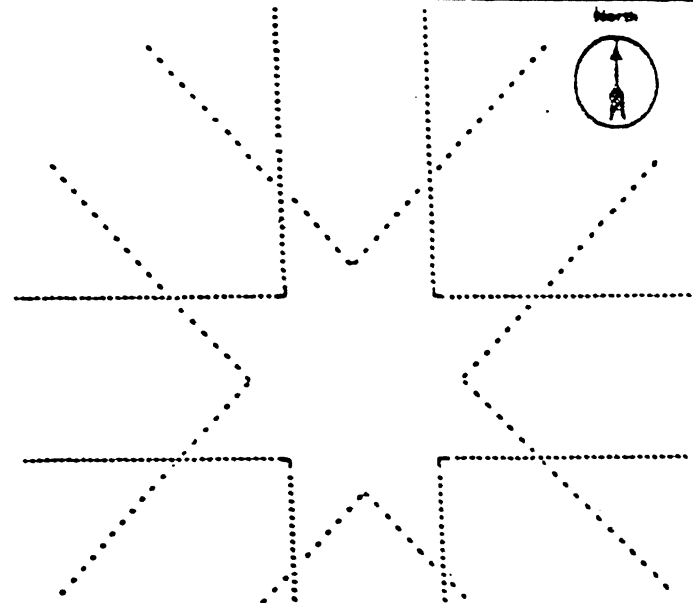
E-W: _____

ADT: EB _____ WB _____ Total _____

N-S: _____

ADT: NB _____ SB _____ Total _____

Number of Signal Phases _____





JAMES J. BLANCHARD, GOVERNOR
DEPARTMENT OF STATE POLICE
COL. GERALD L. HOUGH, DIRECTOR

OFFICE OF HIGHWAY SAFETY
PLANNING
LOWER LEVEL
111 S. CAPITOL AVENUE
LANSING, MICHIGAN 48913
PHONE 517 373-5011

August 2, 1983

TO WHOM IT MAY CONCERN:

The University of Michigan Transportation Research Institute (UMTRI) is conducting an observation study of seat belt and child restraint usage by Michigan motorists at a representative sample of intersections throughout Michigan. This direct observation study is being funded through a grant issued by this office.

This letter is to advise you that an UMTRI employee will be carrying out the observations at various intersections within your jurisdictional area. A schedule of the exact locations of the observation sites by time of day and day of week are enclosed for your information. No interference with traffic flow is anticipated, as this is only an observation study.

This study will provide useful information on the overall usage of seat belts and child restraints by Michigan's motor vehicle occupants. Your cooperation will be much appreciated. If you have any questions, please feel free to contact this office at any time.

Sincerely,

A handwritten signature in cursive script that reads "Philip W. Haseltine".

PHILIP W. HASELTINE
Executive Director

Table G.1

Belt Usage and Other Factors by Observation Site

Ordered Site No.	PSU County (City)	Site No.	Number of Vehicles	% Driver Usage	% All Occupant Usage	Week	Day	Day of Week	Start Time	Weather
1	Barry	1	51	5.88	5.56	3	1	Thursday	1300	Cloudy
2	Barry	2	78	11.54	11.11	3	1	Thursday	1700	Cloudy
3	Barry	3	54	7.41	7.41	3	1	Thursday	1900	Cloudy
4	Barry	51	78	26.92	27.37	3	1	Thursday	1100	Cloudy
5	Bay	1	52	3.85	2.82	5	3	Monday	1600	Cloudy
6	Bay	2	99	14.14	14.75	5	3	Monday	1400	Some Rain
7	Bay	3	78	10.26	10.31	5	3	Monday	800	Some Rain
8	Bay	51	99	20.20	19.17	5	3	Monday	1000	Some Rain
9	Berrien	1	52	15.38	16.42	1	2	Wednesday	1100	Clear
10	Berrien	2	54	5.56	4.69	1	2	Wednesday	1300	Cloudy
11	Berrien	3	70	2.86	2.30	1	2	Wednesday	900	Clear
12	Berrien	51	92	22.83	21.01	1	2	Wednesday	1700	Cloudy
216	(Niles)	1	40	7.50	5.48	1	1	Tuesday	1900	Clear
13	Berrien (Niles)	2	63	7.94	9.30	1	1	Tuesday	1100	Clear
14	Berrien (Niles)	3	54	9.26	6.76	1	1	Tuesday	1500	Clear
15	Berrien (Niles)	51	54	9.26	9.52	1	1	Tuesday	1700	Clear
16	Charlevoix	1	78	10.26	11.82	2	1	Wednesday	1100	Some Rain
17	Charlevoix	2	75	10.67	9.38	2	1	Wednesday	1300	Some Rain
18	Charlevoix	3	132	6.82	7.92	2	1	Wednesday	1700	All Rain
19	Charlevoix	4	108	20.37	22.58	2	1	Wednesday	1900	Some Rain
20	Chippewa	1	29	17.24	9.09	2	5	Sunday	1015	Clear
21	Chippewa	2	45	4.44	4.35	2	5	Sunday	800	Cloudy
22	Chippewa	3	39	7.69	12.12	2	5	Sunday	1150	Cloudy
23	Chippewa	51	34	35.29	36.56	2	5	Sunday	1605	Cloudy
24	Crawford-Roscommon	1	96	11.46	9.63	5	5	Wednesday	1400	Some Rain
25	Crawford-Roscommon	2	99	5.05	5.71	5	5	Wednesday	1600	Some Rain
26	Crawford-Roscommon	3	55	30.91	26.87	5	5	Wednesday	800	Clear
27	Crawford-Roscommon	4	43	4.65	5.00	5	5	Wednesday	1200	Clear
28	Delta	1	57	15.79	15.46	2	1	Wednesday	1058	Cloudy
29	Delta	2	31	9.68	7.84	2	1	Wednesday	1249	Some Rain
30	Delta	3	17	17.65	18.18	2	1	Wednesday	1725	Some Rain
31	Delta	4	30	6.67	5.88	2	1	Wednesday	1915	Cloudy
32	Dickinson	1	54	5.56	7.14	2	2	Thursday	1230	Clear
33	Dickinson	2	38	-0.	-0.	2	2	Thursday	1452	Cloudy
34	Dickinson	3	24	8.33	14.71	2	2	Thursday	1600	Cloudy
35	Dickinson	4	39	5.13	6.35	2	2	Thursday	905	Clear
36	Eaton	1	54	11.11	14.29	3	2	Friday	900	Cloudy
37	Eaton	2	78	33.33	30.10	3	2	Friday	1300	Cloudy
38	Eaton	3	94	2.13	1.53	3	2	Friday	1700	Cloudy
39	Eaton	51	132	30.30	29.41	3	2	Friday	1500	Cloudy
40	Genesee	1	54	9.26	9.09	6	5	Thursday	1330	Some Rain

Ordered Site No.	PSU County (City)	Site No.	Number of Vehicles	% Driver Usage	% All Occupant Usage	Week	Day	Day of Week	Start Time	Weather
41	Genesee	2	54	9.26	8.96	6	5	Thursday	1010	Clear
42	Genesee	3	54	12.96	10.81	6	4	Wednesday	1423	Some Rain
43	Genesee	4	50	10.00	8.70	6	4	Wednesday	1552	Cloudy
44	Genesee	7	52	17.31	15.38	6	5	Thursday	810	Clear
45	Genesee	8	54	12.96	17.72	6	3	Tuesday	1154	Clear
46	Genesee	9	54	9.26	8.11	6	3	Tuesday	1355	Some Rain
47	Genesee	51	54	25.93	22.67	6	3	Tuesday	810	Clear
48	Genesee	52	54	11.11	9.09	6	4	Wednesday	1030	Clear
49	Genesee	53	53	16.98	14.67	6	5	Thursday	1217	Clear
50	Grand Traverse	1	54	12.96	12.12	2	2	Thursday	900	Cloudy
51	Grand Traverse	3	78	20.51	22.12	2	2	Thursday	1700	Cloudy
52	Grand Traverse	4	54	22.22	25.29	2	2	Thursday	1300	Cloudy
53	Ingham	1	99	18.18	16.26	3	3	Saturday	800	Cloudy
54	Ingham	2	54	22.22	23.29	3	3	Saturday	1000	Cloudy
55	Ingham	3	77	15.58	16.07	3	3	Saturday	1600	Cloudy
56	Ingham	51	108	28.70	24.72	3	3	Saturday	1400	Cloudy
57	Ingham (East Lansing)	1	54	24.07	24.29	3	4	Sunday	1200	Cloudy
58	Ingham (East Lansing)	2	99	21.21	19.85	3	4	Sunday	1800	Clear
59	Ingham (East Lansing)	3	54	22.22	19.74	3	4	Sunday	1000	Clear
60	Ingham (East Lansing)	51	78	16.67	16.41	3	4	Sunday	1400	Cloudy
61	Iosco-Alcona	1	83	15.66	11.40	5	4	Tuesday	1800	Clear
62	Iosco-Alcona	2	99	18.18	17.69	5	4	Tuesday	1600	Clear
63	Iosco-Alcona	3	77	16.88	16.50	5	4	Tuesday	1200	Some Rain
64	Iosco-Alcona	4	54	11.11	12.50	5	4	Tuesday	1000	Clear
65	Jackson	1	99	11.11	10.00	3	5	Monday	1200	Clear
66	Jackson	2	54	3.70	5.71	3	5	Monday	1400	Clear
67	Jackson	3	78	10.26	10.31	3	5	Monday	1600	Clear
68	Jackson	51	78	32.05	29.79	3	5	Monday	800	Clear
69	Kalamazoo County	1	54	20.37	24.19	1	5	Saturday	800	Clear
70	Kalamazoo County	2	78	6.41	7.08	1	5	Saturday	1000	Clear
71	Kalamazoo County	3	54	18.52	14.89	1	5	Saturday	1400	Clear
72	Kalamazoo County	51	69	14.49	10.32	1	5	Saturday	1200	Clear
73	Kalamazoo (City)	1	54	7.41	7.32	1	4	Friday	1800	Clear
74	Kalamazoo (City)	2	66	25.76	30.68	1	4	Friday	1600	Clear
75	Kalamazoo (City)	3	78	15.38	15.84	1	4	Friday	1200	Clear
76	Kalamazoo (City)	51	93	21.51	22.03	1	4	Friday	1400	Clear
77	Kent	1	99	17.17	18.33	6	2	Monday	1300	Cloudy
78	Kent	2	99	14.14	13.11	6	2	Monday	1100	Cloudy
79	Kent	3	99	22.22	22.88	6	2	Monday	1500	Cloudy
80	Kent	51	99	10.10	10.00	6	2	Monday	900	Cloudy
81	Kent (Grand Rapids)	1	99	20.20	16.39	6	3	Tuesday	800	Cloudy
82	Kent (Grand Rapids)	2	54	16.67	16.13	6	3	Tuesday	1400	Some Rain
83	Kent (Grand Rapids)	3	54	1.85	1.37	6	3	Tuesday	1200	Some Rain
84	Kent (Grand Rapids)	51	54	22.22	26.76	6	3	Tuesday	1600	Some Rain
85	Kent (Wyoming)	1	99	14.14	15.20	6	4	Wednesday	1200	Some Rain

Ordered Site No.	PSU County (City)	Site No.	Number of Vehicles	% Driver Usage	% A11 Occupant Usage	Week	Day	Day of Week	Start Time	Weather
86	Kent (Wyoming)	2	99	13.13	12.21	6	4	Wednesday	1400	Some Rain
87	Kent (Wyoming)	3	99	10.10	8.94	6	4	Wednesday	1600	Some Rain
88	Kent (Wyoming)	51	99	21.21	22.73	6	4	Wednesday	1000	Some Rain
89	Lapeer	1	99	6.06	6.62	4	1	Friday	1500	Clear
90	Lapeer	2	78	5.13	3.36	4	1	Friday	1700	Clear
91	Lapeer	3	55	12.73	9.68	4	1	Friday	1900	Clear
92	Lapeer	51	93	26.88	25.83	4	1	Friday	1300	Clear
93	Lenawee	1	54	12.96	13.73	6	1	Sunday	1110	Some Rain
94	Lenawee	2	54	5.56	3.70	6	1	Sunday	1310	Clear
95	Lenawee	3	54	1.85	3.57	6	1	Sunday	1441	Clear
96	Lenawee	51	35	48.57	39.06	6	1	Sunday	1923	Cloudy
97	Macomb	1	54	12.96	10.53	4	3	Sunday	1400	Cloudy
98	Macomb	2	78	16.67	15.45	4	4	Monday	1600	Clear
99	Macomb	3	54	18.52	17.07	4	4	Monday	1800	Clear
100	Macomb	4	79	17.72	15.84	4	5	Tuesday	1200	Clear
101	Macomb	5	54	5.56	7.04	4	3	Sunday	800	Clear
102	Macomb	6	54	5.56	6.15	4	5	Tuesday	1000	Clear
103	Macomb	7	99	5.05	4.17	4	5	Tuesday	1400	Clear
104	Macomb	8	53	3.77	2.38	4	3	Sunday	1600	Cloudy
105	Macomb	9	77	12.99	11.86	4	4	Monday	1200	Clear
106	Macomb	51	99	10.10	7.69	4	3	Sunday	1200	Cloudy
107	Macomb	52	99	14.14	12.50	4	5	Tuesday	800	Some Rain
108	Macomb	53	99	28.28	30.71	4	4	Monday	1000	Clear
109	Marquette	1	20	20.00	14.81	2	3	Friday	805	Some Rain
110	Marquette	2	41	12.20	13.56	2	3	Friday	1001	Clear
111	Marquette	3	54	9.26	15.38	2	3	Friday	1355	Some Rain
112	Marquette	4	50	22.00	17.81	2	3	Friday	1544	Cloudy
113	Marquette	5	41	9.76	7.46	2	4	Saturday	1305	Clear
114	Marquette	6	53	11.32	12.82	2	4	Saturday	1000	Clear
115	Marquette	7	51	27.45	27.27	2	4	Saturday	1450	Clear
116	Marquette	8	52	19.23	18.56	2	4	Saturday	1634	Clear
117	Mason	1	53	3.77	7.25	2	3	Friday	800	Cloudy
118	Mason	3	78	7.69	8.00	2	3	Friday	1200	Clear
119	Mason	4	78	8.97	9.73	2	3	Friday	1400	Clear
120	Mecosta-Newaygo	1	54	5.56	6.58	2	5	Sunday	800	Cloudy
121	Mecosta-Newaygo	2	54	5.56	6.67	2	5	Sunday	1000	Cloudy
122	Mecosta-Newaygo	3	78	20.51	21.67	2	5	Sunday	1200	Cloudy
123	Mecosta-Newaygo	4	78	17.95	17.69	2	5	Sunday	1600	Some Rain
124	Monroe	1	48	2.08	2.90	5	5	Wednesday	1243	Clear
125	Monroe	2	43	16.28	13.24	5	5	Wednesday	1503	Clear
126	Monroe	3	53	3.77	5.19	5	5	Wednesday	1000	Clear
127	Monroe	51	86	9.30	11.50	6	6	Friday	1540	Clear
128	Montcalm	1	54	7.41	6.59	6	1	Sunday	1100	Some Rain
129	Montcalm	2	99	16.16	15.89	6	1	Sunday	1600	Cloudy
130	Montcalm	3	99	11.11	11.54	6	1	Sunday	1430	Cloudy

Ordered Site No.	PSU County (City)	Site No.	Number of Vehicles	% Driver Usage	% All Occupant Usage	Week	Day	Day of Week	Start Time	Weather
131	Montcalm	51	99	21.21	19.53	6	1	Sunday	1800	Some Rain
132	Muskegon	1	54	12.96	9.76	2	4	Saturday	1800	Clear
133	Muskegon	2	54	12.96	15.38	2	4	Saturday	1400	Clear
134	Muskegon	3	78	7.69	6.09	2	4	Saturday	1000	Clear
135	Muskegon	51	78	10.26	10.09	2	4	Saturday	1200	Clear
136	Oakland	1	53	18.87	19.74	1	1	Tuesday	1840	Clear
137	Oakland	2	49	16.33	16.88	1	1	Tuesday	1312	Clear
138	Oakland	3	41	7.32	7.14	1	1	Tuesday	1510	Clear
139	Oakland	4	44	6.82	4.41	1	3	Thursday	1405	Cloudy
140	Oakland	5	66	16.67	20.35	1	4	Friday	1803	Clear
141	Oakland	6	71	7.04	7.07	1	4	Friday	1610	Clear
142	Oakland	7	78	20.51	16.67	1	4	Friday	1350	Clear
143	Oakland	8	54	31.48	32.39	1	3	Thursday	955	Cloudy
144	Oakland	9	54	27.78	26.32	1	3	Thursday	807	Some Rain
145	Oakland	10	54	29.63	25.97	1	2	Wednesday	1506	Some Rain
146	Oakland	11	105	25.71	25.38	1	2	Wednesday	1650	Some Rain
147	Oakland	12	55	20.00	20.65	1	5	Saturday	1600	Clear
148	Oakland	13	54	31.48	32.39	1	2	Wednesday	1104	Cloudy
149	Oakland	14	54	31.48	27.85	1	5	Saturday	1000	Clear
150	Oakland	15	43	2.33	4.41	1	5	Saturday	1204	Clear
151	Oakland	51	39	28.21	22.39	1	1	Tuesday	1745	Clear
152	Oakland	52	42	16.67	15.25	1	4	Friday	1010	Clear
153	Oakland	53	54	14.81	23.46	1	3	Thursday	1205	Cloudy
154	Oakland	54	79	27.85	25.25	1	2	Wednesday	1257	Clear
155	Oakland	55	54	18.52	18.99	1	5	Saturday	800	Clear
156	Oakland (Royal Oak)	16	78	15.38	14.43	3	1	Thursday	1458	Clear
157	Oakland (Royal Oak)	17	35	25.71	25.00	3	1	Thursday	1345	Clear
158	Oakland (Royal Oak)	18	49	14.29	18.31	3	1	Thursday	1110	Clear
159	Oakland (Royal Oak)	56	80	23.75	20.18	3	1	Thursday	1703	Cloudy
160	Ottawa	1	99	13.13	12.60	6	5	Thursday	1400	Some Rain
161	Ottawa	2	54	5.56	4.76	6	5	Thursday	1000	Some Rain
162	Ottawa	3	78	28.21	29.27	6	5	Thursday	800	Some Rain
163	Ottawa	51	99	18.18	18.33	6	5	Thursday	1200	Some Rain
164	Saginaw	1	54	11.11	10.23	5	1	Saturday	1500	Clear
165	Saginaw	2	54	9.26	11.11	5	1	Saturday	1700	Clear
166	Saginaw	3	53	3.77	3.45	5	1	Saturday	1845	Cloudy
167	Saginaw	4	52	3.85	5.06	5	2	Sunday	900	Cloudy
168	Saginaw	5	54	7.41	7.95	5	2	Sunday	1100	Cloudy
169	Saginaw	6	53	15.09	19.57	5	2	Sunday	1300	Clear
170	Saginaw	51	99	17.17	15.27	5	1	Saturday	1100	Clear
171	Saginaw	52	24	4.17	4.65	5	2	Sunday	1700	Clear
172	St. Clair	1	99	22.22	20.50	4	2	Saturday	1100	Clear
173	St. Clair	2	51	9.80	8.45	4	2	Saturday	1300	Clear
174	St. Clair	3	54	3.70	5.81	4	2	Saturday	1500	Clear
175	St. Clair	51	78	15.38	19.84	4	2	Saturday	900	Clear

Ordered Site No.	PSU County (City)	Site No.	Number of Vehicles	% Driver Usage	% All Occupant Usage	Week	Day	Day of Week	Start Time	Weather
176	Van Buren	1	86	10.47	10.17	1	3	Thursday	1600	Cloudy
177	Van Buren	2	80	8.75	7.84	1	3	Thursday	1400	Some Rain
178	Van Buren	3	55	5.45	4.88	1	3	Thursday	1000	Cloudy
179	Van Buren	51	17	-0.	-0.	1	3	Thursday	800	Cloudy
180	Washtenaw- (Ann Arbor)	1	53	30.19	31.34	6	2	Monday	1043	Cloudy
181	Washtenaw- (Ann Arbor)	2	54	35.19	30.26	6	2	Monday	1242	Clear
182	Washtenaw- (Ann Arbor)	3	53	26.42	28.33	6	2	Monday	910	Some Rain
183	Washtenaw- (Ann Arbor)	51	78	32.05	30.11	6	2	Monday	1630	Clear
184	Wayne (Detroit)	1	54	3.70	2.22	4	1	Friday	1450	Clear
185	Wayne (Detroit)	2	53	13.21	11.32	4	3	Sunday	1011	Clear
186	Wayne (Detroit)	7	52	3.85	6.86	4	3	Sunday	1215	Clear
187	Wayne (Detroit)	8	54	18.52	21.79	3	3	Saturday	1105	Cloudy
188	Wayne (Detroit)	11	50	22.00	18.00	4	3	Sunday	1420	Clear
189	Wayne (Detroit)	14	54	3.70	3.09	3	3	Saturday	1345	Clear
190	Wayne (Detroit)	18	52	7.69	8.43	4	1	Friday	1607	Clear
191	Wayne (Detroit)	51	54	11.11	8.33	4	2	Saturday	900	Clear
192	Wayne (Canton)	1	19	10.53	8.11	5	1	Saturday	1930	Clear
193	Wayne (Canton)	2	51	15.69	22.58	5	1	Saturday	1645	Clear
194	Wayne (Canton)	3	54	9.26	8.51	5	1	Saturday	1315	Clear
195	Wayne (Canton)	51	53	24.53	20.00	5	1	Saturday	1505	Clear
196	Wayne (Canton)	99	50	22.00	22.58	5	1	Saturday	1810	Clear
197	Wayne (Garden City)	1	54	9.26	11.27	4	5	Tuesday	958	Clear
198	Wayne (Garden City)	2	52	19.23	18.67	4	5	Tuesday	1142	Clear
199	Wayne (Garden City)	3	54	9.26	10.14	4	5	Tuesday	810	Some Rain
200	Wayne (Garden City)	51	52	42.31	44.44	4	5	Tuesday	1600	Cloudy
201	Wayne (Livonia)	1	52	21.15	16.00	4	4	Monday	1144	Clear
202	Wayne (Livonia)	2	54	20.37	15.73	4	4	Monday	1545	Clear
203	Wayne (Livonia)	3	55	16.36	15.96	4	4	Monday	1345	Clear
204	Wayne (Livonia)	51	45	24.44	19.77	4	4	Monday	1729	Clear
205	Wayne (Melvindale)	1	51	9.80	9.20	5	2	Sunday	905	Clear
206	Wayne (Melvindale)	2	42	-0.	1.49	5	2	Sunday	1515	Clear
207	Wayne (Melvindale)	3	51	7.84	8.89	5	2	Sunday	1725	Clear
208	Wayne (Melvindale)	51	50	24.00	19.79	5	2	Sunday	1400	Clear
209	Wayne (Trenton)	1	53	3.77	7.89	5	4	Tuesday	1116	Clear
	Wayne (Trenton)	2	54	5.56	6.15	5	4	Tuesday	1353	Clear
210	Wayne (Trenton)	3	52	9.62	10.94	5	4	Tuesday	1525	Clear
211	Wayne (Trenton)	51	51	21.57	16.92	5	4	Tuesday	1800	Clear
212	Wayne (Wyandotte)	1	52	7.69	9.09	5	3	Monday	1030	Clear
213	Wayne (Wyandotte)	2	53	16.98	15.19	5	3	Monday	1210	Clear
214	Wayne (Wyandotte)	3	53	7.55	9.46	5	3	Monday	1415	Clear
215	Wayne (Wyandotte)	51	53	16.98	16.13	5	3	Monday	815	Clear

APPENDIX H - INTERIM REPORT

Memo to: File

From: James O'Day

Subject: First Three Weeks of Belt-Wearing Data

This constitutes an interim report on the seat-belt wearing data as of the end of three (of six) weeks of measurement. Note that the complete representation of the state will not be available without the remaining data, but the first three weeks should give a rough idea of belt usage across several variables such as seat location, car size, sex, etc.

As of this writing 6390 vehicles (cars, pickups, vans, etc) have been observed. Average occupancy for these vehicles was 1.428, with the distribution shown in the following table.

Vehicle Occupancy
First Three Weeks of Survey

Seat Location	Number of Occupants	Percent Wearing Belts
Front Left	6390	15.6
Front Center	87	13.8
Front Right	2197	14.7
Rear Left	152	15.8
Rear Center	91	13.6
Rear Right	210	14.8

Some other preliminary observations: belt usage among drivers is best in small cars with 22.5% of the drivers wearing lap or lap and shoulder belts. Mid-sized cars have a driver wear rate of 16.3%; large cars 13.1%. Among the 379 pickups observed driver belt-wearing was only

6.9%. Female drivers (only 37% of all drivers) wore belts at a 16.4% rate vs. 15.2% for males.

Driver age was estimated by the observers in three groups: 16-34, 35-54, and older than 55. In the first week of data, belt wearing for the young group was highest, middle next, and old the least. In the 3-week data the young and middle groups were nearly the same at 16.4 and 16.8%. Those over 55, however, scored just 11.4%.

All counties were not sampled in this survey, and there is some variation by county due to other factors. However, the differences by region are substantial and are worth looking at. The county with the best wear rate was Ingham, with 21.6% of 265 drivers observed wearing a belt. Eaton County had 20.7% of 284 drivers wearing. In Oakland County 20.5% of 857 drivers were wearing belts.

On the lower end of the scale only 7.2% of the observed Mason County drivers were belt-wearers, 8% in Van Buren, 4.5% in Dickinson. All counties will not be included in the six-week survey, but some other counties not yet sampled will be. These will include Washtenaw, Genesee, and western Wayne County.

While the recent telephone surveys suggested that belt-wearing was more likely in inclement weather, there was relatively little difference observed in the rain during this survey.

Only 101 0-3 year olds were observed in these vehicles. Of the 18 infants (less than one year old), 3 were being held in an adult's lap, and 2 were in inappropriate child restraint devices. The remainder (13 of 18) were in approved carriers. Of the 83 1-3 year olds, 14 were using no restraint, and 8 more were reported as "unknown" restraint usage.

APPENDIX I

MICHIGAN DEPARTMENT OF TRANSPORTATION DISTRICT MAP

APPENDIX I

MICHIGAN DEPARTMENT OF STATE HIGHWAYS

DISTRICT AND COUNTY NUMBERS

