

EFFECT OF THE 65 MPH SPEED LIMIT ON VEHICLE SPEEDS IN MICHIGAN

Interim Report

December, 1987

The opinions, findings, and conclusions expressed in this publication are those of the author(s) and not necessarily those of the Michigan Office of Highway Safety Planning nor the U.S. Department of Transportation, National Highway Traffic Safety Administration.

Prepared in cooperation with the  
Michigan Office of Highway Safety Planning  
and  
U.S. Department of Transportation,  
National Highway Traffic Safety Administration  
through Highway Safety Project #MPT-87-011A

Technical Report Documentation Page

1. Report No. UMTRI-87-50	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle EFFECT OF THE 65 MPH SPEED LIMIT ON VEHICLE SPEEDS IN MICHIGAN		5. Report Date December 1987	6. Performing Organization Code 024625
		8. Performing Organization Report No. UMTRI-87-50	
7. Author(s) Paul L. Olson		10. Work Unit No.	
9. Performing Organization Name and Address The University of Michigan Transportation Research Institute 2901 Baxter Road Ann Arbor, MI 48109		11. Contract or Grant No.	
		13. Type of Report and Period Covered Interim 7/1/87 - 10/31/87	
12. Sponsoring Agency Name and Address Office of Highway Safety Planning 300 So. Washington Square, Suite 300 Lansing, Michigan 48913		14. Sponsoring Agency Code	
		15. Supplementary Notes	
<p>16. Abstract</p> <p>The purpose of this study is to take data on vehicle speeds at 20 sites in Michigan. Five of these sites are among those regularly monitored by the Michigan Department of Transportation, and are included to provide historical continuity. The other sites were selected from rural and urban Interstates, US-routes, and two- and four-lane trunk lines to measure the effect of the new speed limit on vehicle speeds on a variety of roads.</p> <p>This report describes the results of the first round of speed measurements, taken in a three-month period before the speed limit was changed to 65 mph.</p>			
17. Key Words Speed limits, vehicle speeds, speed measurements		18. Distribution Statement	
19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of Pages 27	22. Price

## TABLE OF CONTENTS

LIST OF TABLES .....	ii
INTRODUCTION .....	1
METHOD .....	2
PROCEDURE .....	6
RESULTS .....	7
DISCUSSION .....	22

LIST OF TABLES

1. I-69 near the Indiana border .....	7
2. I-96 west of US-23 interchange (rural classification) .....	8
3. I-96 east of US-23 interchange (urban classification) .....	9
4. I-69 east of Perry .....	10
5. Temporary I-69 west of Perry .....	11
6. I-94 near Watervliet .....	12
7. US-23 at Ann Arbor .....	13
8. US-23 south of Ann Arbor (rural area) .....	14
9. I-75 north of Grayling .....	15
10. US-27 south of Grayling .....	16
11. I-75 south of Grayling and south of US-27 split .....	17
12. M-52 south of Manchester .....	18
13. M-52 north of Manchester .....	19
14. M-36 east of Pinckney .....	20
15. M-36 west of Pinckney .....	21

## INTRODUCTION

In the fuel crisis of 1973-74, one of the measures taken by the Federal Government to promote conservation was the enactment of a 55-mph speed limit nationwide, on all classes of roads. The direct effect of the law on vehicle speeds was marked and immediate. The average speed of all vehicles on main rural highways fell from about 61 mph in 1973 to about 55 mph in 1974. On rural interstates the average dropped from 65.2 mph in 1973 to 57.7 in 1974.

In 1987, after more than twelve years of a 55-mph national speed limit, the Federal Government passed legislation permitting individual states to raise the speed limit to 65 mph on rural portions of the Interstate system. Many states did so within a few months. As of October, 1987 nearly forty states had changed the speed limit to 65 mph on applicable portions of their Interstate highways.

In the early summer of 1987 it appeared that Michigan would follow suit and raise the speed limit. The Office of Highway Safety Planning (OHSP), the Michigan Department of Transportation (MDOT), the Office of the Secretary of State, and the Michigan Department of State Police saw this as an opportunity to conduct research to determine what effect the revised speed limit would have on vehicle speeds on all classes of roads in the state, not just Interstate routes.

As a consequence of this interest OHSP awarded a contract to the University of Michigan Transportation Research Institute (UMTRI) to carry out the necessary research. UMTRI researchers worked closely with individuals from the interested groups in Lansing in planning the work.

The first step in the study was to take speed data at the sites of interest before the speed limit was changed. Initially it was hoped to do this in the early summer of 1987. However, there were significant delays in getting the project underway. As it happened, the Michigan Legislature was unable to reach agreement with the Governor on a bill, and the speed limit remained at 55 mph over the summer and into the fall. An agreement was finally reached in October. The new speed limit took effect at the end of November, 1987. The initial "before change" speed data were collected in September and October of 1987.

## METHOD

### Conditions Investigated

This investigation was concerned with the effects of the speed limit change on vehicle speeds on different types of highways and in certain types of roadway interactions of interest. The conditions were as follows:

Rural Interstates. This is the one type of roadway on which the speed limit can be changed, under current law. Thus, an obvious aim of the study is to measure speeds on such highways before and after the speed limit change. However, if the new speed limit results in higher speeds on rural Interstates, the effect may carry over to other roads.

Urban Interstates. In and near built-up areas Interstates are classed as "urban." In these areas the speed limit will remain at 55 mph. However, some "urban" sections of Interstates are indistinguishable from rural portions in terms of the physical characteristics of the highways and the appearance of their surroundings. It is reasonable to ask whether drivers will slow appreciably when moving from rural to urban Interstate sections that appear the same simply because speed limit signs indicate they should.

Rural Freeways. Michigan has substantial mileage in "US" routes. These are built to Interstate standards, but cannot be increased to 65 under the law as it is presently written. What effect will the new limit have on speeds elected by drivers who cannot see any difference between two freeways except in the posted speed limits?

Two- and four-lane rural highways. In the days before the national 55 mph speed limit most of these roads were signed for 65 mph during the day and 55 mph at night in Michigan. They are not affected by the new speed limit law, hence will stay at 55 mph. The interest here is in determining whether allowing higher speeds on certain sections of the Interstates will affect speeds on these roads as well.

### Locations Selected

Speed data were collected at twenty sites throughout Michigan. Some of these were sites at which MDOT collects speed information as part of its regular monitoring program. The purpose for this is to establish long-term continuity. There is reason to believe that speeds have been creeping up over the years since the 55 mph law was enacted. If so, then speed changes associated with the new 65 mph law may be far smaller than was seen when the 55 mph law came into effect. The MDOT sites will provide a history of

speeds that will assist in interpreting the data collected at other sites as part of the present study.

At each site in the listing to follow speed information was collected in both directions. On four-lane facilities, speed information was collected in both lanes in both directions.

Rural Interstates. The following sites were monitored:

- a. I-69, about three miles north of the Indiana border
- b. I-96, west of US-23, near Howell
- c. I-75, near Grayling and near Roscommon
- d. I-69, near Bancroft
- e. I-94, near Watervliet

The choices were based on various interests. At the time of the initial measurements Indiana had gone to 65 mph while Michigan was still at 55. Cars coming out of Indiana on I-69 had just come from a 65-mph zone. Of interest was whether they would slow down appreciably on entering Michigan. If the Indiana speed carried over to Michigan, then southbound traffic should be moving slower than northbound traffic.

I-69, near Bancroft, was selected to match with a section of Temp. 69 nearer to Lansing that is not built to Interstate standards and will stay at 55 mph. The interest here was whether drivers would change speeds coming off I-69 (which will go to 65 mph) and entering Temp. 69.

I-96 was a rural section, which was paired with an urban section of the same freeway about ten miles east. The rural portion will go to 65 mph, the urban portion will stay at 55 mph. The question was the degree to which driving speed would be influenced by the posted limit when all physical aspects of the facility, and the general surroundings, were much the same.

I-75 was a rural section that was of interest because of its relationship to US-27 south of Grayling. Traffic that stays on I-75 will continue to have a 65-mph limit. Drivers that take US-27 will find themselves on a facility having all the characteristics of an Interstate, but with a 55-mph speed limit.

I-94 was selected because, at the location selected, it is one of the most densely travelled routes in the state. This location was of particular interest to the State Police.



Urban Interstates. One urban Interstate site was selected. This was I-96, near Brighton. This was paired with the rural portion of the same highway, as explained above.

Rural US routes. Two rural US sites were selected. These were:

- a. US-27, south of Grayling
- b. US-23, near Dundee

The reason for selecting US-27 has already been noted. US-23, in the area mentioned, is an Interstate-class facility in an obviously rural area. The question is whether drivers would feel bound by the 55-mph limit when they could travel 65 mph on apparently identical roads elsewhere.

Urban US routes. One urban US route was selected, that being US-23 near Ann Arbor. The interest here was in determining whether speed behavior would be affected by the more urban setting compared to the other section of US-23.

Two- and four-lane rural highways. In the years prior to 1973 roads in this category had speed limits of 65 mph during the day and 55 mph at night. They are all limited to 55 mph now, and will stay that way when the new speed law takes effect. The question in each case is the degree to which the higher speed limit on freeways will carry over to other classes of roads. The following sites were measured:

- a. M-52, about five miles either side of Manchester
- b. M-36, about five miles either side of Pinckney
- c. Temp. 69, north of Lansing

Each of these roads come off of a freeway (US-23 in the case of M-36, I-94 in the case of M-52, and I-69 in the case of Temp. 69) near the point at which the measurements were taken. The interest was in seeing the degree to which the freeways may influence the speed on these roads. In the case of the first two sites, there was also an interest in noting the degree to which the intervening community, with its lower speed limits, would also influence speeds.

Two of these roads (M-52 and M-36) are two-lane facilities, Temp. 69 is a four-lane road with a grassy median. All are characterized by unlimited access, in fact, all have frequent intersections with driveways and cross roads.

## Equipment

The speed data were collected using Sarasota Model VC 1900 machines, on loan from MDOT. These devices are portable and fully self-contained. The input is via two pneumatic tubes, spaced six and a half feet apart. Average speed from tube one to tube two is determined by a calculation based on elapsed time. Information is stored in the counter in one mile per hour bands from 0 to 127 mph.

The traffic counters are programmed, and information is retrieved from them by means of a hand-held microcomputer. The information in the microcomputer was subsequently transferred to a floppy disc for permanent storage and to the University's main-frame computer for analysis.

## PROCEDURE

Data were taken on the highways listed above for a 24-hour period during fair weather only. When the installers arrived in the general location that had been selected they first sought out a site on a representative reasonably flat and straight section, removed from entrance and exit ramps that may affect speed, and offering something solid to which the traffic counter box could be secured. The tubes were then attached to the road surface and hooked to the counter box. The necessary setup programming was accomplished and the speeds of a few passing cars monitored on the microcomputer and compared with speeds of the same cars measured with a Doppler radar. Assuming all was well, the installers then went on to set up the next box.

At the conclusion of the 24-hour measurement period the installers returned to the site. They checked each box to be sure it was still taking data, then disconnected the hoses and removed them from the road. Data were read from the counter box into the microcomputer at a convenient time later.

## RESULTS

The results of the measurements collected in this first phase of the program will be presented in tabular form, showing the values associated with various percentiles of the speed distributions from each lane at each site.

Table 1 is for I-69, just north of the Indiana border. The format for this table is the same as for those that follow. "Right Lane" and "Left Lane" are from the perspective of the driver and represent what are sometimes called the "slow lane" and "passing lane" respectively. The table gives the total count for each lane, the speed (in miles per hour) for each percentile, and the percent of vehicles exceeding 55 mph.

TABLE 1  
I-69 NEAR THE INDIANA BORDER

Percentile	Direction of Travel			
	Southbound		Northbound	
	Right Lane	Left Lane	Right Lane	Left Lane
Total Count	6875	955	6669	727
5	55	57	56	61
10	57	60	58	63
25	60	62	61	66
50	62	66	65	69
75	66	69	67	73
90	68	72	71	76
95	71	75	73	78
% exceeded 55	94	97	96	99

It will be recalled at the time these data were taken that Indiana was at 65 mph on I-69 while Michigan was still at 55 mph. Hence, it is interesting to note that cars were moving somewhat faster coming north out of Indiana than were those going south toward

Indiana. This may be attributable to the fact that the former group had been in a higher speed limit zone until just a few minutes before. However, about 94% or more of drivers in both groups were travelling in excess of 55 mph.

Tables 2 and 3 are for I-96, west and east of the US-23 interchange respectively. The west section (Table 2) has a rural classification, and will go to 65 mph. The east section (Table 3) has an urban classification, and will stay at 55 mph. These data suggest that traffic eastbound presently moves at about the same speed in both sections. However, traffic westbound appears to be moving somewhat faster in the west section, particularly in the left lane.

**TABLE 2**  
I-96 WEST OF US-23 INTERCHANGE (Rural classification)

Percentile	Direction of Travel			
	Eastbound		Westbound	
	Right Lane	Left Lane	Right Lane	Left Lane
Total Count	12000	5977	12319	4648
5	54	61	55	65
10	56	63	57	66
25	58	66	60	69
50	62	68	62	73
75	65	72	66	76
90	67	75	69	79
95	70	77	71	82
% exceeded 55	91	99	94	99

Table 4 is for I-69 between Lansing and Flint, an Interstate section that will go to 65 mph. It was paired with Temp. 69 (Table 5) a four-lane divided highway that runs east out of Lansing and joins with I-69 near Perry.

TABLE 3

## I-96 EAST OF US-23 INTERCHANGE (Urban classification)

Percentile	Direction of Travel			
	Eastbound		Westbound	
	Right Lane	Left Lane	Right Lane	Left Lane
Total Count	8964	5759	9123	6323
5	54	62	50	60
10	56	64	54	62
25	59	67	56	65
50	62	70	60	67
75	66	73	63	71
90	69	76	67	74
95	72	78	70	76
% exceeded 55	91	99	81	99

A comparison of Tables 4 and 5 indicates that speeds are higher on the Interstate section. However, traffic volumes are considerably lower on the Interstate section as well. It is possible that the difference is at least partly due to local traffic on the Temporary section, which is closer to Lansing.

Table 6 is for I-94, east of Benton Harbor, near Watervliet. Although most drivers were going in excess of 55 mph, overall speeds seems slightly lower here than at other rural Interstate sections measured.

Table 7 is for US-23 at Ann Arbor. This is an Interstate-class facility in an urban setting. The traffic volume measured here (22-23,000 vehicles in each direction) was considerably higher than at any other site. In addition, for some reason, speeds were noticeably higher for southbound than for northbound traffic.

The data in Table 7 can be compared with those in Table 8, taken on the same freeway, but in a rural section. It should be noted that both sections will stay at 55 mph. In the rural section (Table 8) northbound traffic seems to be moving a bit faster than in

TABLE 4  
I-69 EAST OF PERRY

Percentile	Direction of Travel			
	Eastbound		Westbound	
	Right Lane	Left Lane	Right Lane	Left Lane
Total Count	4631	821	4838	865
5	55	60	56	60
10	56	61	58	61
25	60	63	61	64
50	62	66	64	67
75	66	70	67	70
90	69	74	71	74
95	72	76	74	77
% exceeded 55	93	99	96	99

the urban section. However, while southbound right-lane traffic appears to be moving at about the same speed in both sections, southbound left-lane traffic appears to be moving an average of about 5 mph faster in the urban section (Table 7).

Tables 9, 10, and 11 are for the I-75, US-27 split near Grayling. Table 9 provides the speed data for I-75 north of Grayling, a rural section that will go to 65 mph. A review of the data in Table 9 indicates that speeds are comparable for north and southbound traffic in this section.

Southbound traffic encounters a split south of Grayling. Drivers that elect to take US-27 will find themselves on an Interstate-class facility that will stay at 55 mph. The present status of speeds on US-27 is shown in Table 10. Median speeds north and southbound on US-27 are identical, and very close to those measured on I-75.

Table 11 summarizes the present status of speeds on I-75 south of the split with US-27. The median speeds, especially southbound, appear to be somewhat higher in this section compared with the section north of Grayling.

TABLE 5  
TEMPORARY I-69 WEST OF PERRY

Percentile	Direction of Travel			
	Eastbound		Westbound	
	Right Lane	Left Lane	Right Lane	Left Lane
Total Count	6573	2160	6762	2320
5	51	57	50	56
10	53	59	52	58
25	56	62	55	61
50	60	65	58	63
75	63	68	61	66
90	66	72	64	70
95	68	74	66	72
% exceeded 55	80	97	73	95

The last four tables are for two-lane highways. Tables 12 and 13 are for M-52 south and north of Manchester respectively. Speeds in the two directions are very close north of Manchester. However, traffic south of town going away from Manchester was moving appreciably faster than that going toward town. Even on this two-lane facility, note that most cars were going over the 55 mph limit.

Tables 14 and 15 are for M-36 east and west of Pinckney respectively. Speeds are lower here than at any other place measured; the median speeds for all four measurement points were less than 55 mph. Even so, 95th percentile speeds on the section west of town were close to 70 mph.



TABLE 6  
I-94 NEAR WATERVLIET

Percentile	Direction of Travel			
	Eastbound		Westbound	
	Right Lane	Left Lane	Right Lane	Left Lane
Total Count	10456	3592	11194	3623
5	55	60	54	58
10	57	61	56	59
25	60	63	58	61
50	63	66	61	64
75	66	69	64	66
90	68	74	67	69
95	71	82	69	72
% exceeded 55	94	99	90	99

TABLE 7  
US-23 AT ANN ARBOR

Percentile	Direction of Travel			
	Southbound		Northbound	
	Right Lane	Left Lane	Right Lane	Left Lane
Total Count	15080	7111	14085	9391
5	55	63	46	54
10	56	65	51	57
25	60	67	55	60
50	62	71	58	63
75	66	74	62	66
90	69	77	65	68
95	72	79	67	70
% exceeded 55	92	99	72	95

TABLE 8

## US-23 SOUTH OF ANN ARBOR (rural area)

Percentile	Direction of Travel			
	Southbound		Northbound	
	Right Lane	Left Lane	Right Lane	Left Lane
Total Count	7548	1883	7485	1906
5	54	58	56	60
10	55	60	58	62
25	58	62	60	64
50	61	66	63	66
75	64	68	67	70
90	67	72	70	75
95	70	75	73	77
% exceeded 55	89	99	96	99

TABLE 9  
I-75 NORTH OF GRAYLING

Percentile	Direction of Travel			
	Southbound		Northbound	
	Right Lane	Left Lane	Right Lane	Left Lane
Total Count	3315	472	3977	1353
5	52	58	48	60
10	55	60	52	62
25	58	62	56	64
50	61	65	60	66
75	64	68	63	69
90	67	71	66	73
95	70	73	68	75
% exceeded 55	87	98	79	99

TABLE 10  
US-27 SOUTH OF GRAYLING

Percentile	Direction of Travel			
	Southbound		Northbound	
	Right Lane	Left Lane	Right Lane	Left Lane
Total Count	2705	120	1927	668
5	54	58	54	57
10	55	60	56	59
25	59	62	60	62
50	62	65	62	65
75	65	69	66	69
90	69	74	70	73
95	71	78	73	75
% exceeded 55	90	97	92	97

TABLE 11

I-75 SOUTH OF GRAYLING AND SOUTH OF US-27 SPLIT

Percentile	Direction of Travel			
	Southbound		Northbound	
	Right Lane	Left Lane	Right Lane	Left Lane
Total Count	3395	518	2639	351
5	54	63	54	60
10	56	65	56	61
25	60	67	60	64
50	63	71	63	66
75	66	74	66	69
90	70	78	70	73
95	72	81	73	75
% exceeded 55	92	99	93	98

TABLE 12  
M-52 SOUTH OF MANCHESTER

Percentile	Direction of Travel	
	Southbound	Northbound
Total Count	1432	1368
5	50	40
10	52	46
25	56	51
50	59	55
75	63	59
90	67	62
95	71	66
% exceeded 55	75	48

TABLE 13  
M-52 NORTH OF MANCHESTER

Percentile	Direction of Travel	
	Southbound	Northbound
Total Count	1964	1967
5	46	47
10	49	50
25	52	54
50	56	57
75	60	61
90	63	64
95	66	66
% exceeded 55	64	63



TABLE 14  
M-36 EAST OF PINCKNEY

Percentile	Direction of Travel	
	Eastbound	Westbound
Total Count	2410	2716
5	42	43
10	44	46
25	48	50
50	51	54
75	55	58
90	59	62
95	62	64
% exceeded 55	23	40

TABLE 15  
M-36 WEST OF PINCKNEY

Percentile	Direction of Travel	
	Eastbound	Westbound
Total Count	1542	1484
5	41	41
10	46	44
25	50	48
50	54	53
75	59	58
90	64	63
95	68	67
% exceeded 55	40	38

## DISCUSSION

The data collected in this first phase of the speed study are primarily for purposes of comparison with data to be taken later, after the 65-mph limit has gone into effect. Thus, by themselves, the data have no meaning in the context of this study. However, it is interesting to note that 90% or more of the vehicles included in this sample are presently exceeding the 55-mph limit on most of the facilities measured. Indeed, on Interstate routes, 40-50% of vehicles are exceeding 65 mph.

It will be very interesting to see how the new speed limit affects speed distributions. Given the fact that the median speeds on the freeways included in the sample are already near 65 mph, it is to be hoped that the new speed law will have little effect.