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## EVALUATION OF 70 MPH SPEED LIMIT IN KENTUCKY

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# EVALUATION OF 70 MPH SPEED LIMIT IN KENTUCKY 

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| 16. Abstract <br> The objective of this study was to document the change in operating speeds of cars and trucks on rural interstates and parkways as a result of the change in speed limit from 65 mph to 70 mph . The $85^{\text {th }}$ percentile speed increased 1.3 mph for cars ( 74.6 to 75.9 mph ) and 0.6 mph for trucks ( 69.8 to 70.4 mph ) on rural interstates and 2.0 mph for cars ( 73.5 to 75.5 mph ) and 1.2 mph for trucks ( 69.5 to 70.7 mph ) on four-lane parkways. The increase in speed limits on a limited number of roads did not result in an increase in speeds on other highway types. There is a large difference between the $85^{\text {th }}$ percentile speed and posted speed limit on non-interstate and parkway roads which were designed to accommodate higher speeds. |  |  |  |
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## EXECUTIVE SUMMARY

The Kentucky legislature enacted a law in 2007 which identified specific roads (rural interstates and rural, four-lane parkways) where the speed limit could be raised to 70 mph from 65 mph . The speed limit applies to all vehicles with no difference between cars and trucks. The objective of this study was to document the change in operating speeds of cars and trucks on rural interstates and parkways as a result of the change in speed limit. Speeds on other types of roads were also obtained.

The evaluation consisted of a comparison of operating speeds of cars and trucks on various types of roads before and after implementation of the 70 mph speed limit. All of the data were collected using a moving radar procedure where speeds of opposing vehicles were obtained while driving down the highway. Data were collected for vehicles not affected by other vehicles or roadway character. The before data were obtained in April through June 2007 with the after data taken from September 2007 through April 2008. Vehicles were classified as either a car or truck. As a comparison to speed data collected on rural interstates and parkways, data were also collected on urban interstates, two lane parkways, a few two lane roads with full width shoulders, and some non-interstate or parkway four lane roads with full width shoulders.

The increase in speed limits on rural interstates and four-lane parkways from 65 to 70 mph only resulted in a small increase in travel speeds. The $85^{\text {th }}$ percentile speed increased 1.3 mph for cars and 0.6 mph for trucks on rural interstates and 2.0 for cars and 1.2 mph for trucks on four-lane parkways. Speeds for trucks are less than for cars with a difference of about five mph on rural interstates and four-lane parkways. The increase in speed limits on a limited number of roads did not result in an increase in speeds on other highway types. There is a large difference between the $85^{\text {th }}$ percentile speed and posted speed limit on non-interstate and parkway roads which were designed to accommodate higher speeds.

The data support retention of the 70 mph speed limit on rural interstates and rural, fourlane parkways. The large difference in the $85^{\text {th }}$ percentile speed and posted speed limit on a few other road types justify an increase in speed limit for a limited number of high-design type roads. For example, an increase in the speed limit from 55 to 60 mph on two-lane parkways and other roads designed to accommodate higher speeds would be appropriate. The difference in operating speeds of cars and trucks shows that a different speed limit for cars and trucks may be considered in some instances. If a different speed limit was used, data show the speed limit would be five mph higher for cars than for trucks.

### 1.0 BACKGROUND

Recent legislation in Kentucky allowed the speed limit on rural interstates and parkways to be increased to 70 mph from 65 mph (1). The specific roads where the Secretary of Transportation could increase the speed limit to 70 mph were listed in the legislation. The speed limit on these roads had been 65 mph for many years.

A previous evaluation of speed limits in Kentucky examined criteria and procedures used for setting speed limits and recommended maximum speed limits for various types of roads (2). The recommendation was made that the $85^{\text {th }}$ percentile speed should be used as the standard method to establish speed limits since this speed reflects operating speeds as determined by the overall roadway environment. The Manual on Uniform Traffic Control Devices (MUTCD) (3) states that the posted speed limit should be within five mph of the $85^{\text {th }}$ percentile speed of freeflowing traffic. The MUTCD allows two types of speed limit signs; one to designate passenger car speeds (including any nighttime information or minimum speed) and the other to show special speed limits for trucks and other vehicles.

The previous study (completed in 1997) found that travel speeds for most types of highways were substantially above the posted speed limit (2). Also, speeds of cars were slightly above those of trucks. For rural interstates, the $85^{\text {th }}$ percentile speed was 72.9 percent for cars and 68.7 percent for trucks with 70 percent of cars and 37 percent of trucks traveling at a speed over the 65 mph speed limit. For rural parkways, the $85^{\text {th }}$ percentile speed was 73.6 mph for cars and 69.7 mph for trucks with the speed of 71 percent of cars and 45 percent of trucks over the 65 mph speed limit. The recommended speed limits for rural interstates and parkways were 70 mph for cars and 65 mph for trucks (2).

Since the 1997 study, the speed limit on rural interstates in many states has increased to 70 mph while Kentucky's speed limit on this type of road remained at 65 mph . A 2007 summary of speed limits across the United States on various types of roads showed that 19 states had a speed limit of 70 mph on rural interstates with 13 states having a speed limit of 75 mph on these roads (4). In 11 states the speed limit for trucks is less than cars on rural interstates. Also, for roads other than interstates and other limited access roads, 22 states had a speed limit for cars of over 55 mph .

As previously noted, the Kentucky legislature enacted a law in 2007 which identified specific roads (rural interstates and rural, four-lane parkways) where the speed limit could be raised to 70 mph . The speed limit was raised on all the allowed roads in July 2007. The speed limit applies to all vehicles with no difference between cars and trucks. The objective of this study was to document the change in operating speeds of cars and trucks on rural interstates and parkways as a result of the increase in speed limit from 65 to 70 mph . Speeds on other types of roads were also obtained.

### 2.0 PROCEDURE

The evaluation consisted of a comparison of operating speeds of cars and trucks on various types of roads before and after implementation of the 70 mph speed limit on rural interstates and rural, four-lane parkways. All of the data were collected using a moving radar procedure. Speeds of opposing vehicles were obtained while driving down the highway. The before data was obtained in April through June 2007 with the after data collected from September 2007 through April 2008. Vehicles were classified as either a car or truck. Speeds were collected for vehicles which were free flowing with their speed not affected by other vehicles or the roadway character such as a steep grade.

Data were taken on all of the following roads which were identified in the legislation as roads where the speed limit could be increased to 70 mph .
a. Interstate 24 (entire length)
b. Interstate 64 (from Interstate 264 to the West Virginia state line)
c. Interstate 65 (from the Tennessee state line to Interstate 264)
d. Interstate 71 (from Interstate 264 to Interstate 275)
e. Interstate 75 (from the Tennessee state line to Interstate 275)
f. Audubon Parkway (entire length)
g. Julian M. Carroll Purchase Parkway (entire length)
h. Bert T. Combs Mountain Parkway (from Interstate 64 to Mountain Parkway Extension)
i. Edward T. Breathitt Pennyrile Parkway (entire length)
j. Wendell H. Ford Western Kentucky Parkway (entire length)
k. Louie B. Nunn Cumberland Parkway (entire length)

1. Martha Layne Collins Bluegrass Parkway (entire length)
m. William H. Natcher Parkway (entire length)

As a comparison, data were also collected on urban interstates (Interstate 265 and Interstate 275), two-lane rural parkways (Hal Rogers and Mountain Parkway Extension), a few two lane roads with full width shoulders, and a sample of non-interstate or parkway four lane roads with full width shoulders.

The data were analyzed separately for cars and trucks. The following data were determined for each category of road.
a. $\quad 50^{\text {th }}$ percentile speed
b. $\quad 85^{\text {th }}$ percentile speed
c. $\quad 10-\mathrm{mph}$ pace
d. percentage of vehicles in $10-\mathrm{mph}$ pace
e standard deviation

### 3.0 RESULTS

The sample sizes were 30,642 cars and 11,269 trucks in the months prior to implementation of the 70 mph speed limit on selected roads with speeds for 42,624 cars and 17,629 trucks collected in the period after implementation. Also, the data collected in 2007 before the new speed limit began was compared to data collected in the 1997 study to determine any changes over those years. Speed limits had increased on various types of road in several states so a question was whether this affected speeds on roads in Kentucky. Following is a comparison of the $85^{\text {th }}$ percentile speeds for cars and trucks in 1997 and 2007 (before implementation of the 70 mph speed limit).

## $85^{\text {th }}$ Percentile Speed ( mph )



This comparison shows some minor changes in speeds over this 10 -year period. The speed limit for both data sets was 65 mph for interstates and four-lane parkways with 55 mph on the other highway types. The largest difference was the increase of 1.6 mph for cars on rural interstates. This is the type of road which would be most affected by the speed limit in adjacent states. The speeds on four-lane parkways did not change.

Another comparison was conducted for speeds on Interstates 265 and 471 where the speed limit was 55 mph in 1997 and had been increased to 65 mph prior to 2007. These highways are urban interstates which were not included in the change to the 70 mph speed limit. The $85^{\text {th }}$ percentile speeds on these roads in 1997 (with a speed limit of 55 mph ) were 66.3 mph for cars and 62.7 mph for trucks. The $85^{\text {th }}$ percentile speeds in 2007 (with a speed limit of 65 mph ) increased to 72.2 mph for cars and 67.9 mph for trucks. While there was a 10 mph increase in the speed limit, the $85^{\text {th }}$ speeds increased by only 5.9 mph for cars and 5.2 mph for trucks.

Summaries of the before and after speed data on each roadway are given in the Appendix. The data (before and after implementation of the 70 mph speed limit) are summarized by highway type in Tables 1 and 2. The data show there were only small increases in speeds as a result of the increase in the speed limit from 65 to 70 mph on rural interstates and parkways.

Following is a comparison of the $85^{\text {th }}$ percentile speeds for cars and trucks for each roadway type. The speed limit was 65 mph before and 70 mph after for rural interstates and four lane parkways, 65 mph both before and after for urban interstates, and 55 mph both before and after for two lane parkways and the US and KY routes. All the US and KY routes where speed data were collected were roads with designs which included full-width shoulders and roadway geometrics which allowed speeds higher than the regulatory speed limit.

## $85^{\text {th }}$ Percentile Speed (mph)

| Highway Type | Cars |  |  | Trucks |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Before | After | Change | Before | After | Change |
| Rural Interstate | 74.6 | 75.9 | 1.3 | 69.8 | 70.4 | 0.6 |
| Parkway (4-lane) | 73.5 | 75.5 | 2.0 | 69.5 | 70.7 | 1.2 |
| Parkway (2-lane) | 67.5 | 67.7 | 0.2 | 64.4 | 64.2 | -0.2 |
| Urban Interstate | 72.2 | 73.1 | 0.9 | 67.9 | 67.9 | 0.0 |
| US (4-lane) | 63.9 | 65.3 | 1.4 | 62.6 | 63.1 | 0.5 |
| KY (4-lane) | 65.7 | 65.6 | -0.1 | 62.7 | 61.7 | -1.0 |
| KY (2-lane) | 65.2 | 65.7 | 0.5 | 62.4 | 61.8 | -0.6 |

The five mph increase in speed limit resulted in increases of only 1.3 and 2.0 mph on interstates and parkways, respectively, for cars with 0.6 and 1.2 mph increases in speeds for trucks.

As previously noted, the MUTCD (3) states that the posted speed limit should be within five mph of the $85^{\text {th }}$ percentile speed of free-flowing traffic. Following is a comparison of the difference between the $85^{\text {th }}$ percentile speed and speed limit before and after the 70 mph speed limit. The $85^{\text {th }}$ percentile speed was always higher than the posted speed limit.

Difference Between $85^{\text {th }}$ Percentile Speed and Posted Speed Limit (mph)
Highway Type
Rural Interstate

| Before | After |
| :---: | :---: |
| 9.6 | 5.9 |

Trucks

Parkway (4-lane)
Parkway (2-lane)
Urban Interstate
$8.5 \quad 5.5$

| Before | After |
| :---: | :---: |
| 4.8 | 0.4 |

US (4-lane)
KY (4-lane)
KY (2-lane)
$12.5 \quad 12.7$
$7.2 \quad 8.1$
$8.9 \quad 10.3$
$10.7 \quad 10.6$
$10.2 \quad 10.7$
$4.5 \quad 0.7$
$9.4 \quad 9.2$
$2.9 \quad 2.9$
$7.6 \quad 8.1$
$\begin{array}{ll}7.7 & 6.7\end{array}$
$7.4 \quad 6.8$

The $10-\mathrm{mph}$ pace (which is the 10 mph range with the highest percentage of vehicles) was determined along with the standard deviation of the speeds. There were no major changes in the percentage of vehicles in the $10-\mathrm{mph}$ pace or the standard deviation.

### 4.0 CONCLUSIONS

The evaluation resulted in the following conclusions.
1.There has been only small changes in speeds between 1997 and 2007 on roads where the speed limit has not changed. Speeds on rural interstates increased slightly.
2. While the speed limit on urban interstate routes were increased 10 mph (from 55 to 65 mph ) between 1997 and 2007, the increase in speeds for cars and trucks was only about five mph .
3.The increase in speed limits on rural interstates and four-lane parkways from 65 to 70 mph resulted in only a small increase in travel speeds. The $85^{\text {th }}$ percentile speed increased 1.3 mph for cars and 0.6 mph for trucks on rural interstates and 2.0 for cars and 1.2 mph for trucks on four-lane parkways..
4.Speeds for trucks are less than for cars. The difference is about five mph on rural interstates and four-lane parkways.
5.The increase in speed limits on the limited number of roads did not result in an increase in speeds on other highway types.
6.There is a large difference between the $85^{\text {th }}$ percentile speed and posted speed limit on noninterstate and parkway roads which were designed to accommodate higher speeds.

### 5.0 RECOMMENDATIONS

The speed data support retention of the 70 mph speed limit on rural interstates and rural, fourlane parkways. The large difference in the $85^{\text {th }}$ percentile speed and posted speed limit on a few other road types justify an increase in speed limit on a limited number of high-design type roads. For example, an increase in the speed limit from 55 to 60 mph on two-lane parkways and other roads designed to accommodate higher speeds would be appropriate.

The difference in operating speeds of cars and trucks shows that a different speed limit for cars and trucks may be considered in some instances. If a different speed limit was used, data show the speed limit would be five mph higher for cars than for trucks.

### 6.0 REFERENCES

1.Kentucky Revised Statutes, Chapter 189, Section 189.390.
2.Agent, K.R. and Pigman, J.G.; "Evaluation of Speed Limits in Kentucky," University of Kentucky, Report KTC-97-6, April 1997.
3.Manual on Uniform Traffic Control Devices, Federal Highway Administration, 2003.
4.Insurance Institute for Highway Safety, June 2007.

| Table 1. Speed D | efore 7 | PH Spe | Limit |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| CARS | Percen | (mph) | 10-M | Pace | Standard | Sample |
| Highway Type | 50th | 85th | Range | Percentage | Deviation (mph) | Size |
| Interstate | 70.0 | 74.6 | 66-75 | 75.3 | 4.70 | 7,859 |
| Urban Interstate | 68.1 | 72.2 | 64-73 | 74.4 | 5.13 | 1,711 |
| Parkway 4 Lane | 69.1 | 73.5 | 65-74 | 71.8 | 5.07 | 12,607 |
| Parkway 2 Lane* | 61.8 | 67.5 | 58-67 | 66.7 | 8.80 | 783 |
| KY-2 Lane* | 60.2 | 65.2 | 56-65 | 69.4 | 10.17 | 816 |
| KY-4 Lane* | 60.5 | 65.7 | 57-66 | 69.0 | 9.93 | 2,319 |
| US-4 Lane* | 59.0 | 63.9 | 55-64 | 71.2 | 11.19 | 4,547 |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| TRUCKS | Percen | (mph) | 10-M | Pace | Standard | Sample |
| Highway Type | 50th | 85th | Range | Percentage | Deviation (mph) | Size |
| Interstate | 65.9 | 69.8 | 62-71 | 82.1 | 3.88 | 5,213 |
| Urban Interstate | 63.6 | 67.9 | 60-69 | 75.1 | 4.76 | 766 |
| Parkway 4 Lane | 65.7 | 69.5 | 62-71 | 84.1 | 3.72 | 3,760 |
| Parkway 2 Lane* | 60.6 | 64.4 | 55-64 | 71.2 | 6.67 | 95 |
| KY-2 Lane* | 58.4 | 62.4 | 55-64 | 76.4 | 8.14 | 306 |
| KY-4 Lane* | 58.3 | 62.7 | 54-63 | 71.5 | 8.54 | 347 |
| US-4 Lane* | 57.9 | 62.6 | 54-63 | 74.7 | 8.61 | 782 |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| * Speed Limit 55 mph |  |  |  |  |  |  |



## APPENDIX

SPEED DATA


| Table A-2. Speed Data After 70 MPH Speed Limit |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Cars (mph) |  | Trucks (mph) |  | Car | Truck |
| Route | 50th | 85th | 50th | 85th | Sample | Sample |
| 124 | 71.7 | 75.6 | 66.2 | 69.9 | 781 | 610 |
| 164 | 71.4 | 75.9 | 66.4 | 70.4 | 4,994 | 3,027 |
| 165 | 71.9 | 76.0 | 66.7 | 70.7 | 3,054 | 2,598 |
| 171 | 70.8 | 75.6 | 65.2 | 69.6 | 457 | 539 |
| 175 | 72.0 | 76.4 | 66.3 | 70.3 | 2,190 | 1,881 |
|  |  |  |  |  |  |  |
| 1265 | 68.1 | 73.3 | 64.0 | 68.4 | 1,019 | 518 |
| 1275 | 68.3 | 72.9 | 62.2 | 66.1 | 468 | 200 |
| Audubon Pkwy. | 70.0 | 74.4 | 66.8 | 70.1 | 324 | 151 |
| Bluegrass Pkwy. | 71.5 | 75.9 | 66.5 | 70.2 | 4,955 | 1,470 |
| Nunn Pkwy. | 70.1 | 75.7 | 67.5 | 71.6 | 982 | 403 |
| Mountain Pkwy. | 70.3 | 75.1 | 66.5 | 70.7 | 5,429 | 587 |
| Natcher Pkwy. | 71.1 | 75.4 | 67.2 | 71.5 | 1,008 | 573 |
| Breathitt Pkwy. | 70.1 | 74.5 | 67.0 | 70.3 | 1,272 | 781 |
| Carroll Pkwy. | 70.5 | 73.8 | 65.5 | 69.7 | 513 | 208 |
| WK Pkwy. | 72.0 | 76.1 | 67.0 | 71.0 | 3,813 | 1,704 |
|  |  |  |  |  |  |  |
| Mountain Pkwy Ext. | 62.1 | 67.8 | 59.5 | 63.8 | 2,515 | 317 |
| Hal Rogers Pkwy. | 61.3 | 67.0 | 59.9 | 64.8 | 575 | 108 |
| KY 9 AA | 59.5 | 63.6 | 58.4 | 62.4 | 226 | 152 |
| KY 15 | 59.3 | 64.3 | 56.6 | 60.3 | 485 | 109 |
| KY 80 (2-lane) | 62.9 | 67.8 | 59.6 | 62.9 | 212 | 71 |
| KY 114 | 60.5 | 65.8 | 57.8 | 61.5 | 749 | 122 |
| KY 4 | 60.3 | 65.1 | 56.0 | 60.5 | 392 | 116 |
| KY 80 (4-lane) | 60.7 | 66.1 | 58.2 | 62.4 | 1,389 | 272 |
| US 23 | 60.8 | 66.0 | 59.0 | 64.1 | 1,528 | 589 |
| US 25E | 60.0 | 65.9 | 59.2 | 62.7 | 366 | 80 |
| US 60 | 60.6 | 65.3 | 58.3 | 62.5 | 1,227 | 147 |
| US 60 B | 59.2 | 64.1 | 57.5 | 60.9 | 549 | 132 |
| US 127 | 59.5 | 64.3 | 56.2 | 59.9 | 653 | 98 |
| US 150 | 58.0 | 63.6 | 55.6 | 59.4 | 233 | 42 |
| US 641 | 60.0 | 63.9 | 57.2 | 59.4 | 266 | 24 |

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