



Report of Findings

of the

Joint Legislative Committee on Turnpike Safety

**Under Authority
of**

**Senate Concurrent Resolution
Serial No. 110**

SESSION OF 1953

1. $\frac{1}{2} \times \frac{1}{3} = \frac{1}{6}$

2. $\frac{2}{3} \times \frac{3}{4} = \frac{1}{2}$

3. $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$

4. $\frac{3}{5} \times \frac{5}{6} = \frac{1}{2}$

5. $\frac{1}{3} \times \frac{1}{4} = \frac{1}{12}$

6. $\frac{2}{5} \times \frac{5}{7} = \frac{2}{7}$

7. $\frac{1}{5} \times \frac{1}{3} = \frac{1}{15}$

8. $\frac{3}{4} \times \frac{4}{5} = \frac{3}{5}$

SENATE CONCURRENT RESOLUTION

Serial No. 110

Legislative Journal Page 244.

By Messrs. MAHANY and DENT

JOINT COMMITTEE TO INVESTIGATE SAFETY MEASURES ON THE PENNSYLVANIA TURNPIKE

In the Senate, February 9, 1953.

WHEREAS, The Pennsylvania Turnpike is world famous as the greatest toll highway ever constructed; and

WHEREAS, It has brought to our Commonwealth an ever increasing flow of tourists from all the states of the union and serves as a working model for future highway developments; and

WHEREAS, Much information and misinformation has appeared from time to time, concerning its safety factor for vehicular traffic; therefore be it

Resolved (if the House of Representatives concur), That the President Pro Tempore of the Senate appoint a committee of five Senators to act jointly with a similar committee of five House members to be appointed by the Speaker of the House of Representatives, and the said committee be empowered to investigate the subject of Turnpike safeguards and safety regulations; and

Be It Further Resolved, That this committee shall make a report of their findings and recommendations to the General Assembly as soon as possible.

Adopted by the Senate, February 9, 1953.

Concurred in by the House, February 16, 1953.

Approved by the Governor, March 3, 1953.

Pamphlet Laws Resolution No. 2.

THE JOINT LEGISLATIVE COMMITTEE
ON TURNPIKE SAFETY

Honorable FRED P. HARE, JR., *Chairman*

Honorable BAKER ROYER, *Vice Chairman*

Senate Committee

JOHN H. DENT

FRED P. HARE, JR.

ALBERT R. PECHAN

JOHN G. SNOWDEN

PAUL L. WAGNER

House Committee

JULES FILO

BLAINE C. HOCKER

BAKER ROYER

WILMER W. WATERHOUSE

HAROLD G. WESCOTT

LETTER OF TRANSMITTAL

To the Members of the General Assembly of the Commonwealth of Pennsylvania:

Senate Concurrent Resolution Serial No. 110, adopted by the Senate February 9, 1953, concurred in by the House of Representatives February 16, 1953, and approved by the Governor, March 3, 1953, directed the appointment of a joint legislative committee to investigate the subject of safeguards and safety regulations for the Pennsylvania Turnpike. The attached report is submitted, as directed by the resolution, by the appointed joint committee, composed of five members each from the Senate and the House of Representatives.

As the resolution points out, "Much information and misinformation" has circulated from time to time concerning the turnpike's "safety factor for vehicular traffic." The first concern of the committee, therefore, was to furnish the General Assembly with accurate statistical information regarding turnpike traffic and accident and fatality rates. Part I of the report presents the results of a comprehensive study of these data.

Part II of the report is a classified listing of subjects discussed at public hearings and contained in communications to the committee, and Part III presents the names of the witnesses at the hearings.

The committee wishes to express its appreciation to the Joint State Government Commission, whose staff and facilities were utilized.

FRED P. HARE, JR., *Chairman*
Joint Legislative Committee
on Turnpike Safety.

Harrisburg, Pennsylvania
March, 1953

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PART I

MOTOR VEHICLE ACCIDENTS AND THE PENNSYLVANIA TURNPIKE SYSTEM

Accidents and seriousness of accidents are shown, for purposes of comparison, as rates which take into account the travel mileage of motor vehicles. Although *general* inferences may be drawn from different rates observed for different highways and highway systems, *specific* conclusions are of doubtful validity, because of driver, vehicle, highway, and weather differences, as well as variations in adequacy and methods of accident reporting.

INTRODUCTION

Fatal accidents and *fatalities* are generally expressed in terms of number of fatal accidents or number of fatalities resulting from these accidents per *hundred million* miles of vehicle travel.

Injury accidents, *injuries resulting from these accidents*, and *property-damage accidents* are generally expressed in terms of numbers per *hundred thousand* miles of vehicle travel.

Involvement of vehicles in accidents is expressed in this report in terms of the numbers of vehicles involved in accidents per *hundred million* vehicle miles.

For the United States, the fatality rate—that is, number of motor vehicle deaths per hundred million vehicle miles of travel—decreased from 7.7 during 1951 to 7.3 in 1952. In individual states in 1952, fatality rates ranged from 2.4 in Rhode Island to 12.1 in South Carolina, and for the year 1951, from 2.9 in Rhode Island to 12.6 in New Mexico. In Pennsylvania, the fatality rate in 1952 was 5.1, and in 1951, 5.4.¹

The factors which determine accident rates are: (1) driver characteristics, (2) vehicle type and condition, (3) highway

¹ Fatality rates for all states for the years 1951 and 1952 appear in Appendix Table A-1.

design and condition, (4) weather, and (5) methods and adequacy of accident reporting.

Differences in the factors, as well as in combinations of factors, produce varying effects upon accident rates. Driver characteristics are modified by education and enforcement. Vehicle type and condition vary because of safety inspection and direct control of types of vehicles permitted on a given facility. Highways may be made safer through curvature and gradient design, adequate repair, and utilization of safety devices. Weather conditions can be partially counteracted by precautionary measures on the part of the motorist and by treatment of highway surfaces.

A difference in rate between two highways or highway systems should not be stressed, since the impact of the factors is not easily ascertained.

TURNPIKE ACCIDENTS

The Pennsylvania Turnpike is a limited-access, high-speed thoroughway. On the turnpike, as on other highways, variations in driver, vehicle, and road characteristics admit of but partial control.²

Accident reporting differences may make data for the Pennsylvania Turnpike System not comparable with that for other roads and highway systems. On the turnpike, as on other Pennsylvania Highways, each accident is to be reported by the motor vehicle operators to the Bureau of Highway Safety of the Pennsylvania Department of Revenue. In addition, each accident on the turnpike is the subject of an on-the-spot investigation by the Pennsylvania State Police.

During the year 1952, 1,832 accidents, involving 2,908 vehicles, occurred on the Pennsylvania Turnpike System. Of these 1,832 accidents, 62 were fatal accidents, 623 involved injuries, and 1,147 involved property damage only. In the 62 fatal accidents, 83 deaths occurred (1.3 per accident), and 112 injuries occurred (1.8 per accident). In the 623 injury accidents, 1,065 persons were injured (an average of 1.7 persons per accident).

For the year 1952, the fatal accident rate for the turnpike

² For sample vehicle safety check tabulation, see Appendix Table A-2.

was 5.4, and the fatality rate was 7.3 (both in terms of hundreds of millions of vehicle miles). The injury accident rate, the injury rate, and the property-damage accident rate for the same time period (in terms of hundreds of thousands of vehicle miles) were .055, .103, and .100, respectively. The numbers of fatal accidents, fatalities, injury accidents, injuries, and property-damage accidents, together with rates for these categories, for the years 1940 through 1952, appear in Table 1, page 4.

Although the *number* of accidents for all categories and *numbers* of fatalities and injuries were highest for the year 1952, the *rates* (taking into account travel mileage) for that year were among the lowest. The fatal accident rate and the fatality rate were highest during the year 1944: 12.4 and 14.4, respectively. The highest injury accident rate, .101, the highest injury rate, .216, and the highest property-damage accident rate, .184, occurred during the first year, 1940.

From 1944 to 1947, rate decreases occurred; during 1947, the lowest rates for all categories other than property-damage accidents obtained. Increases in all rates occurred during the years 1948, 1949, and 1950, but the years 1951 and 1952 were characterized by decreases. Except for the year 1947, the fatal accident rate of 5.4 and the fatality rate of 7.3, shown for the year 1952, were the lowest for the thirteen-year period.

Differences in accident rates resulting from factor changes may be noted with reference to war years and nonwar years. During the war years (1942 through August, 1945), the general speed limit on all highways was 35 miles per hour, compared to current turnpike speed limits of 60 and 70 miles per hour for passenger vehicles and 50 miles per hour for commercial vehicles. There is a strong presumption that, during the war years, the average age of drivers increased and the average vehicle was in relatively inferior condition. Accident rates for war years, as shown in Table 1, were generally higher than for nonwar years.

Accident rates for sections of the turnpike, interchange to interchange, are shown in Table 2.³

³ For fatal accident rates and injury accident rates, interchange to interchange, see Appendix Tables A-3 and A-4.

Table 1

NUMBERS AND RATES OF FATAL ACCIDENTS, FATALITIES, INJURY ACCIDENTS, INJURIES, AND PROPERTY-DAMAGE
ACCIDENTS, PENNSYLVANIA TURNPIKE SYSTEM: 1940 TO 1952

<i>Year</i>	<i>Fatal Acci- dents</i>	<i>Fatalities</i>	<i>Injury Acci- dents</i>	<i>Injuries</i>	<i>Property- damage Accidents</i>	<i>Fatal Accident Rate *</i>	<i>Fatality Rate *</i>	<i>Injury Accident Rate †</i>	<i>Injury Rate †</i>	<i>Property- damage Accident Rate †</i>
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1940	5	5	47	101	86	10.7	10.7	.101	.216	.184
1941	20	23	198	402	311	8.3	10.7	.082	.166	.128
1942	12	14	100	180	186	9.3	10.9	.078	.140	.145
1943	7	7	53	106	152	8.0	8.0	.061	.121	.174
1944	12	14	77	153	143	12.4	14.4	.079	.158	.148
1945	12	16	86	158	140	8.4	11.2	.060	.111	.098
1946	14	24	124	233	193	5.7	9.8	.051	.095	.079
1947	13	17	139	269	247	4.4	5.8	.048	.092	.084
1948	21	25	195	402	319	6.1	7.3	.057	.117	.093
1949	28	39	227	456	354	7.2	10.0	.058	.117	.091
1950	42	59	338	624	569	8.8	12.4	.071	.131	.120
1951	47	66	502	975	860	6.1	8.5	.065	.126	.111
1952	62	83	623	1,177	1,147	5.4	7.3	.055	.103	.100

* In terms of hundreds of millions of vehicle miles.

† In terms of hundreds of thousands of vehicle miles.

SOURCE: Records of the Pennsylvania Turnpike Commission.

Since rates shown on Table 2 apply to the portions of the turnpike system, the accident reporting may be assumed to be uniform and highway design and condition generally similar. Under the circumstances, variations may be presumed to be attributable to driver, vehicle, and weather factors.

Table 2
ACCIDENT RATES ON SECTIONS OF PENNSYLVANIA TURNPIKE SYSTEM:
1950, 1951, AND 1952

<i>Section: Interchange to Interchange</i>	<i>Accident Rates: Number of Accidents per Hundred Thousand Vehicle Miles</i>		
	1950	1951	1952
(1)	(2)	(3)	(4)
Gateway—Beaver Valley	*	0	.098
Beaver Valley—Perry Highway	*	.242	.112
Perry Highway—Butler Valley	*	.306	.154
Butler Valley—Allegheny Valley	*	1.585	.133
Allegheny Valley—Pittsburgh	*	.312	.128
Pittsburgh—Irwin	*	.286	.171
Irwin—New Stanton .....	.205	.254	.144
New Stanton—Donegal .....	.222	.166	.157
Donegal—Somerset .....	.250	.270	.233
Somerset—Bedford .....	.235	.229	.222
Bedford—Breezewood .....	.168	.209	.162
Breezewood—Fort Littleton .....	.163	.142	.145
Fort Littleton—Willow Hill .....	.152	.149	.218
Willow Hill—Blue Mountain .....	.150	.098	.109
Blue Mountain—Carlisle .....	.139	.148	.139
Carlisle—Gettysburg Pike .....	.699	.144	.157
Gettysburg Pike—Harrisburg—West Shore ..	.237	.203	.247
Harrisburg—West Shore—Harrisburg East ..	.420	.161	.137
Harrisburg East—Lebanon—Lancaster .....	.269	.141	.127
Lebanon—Lancaster—Reading .....	.365	.137	.141
Reading—Morgantown .....	.193	.102	.130
Morgantown—Downingtown .....	.127	.197	.152
Downingtown—Valley Forge .....	.185	.146	.123

* Not open to traffic.

SOURCE: Records of the Pennsylvania Turnpike Commission.

In 1952, 2,908 vehicles were involved in 1,832 accidents on the Pennsylvania Turnpike System. Nine hundred and two of the 1,832 accidents involved one vehicle, and 930 accidents involved two or more vehicles. Accident frequencies, by vehicle classification (passenger cars and motorcycles, trucks, and buses) are measured by *involvement rates*, which show, within classes, the numbers of vehicles involved in accidents *per hundred million* vehicle miles. Involvement rates (for all accidents, property-damage accidents, injury accidents, and fatal accidents) for the years 1951 and 1952 are shown in Table 3.⁴

Involvement rates for all accidents, property-damage accidents, and injury accidents in each of these two years were highest for trucks. Although fatal accident involvement rates were highest for buses, no general conclusion may be drawn because of the very limited number of fatal bus accidents.

Accident rates do not facilitate allocation of accident responsibility among drivers, vehicles, and highways. If an allocation of responsibility is to be attempted, accident information must be interpreted with reference to driver, vehicle, and highway characteristics.

Differences may be noted in reporting of individual accidents on the Pennsylvania Turnpike System. Information obtained during on-the-spot investigations and from operators' accident reports differ in numbers of vehicles involved in accidents and in numbers of injuries resulting from accidents. Accident investigations by the Pennsylvania State Police show that during 1951 there were 674 single-vehicle accidents and 735 multivehicle accidents. Accident reports by operators, on the other hand, show 639 single-vehicle accidents and 770 multivehicle accidents.⁵ In 35 cases, accidents judged to be single-vehicle accidents in on-the-spot investigations were evidently reported by operators as multivehicle accidents.

⁴ Data for the years 1940 through 1952 appear in Appendix Tables A-5 to A-8, inclusive.

⁵ Data for all accidents occurring on the Pennsylvania Turnpike System during the calendar year 1951 are currently available, while preliminary information, only, is available at this time for the calendar year 1952.

Table 3

PENNSYLVANIA TURNPIKE SYSTEM, NUMBER OF VEHICLE TRIPS, VEHICLE MILES, AND NUMBER OF VEHICLES INVOLVED IN ACCIDENTS PER HUNDRED MILLION VEHICLE MILES OF TRAVEL: 1951 AND 1952

Class of Vehicle	Number of Vehicle Trips	Vehicle Miles	Number of Vehicles Involved in Accidents per Hundred Million Miles of Travel			
			All Accidents	Property-damage Accidents	Injury Accidents	Fatal Accidents
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1952						
Passenger Cars and Motorcycles	9,228,665	856,520,531	230	138	84	8
Trucks	2,080,647	278,483,631	334	218	100	16
Buses	62,805	6,778,119	147	59	59	29
1951						
Passenger Cars and Motorcycles	6,085,664	567,306,521	253	146	98	9
Trucks	1,644,295	201,847,624	413	273	123	17
Buses	47,549	5,061,836	178	119	39	20

SOURCE: Records of the Pennsylvania Turnpike Commission.

On-the-spot investigations of accidents on the Pennsylvania Turnpike System in 1951 showed that 975 persons were injured in these accidents. Operators, on the other hand, reported 1,121 injuries. It is probable that these differences in numbers of injuries arise because of injuries not noticed or reported at the time of on-the-spot investigations but observed later and so reported by the operators. According to operators' accident reports, 775 of the 1,362 nonfatal accidents involved property damage only, while 587 involved injuries.

Of the 2,317 drivers involved in accidents on the Pennsylvania Turnpike System during 1951, the state of residence of the operator is known for 2,178 drivers. Of these, 1,151 (52.8 percent) resided in Pennsylvania, and 1,027 (47.2 percent) were out-of-state drivers. Complete data relating to use of the turnpike by residents of Pennsylvania and of other states are not available. However, data obtained during a survey for the time period October 1 to 15, 1952, concerning state of registration of vehicles, indicate that but 36 percent of all vehicles using the turnpike during that time were registered outside of Pennsylvania, and, conversely, that 64 percent were registered in Pennsylvania. Although complete data are lacking, it appears that the incidence of turnpike accidents is higher for residents of other states than for residents of Pennsylvania.

Data are available concerning the age of 2,142 of the 2,317 drivers involved in turnpike accidents during 1951. Of these, 928 (43.3 percent) were 20 years of age but less than 30; 26.4 percent were 30 years of age but less than 40; 14 percent were 40 years of age but less than 50; 8.5 percent were 50 years of age but less than 60; 3.4 percent were over 60 years of age; and 4.4 percent were under 20 years of age. Since data relating mileage utilization to operators' ages are not available, no specific conclusions can be drawn.

Of the 1,409 turnpike accidents during the year 1951, 770 were collision accidents, and of these, 24 (3.1 percent) were head-on accidents, 387 (50.3 percent) were rear-end accidents, and 345 (44.8 percent) were other types of collision accidents. For 14 accidents (1.8 percent), data were not available.

Of the collision accidents, 16.7 percent of head-on accidents

were fatal accidents, 4.4 percent of rear-end accidents were fatal accidents, and 3.3 percent of other types of accidents were fatal. Of all noncollision accidents, 2.3 percent were fatal accidents.

Fatal Accidents—

During the year 1952, there were 62 fatal accidents and 83 fatalities, an average of 1.3 fatalities per fatal accident. In these same accidents, 112 persons were injured (1.8 persons per accident).

The number of fatal accidents classified by number of fatalities and number of vehicles involved is shown below.

<i>Number of Vehicles</i>	<i>Number of Fatal Accidents</i>	<i>Number of Accidents Classified by Number of Fatalities</i>				
		<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
1 Vehicle	19	18	1	..	..	..
2 Vehicles	35	23	8	2	1	1
3 Vehicles	8	7	1	..	..	..

The number of fatal accidents classified by number of persons injured and number of vehicles involved is shown below.

<i>Number of Vehicles</i>	<i>Number of Fatal Accidents</i>	<i>Number of Fatal Accidents Classified by Number of Injuries</i>							
		<i>0</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>Over 6</i>
1 Vehicle ..	19	12	5	2	..	..	..	..	..
2 Vehicles ..	35	10	8	6	2	4	2	1	2
3 Vehicles ..	8	4	1	1	2	..	..	..	..

Of the 62 fatal accidents, 19 involved one vehicle (18 of these, automobile, and one, truck). In 35 fatal accidents, two vehicles were involved (12, two automobiles; 17, one automobile and one truck; 4, two trucks; and 2, one truck and one bus). There were 8 three-vehicle accidents during this time period; in 2 of these accidents, two automobiles and one truck were involved; in 4 of these accidents, one automobile and two trucks were involved; and in 2 accidents, three trucks were involved.

Twenty-five of the fatal accidents (16 collision and 9 non-collision) involved vehicles entering or crossing the medial strip, 19 were rear-end collisions, and 8 were angle collisions and skids.

In the 62 fatal accidents, 15 drivers were judged asleep or inattentive; in 17 cases, operation of vehicles was judged to be too fast for conditions; and in 2 cases, drivers lost control while passing.

During the year 1951, 47 fatal accidents and 66 fatalities occurred, an average of 1.4 fatalities per fatal accident. In these same accidents, 82 persons were injured, or 1.7 persons per accident.

The number of fatal accidents classified by number of fatalities and number of vehicles involved is shown below.

<i>Number of Vehicles</i>	<i>Number of Fatal Accidents</i>	<i>Number of Accidents Classified by Number of Fatalities</i>			
		<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>
1 Vehicle	15	12	3	..	..
2 Vehicles	27	17	8	2	..
3 or more Vehicles	5	3	1	..	1

The number of fatal accidents classified by number of persons injured and number of vehicles involved is shown below.

<i>Number of Vehicles</i>	<i>Number of Fatal Accidents</i>	<i>Number of Fatal Accidents Classified by Number of Injuries</i>							
		<i>0</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>6</i>	<i>9</i>	<i>12</i>
1 Vehicle	15	6	5	3	..	1	..	..	..
2 Vehicles	27	11	7	3	1	3	2	..	..
3 or more Vehicles	5	0	2	..	..	1	..	1	1

Of the 47 fatal accidents, 15 involved one vehicle, 27 involved two vehicles, 4 involved three vehicles, and 1 involved four vehicles. Of the 15 one-vehicle accidents, 10 were accidents of passenger cars or motorcycles, 4 were truck accidents, and for one accident the type of vehicle was not reported. Of the 27

accidents involving two vehicles, 5 involved two passenger cars, 18 involved a passenger car or motorcycle and a truck, and 4 involved two trucks. Of the three-vehicle accidents, 1 involved three trucks, 2 involved two automobiles and one truck and 1 involved one bus and two trucks. The single four-vehicle accident involved three automobiles and one truck.

Eight of the fatal accidents (4 collision and 4 noncollision) during the year 1951 involved vehicles entering or crossing the medial strip, 17 were rear-end collisions, and 11 were other types of collisions.

In the 47 fatal accidents, 15 drivers were judged to be either asleep or inattentive, and in 8 cases the operation of vehicles was judged to be too fast for conditions.

For fatal accidents for the year 1951, information concerning state of residence of driver is available. Of the 85 drivers involved in fatal accidents, 43 were residents of Pennsylvania and 42 were residents of other states.

The number of fatal accidents classified by number of vehicles involved and by age of driver is shown below.

Age	Accidents Involving:			All Accidents
	One Vehicle	Two Vehicles	Three Vehicles	
Under 20	1	1	..	2
20 to 29	7	26	8	41
30 to 39	2	16	3	21
40 to 49	3	8	2	13
50 to 59	2	2	2	6
60 and over .....	..	1	1	2
TOTAL	15	54	16	85

Since no estimates of miles traveled according to age of driver are available, the accident rates within age groups cannot be determined.

Nonfatal Accidents—

During the year 1951, 1,362 nonfatal accidents occurred. Of these, 587 were injury accidents, and 775 were property-damage

accidents. In the 587 injury accidents, 1,039 persons were reported as injured by vehicle operators, an average of 1.8 injuries per accident.

The number of nonfatal accidents classified by number of injuries and number of vehicles involved is as follows:

Number of Vehicles	Number of Accidents	Number of Nonfatal Accidents Classified by Number of Injuries									
		0	1	2	3	4	5	6	7	9	
1 Vehicle	624	341	164	86	23	8	2	..	..	..
2 Vehicles	630	373	124	77	32	14	4	4	1	1	
3 or more Vehicles	108	61	16	17	6	6	2	..	..	..

Operators reported 624 of the 1,362 nonfatal accidents as single-vehicle accidents and 738 as accidents involving two or more vehicles. Of the 738 collision accidents, information pertaining to manner of collision is available for 724. Of these, 20 (2.7 percent) were head-on accidents, 370 (50.4 percent) were rear-end accidents, and 334 (46.9 percent) were other types of collision accidents.

For nonfatal accidents during the year 1951, information concerning state of residence of driver is available for 2,093 of the 2,232 drivers involved; 52.9 percent were residents of Pennsylvania, and 47.1 percent residents of other states.

The ages of drivers involved in nonfatal accidents in 1951 were as follows:

Age	Number of Drivers
19 and under	92
20 to 29	887
30 to 39	545
40 to 49	287
50 to 59	176
60 and over	70
TOTAL	2,057

Since no estimates of miles traveled according to age of driver are available, accident rates within age groups cannot be determined.

PART II

PUBLIC HEARINGS AND COMMUNICATIONS

Public hearings concerning turnpike safety were held as follows:

Wednesday, March 4, 1953—Lancaster County Court House,
Lancaster, Pennsylvania

Friday, March 6, 1953—Somerset County Court House, Som-
erset, Pennsylvania

Wednesday, March 11, 1953—House Caucus Room, Capitol
Building, Harrisburg, Pennsylvania.

Invitations to attend and testify at these hearings were extended to district attorneys and coroners of the counties traversed by the Pennsylvania Turnpike, representatives of civic organizations and governmental agencies, the press, and the public.* A stenographic record of the proceedings at each hearing was made.

The testimony at the hearing and the communications received by the joint committee dealt with such matters as:

A. DRIVER FACTORS

1. *Speed*

- a. Proper maximum speed limits
- b. Differential speed limits for cars, trucks, and buses
- c. Speed limit zones
- d. Average speed checks, time of entry and exit.

2. *Driver Fatigue and Driving Monotony (hypnosis)*

- a. Compulsory waiting periods and rest stops
- b. Payment of fare at every interchange
- c. Type, color, and spacing of reflectors
- d. Use of radio
- e. Tunnel lighting

* For a listing of the witnesses at the hearings, see Part III.

- f. Color of bridges, overpasses, tunnel entrances, and tunnels.
3. *Driver Training and Experience*
- a. Education of drivers (especially out-of-state drivers) through signs, literature, warnings, radio broadcasting and lighting systems
 - b. Tape recordings at turnpike restaurants, and public address system on turnpike
 - c. Study of losses of depth perception
 - d. Driver examination at points of entry
 - e. Special licenses for high-speed operation
 - f. Drivers' lack of high-speed driving experience.
4. *Driver Habits*
- a. Radar study
 - b. Night driving speeds
 - c. Long slow passes and sudden pull-outs
 - d. Auto ventilation and carbon monoxide hazard
 - e. Following too closely
 - f. Lack of horn warning when passing
 - g. Intoxication.

B. HIGHWAY FACTORS

1. *Medial Strip*
- a. Width and level
 - b. Paving and stability
 - c. Barriers (shrubby and trees, concrete—rigid or flexible, continuous or at danger points).
2. *Enforcement*
- a. Number of State Police detail, and number of men per car
 - b. Effectiveness of present force
 - c. Color of police cars
 - d. Police car equipment (radio, two-way telephone)
 - e. Unit patrol area.
 - f. Radar detection
 - g. Fines and penalties

- h. Violation reports to drivers' employers
- i. Separate turnpike police force.

3. *Surface and Traffic Flow*

- a. Paved pull-off spaces
- b. Overnight accommodations on turnpike
- c. Elimination of parking opposite service stations
- d. White reflectorized line on inner edge of surface
- e. Elevation of outside lanes on curves
- f. Ribbon painting of surface
- g. Inside slow vehicle lane (passing on right).

4. *Road Conditions*

- a. Accident hazards from rain, snow, ice, fog
- b. Weather stations and effective driver warning of conditions ahead
- c. Rocks and other objects on road surface
- d. Diesel exhaust oil on road surface.

C. VEHICLE FACTORS

1. *Equipment*

- a. Lights
- b. Reflectors
- c. Brakes
- d. Flares
- e. Governors
- f. Underpowered vehicles
- g. Bumpers for commercial vehicles at same level as for passenger cars.

2. *Enforcement*

- a. Inspection at entry points
- b. Exclusion for noncompliance.

Testimony offered and communications received dealt at times with probable causes of accidents without suggestions for accident prevention, at times with accident prevention without reference to accident causes, and on occasion with both cause and prevention aspects.

PART III

WITNESSES AT THE PUBLIC HEARINGS

WITNESSES AT HEARING HELD AT LANCASTER COUNTY COURT HOUSE, MARCH 4, 1953

William S. Canning, Engineering Director
Keystone Automobile Club

O. D. Shipley, Director of Safety
Pennsylvania Motor Truck Association

John W. Beyer
District Attorney, Lancaster County

Creston I. Shoemaker
Coroner, Chester County

Jacob H. Wagner, Chairman
Highway and Traffic Committee
Coatesville Chamber of Commerce

Isaac Roach
Pennsylvania Turnpike Safety Committee

John J. Carbon
Chief County Detective, York County
(Representing District Attorney's Office)

Paul D. Good
Coroner, Berks County

Philip R. Ness
Representing Coroner of York County

Dr. M. H. Yoder
Coroner, Lancaster County

Winslow J. Rushong
Coroner, Montgomery County

Daniel Baum
Elizabethtown Rotary Club

Orville Schwanger
Elizabethtown Rotary Club

M. A. Rollman
Manufacturing Engineer, Lancaster County

Earl Warner
Warner's Motor Express

E. L. Lange, Jr.
All State Insurance Company

Henry Boyd
Manheim, Lancaster County

**WITNESSES AT HEARING HELD AT SOMERSET COUNTY
COURT HOUSE, MARCH 6, 1953**

Frank A. Orban, Jr.
District Attorney, Somerset County

O. D. Shipley, Director of Safety
Pennsylvania Motor Truck Association

Charles M. Koontz
District Attorney, Bedford County

Dr. William D. McClelland
Coroner, Allegheny County

A. A. Domicca, Instructor, Driver Education
Meyersdale Junior High School, Somerset County

Clark H. Painter
District Attorney, Butler County

L. Alexander Sculco
District Attorney, Westmoreland County

Dr. C. T. Saylor
Coroner, Somerset County

Harry Brainerd, Executive Manager
Western Pennsylvania Safety Council

Joseph R. Check
Coroner, Westmoreland County

Margaret Sanders
Deputy Coroner, Beaver County

Vernon G. Geisel
Coroner, Bedford County

William Haddad, Safety Promoter
Windber, Pennsylvania

James DeRose, Field Service Engineer
Pittsburgh, Pennsylvania

Robert Platt, Instructor, Driver Education
Somerset Joint High School

Chester Nicholson
Somerset, Pennsylvania

Norman A. Shaulis
Counsel for United Truckers Association

Robert Dietz
Uniontown Motor Club, Somerset County

Sgt. Albert H. Shuller
Pennsylvania State Police

Rev. H. A. Dornheim
Somerset, Pennsylvania

Richard Willkow
Berlin, Pennsylvania

**WITNESSES AT HEARING HELD AT CAPITOL BUILDING,
HARRISBURG, MARCH 11, 1953**

James F. Torrance, Secretary Treasurer
Pennsylvania Turnpike Commission

David E. Watson, Member
Pennsylvania Turnpike Commission

Paul K. Eckhardt
Engineer in Charge of Research
Union Switch and Signal Division
Westinghouse Air Brake Company

Dr. Richard Krumm, Psychologist
American Institute of Research

Frederick A. Noah
Statistician and Analyst
Union Switch and Signal Division
Westinghouse Air Brake Company

John D. Paul, Engineer
Pennsylvania Turnpike Commission

Major H. H. Allen
J. E. Greiner Company, Consulting Engineers
Pennsylvania Turnpike Commission

Colonel C. M. Wilhelm, Commissioner
Pennsylvania State Police

Huette F. Dowling
District Attorney, Dauphin County

Clinton R. Weidner
District Attorney, Cumberland County

Peter Wambach
Radio Station WCMB

Lt. A. H. Kratzky
Pennsylvania State Police

Dr. Edward A. Haegele
Coroner, Cumberland County

O. D. Shipley, Director of Safety
Pennsylvania Motor Truck Association

Honorable Nolan F. Ziegler
House of Representatives

APPENDIX

APPENDIX: STATISTICAL SOURCE DATA

Table A-1

MOTOR VEHICLE ACCIDENT FATALITY RATES IN THE UNITED STATES
BY STATES: 1951 AND 1952

<i>State</i>	<i>Number of Fatalities per Hundred Million Miles of Vehicle Travel</i>	
	<i>1951</i>	<i>1952</i>
(1)	(2)	(3)
All United States	7.7	7.3
Alabama	10.6	9.2
Arizona	12.3	10.3
Arkansas	8.5	8.5
California	7.1	7.2
Colorado	6.5	6.2
Connecticut	3.9	3.0
Delaware	6.1	6.0
Florida	7.9	7.6
Georgia	8.8	8.3
Idaho	9.5	8.4
Illinois	7.2	7.3
Indiana	8.4	7.7
Iowa	6.0	5.1
Kansas	7.8	7.3
Kentucky	9.3	9.8
Louisiana	8.8	8.7
Maine	4.8	4.3
Maryland	7.7	6.6
Massachusetts	3.6	3.4
Michigan	7.2	6.7
Minnesota	6.1	4.7
Mississippi	8.2	7.7
Missouri	6.4	6.2
Montana	7.5	8.8
Nebraska	6.1	6.1
Nevada	9.7	11.8
New Hampshire	5.3	4.0

Table A-1 (Continued)

State	Number of Fatalities per Hundred Million Miles of Vehicle Travel	
	1951	1952
(1)	(2)	(3)
New Jersey	4.5	4.4
New Mexico	12.6	10.8
New York	6.0	5.5
North Carolina	8.5	8.1
North Dakota	7.1	7.5
Ohio	6.4	6.5
Oklahoma	7.0	6.2
Oregon	6.7	6.3
Pennsylvania	5.4	5.1
Rhode Island	2.9	2.4
South Carolina	11.6	12.1
South Dakota	4.0	7.9
Tennessee	8.6	8.0
Texas	7.3	6.7
Utah	8.1	8.8
Vermont	6.7	4.3
Virginia	9.2	7.9
Washington	6.2	5.6
West Virginia	7.1	7.4
Wisconsin	7.0	7.3
Wyoming	10.5	9.1

SOURCE: *Public Safety* (Chicago: National Safety Council, February, 1952, and February, 1953).

Table A-2

TABULATION OF VEHICLES FROM SAFETY CHECK, PENNSYLVANIA
TURNPIKE: WEEK OF OCTOBER 19, 1952, TO
WEEK OF FEBRUARY 15, 1953

<i>Week</i>	<i>Vehicles Refused Entry but Entered After Correction</i>	<i>Vehicles Refused Entry—No Data on Re-entry After Correction</i>
(1)	(2)	(3)
October 19, 1952	33	14
October 26	94	35
November 2	25	24
November 9	36	22
November 16	114	76
November 23	64	61
November 30	45	44
December 7	61	29
December 14	52	27
December 21	58	20
December 28	102	59
January 4, 1953	50	211
January 11	77	168
January 18	70	134
January 25	43	84
February 1	32	92
February 8	55	147
February 15	55	70
TOTALS	1,066	1,317

SOURCE: Records of the Pennsylvania Turnpike Commission.

Table A-3

FATAL ACCIDENT RATES ON SECTIONS OF PENNSYLVANIA
TURNPIKE SYSTEM: 1950, 1951, AND 1952 †

Section: Interchange to Interchange	Number of Fatal Accidents per Hundred Thousand Vehicle Miles		
	1950	1951	1952
(1)	(2)	(3)	(4)
Gateway—Beaver Valley	*	0	0
Beaver Valley—Perry Highway	*	0	.004
Perry Highway—Butler Valley	*	0	.006
Butler Valley—Allegheny Valley	*	0	.003
Allegheny Valley—Pittsburgh	*	0	.003
Pittsburgh—Irwin	*	.027	.011
Irwin—New Stanton .....	.011	.003	.003
New Stanton—Donegal .....	.010	.016	.003
Donegal—Somerset .....	....	.010	.023
Somerset—Bedford .....	.026	.013	.009
Bedford—Breezewood .....	.014	.008	.005
Breezewood—Fort Littleton .....	.002	.002	.003
Fort Littleton—Willow Hill .....	.004	.008	.013
Willow Hill—Blue Mountain .....	.003	.011	0
Blue Mountain—Carlisle .....	.015	.007	.005
Carlisle—Gettysburg Pike	0	.004	0
Gettysburg Pike—Harrisburg-West Shore ..	0	.014	.017
Harrisburg-West Shore—Harrisburg East ..	0	0	0
Harrisburg East—Lebanon-Lancaster	0	.013	.003
Lebanon-Lancaster—Reading	0	.007	.005
Reading—Morgantown	0	0	0
Morgantown—Downingtown .....	.127	.006	.016
Downingtown—Valley Forge	0	0	.013

* Not open to traffic.

† Rates expressed per hundred thousand vehicle miles (rather than per hundred million vehicle miles) to facilitate comparison with Tables 2 and A-4.

SOURCE: Records of the Pennsylvania Turnpike Commission.

Table A-4

INJURY ACCIDENT RATES ON SECTIONS OF PENNSYLVANIA
TURNPIKE SYSTEM: 1950, 1951, AND 1952

Section: Interchange to Interchange	<i>Number of Injury Accidents per Hundred Thousand Vehicle Miles</i>		
	1950	1951	1952
(1)	(2)	(3)	(4)
Gateway—Beaver Valley	*	0	.025
Beaver Valley—Perry Highway	*	.242	.038
Perry Highway—Butler Valley	*	0	.060
Butler Valley—Allegheny Valley	*	.317	.058
Allegheny Valley—Pittsburgh	*	.937	.029
Pittsburgh—Irwin	*	.191	.062
Irwin—New Stanton .....	.061	.052	.045
New Stanton—Donegal .....	.080	.057	.057
Donegal—Somerset .....	.111	.104	.068
Somerset—Bedford .....	.085	.077	.084
Bedford—Breezewood .....	.064	.069	.053
Breezewood—Fort Littleton .....	.060	.046	.056
Fort Littleton—Willow Hill .....	.039	.050	.062
Willow Hill—Blue Mountain .....	.053	.046	.028
Blue Mountain—Carlisle .....	.040	.053	.043
Carlisle—Gettysburg Pike .....	.140	.044	.084
Gettysburg Pike—Harrisburg-West Shore ..	.119	.084	.095
Harrisburg-West Shore—Harrisburg East ..	.210	.087	.063
Harrisburg East—Lebanon-Lancaster .....	.090	.067	.035
Lebanon-Lancaster—Reading .....	.030	.054	.052
Reading—Morgantown .....	.048	.032	.046
Morgantown—Downingtown .....	.042	.058	.052
Downingtown—Valley Forge .....	.046	.040	.023

* Not open to traffic.

SOURCE: Records of the Pennsylvania Turnpike Commission.

Table A-5

NUMBER OF VEHICLES INVOLVED IN TURNPIKE ACCIDENTS
PER HUNDRED MILLION VEHICLE MILES OF TRAVEL
BY CLASS OF VEHICLE: 1940 TO 1952

<i>Year</i>	<i>Class of Vehicle</i>			
	<i>Passenger Cars and Motorcycles</i>	<i>Trucks</i>	<i>Buses</i>	<i>All Vehicles</i>
(1)	(2)	(3)	(4)	(5)
1940	404.7	468.8	.....	411.7
1941	278.7	578.5	148.5	318.3
1942	285.1	484.4	175.4	345.5
1943	279.8	411.1	94.8	334.5
1944	276.3	493.2	339.0	360.2
1945	218.7	444.7	.....	276.6
1946	176.9	317.1	125.0	204.4
1947	177.0	358.2	152.6	216.9
1948	199.5	355.4	319.9	244.5
1949	217.8	325.2	80.5	249.6
1950	283.3	463.6	150.8	344.8
1951	252.4	413.2	177.8	293.8
1952	229.9	333.6	147.5	254.7

SOURCE: Records of the Pennsylvania Turnpike Commission.

Table A-6

NUMBER OF VEHICLES INVOLVED IN TURNPIKE PROPERTY-DAMAGE
ACCIDENTS PER HUNDRED MILLION VEHICLE MILES OF
TRAVEL BY CLASS OF VEHICLE: 1940 TO 1952

<i>Year</i>	<i>Class of Vehicle</i>			
	<i>Passenger Cars and Motorcycles</i>	<i>Trucks</i>	<i>Buses</i>	<i>All Vehicles</i>
(1)	(2)	(3)	(4)	(5)
1940	254.8	312.5	.....	261.3
1941	155.5	378.5	99.0	185.4
1942	170.8	289.1	.....	203.9
1943	172.8	305.0	.....	227.9
1944	157.6	316.1	169.5	218.8
1945	110.8	292.1	.....	158.3
1946	95.7	217.5	62.5	119.8
1947	101.2	239.3	.....	130.7
1948	108.4	220.9	213.3	140.8
1949	119.6	191.9	26.8	141.4
1950	163.4	287.8	75.4	187.4
1951	145.8	272.5	118.5	178.6
1952	137.9	217.6	59.0	156.9

SOURCE: Records of the Pennsylvania Turnpike Commission.

Table A-7

NUMBER OF VEHICLES INVOLVED IN TURNPIKE INJURY ACCIDENTS
PER HUNDRED MILLION VEHICLE MILES OF TRAVEL
BY CLASS OF VEHICLE: 1940 TO 1952

<i>Year</i>	<i>Class of Vehicle</i>			
	<i>Passenger Cars and Motorcycles</i>	<i>Trucks</i>	<i>Buses</i>	<i>All Vehicles</i>
(1)	(2)	(3)	(4)	(5)
1940	134.9	125.0	.....	133.5
1941	113.6	178.5	49.5	121.8
1942	106.4	156.2	175.4	124.5
1943	100.8	87.5	94.3	95.1
1944	103.4	149.9	169.5	121.8
1945	97.2	126.3	.....	103.6
1946	73.9	87.4	62.5	76.4
1947	68.2	103.5	152.6	77.0
1948	84.6	110.4	106.6	92.6
1949	87.5	116.1	53.7	95.7
1950	109.9	149.9	75.4	142.7
1951	97.8	123.4	39.5	104.1
1952	84.4	100.2	59.0	88.1

SOURCE: Records of the Pennsylvania Turnpike Commission.

Table A-8

NUMBER OF VEHICLES INVOLVED IN TURNPIKE FATAL ACCIDENTS
PER HUNDRED MILLION VEHICLE MILES OF TRAVEL
BY CLASS OF VEHICLE: 1940 TO 1952

Year	Class of Vehicle			
	Passenger Cars and Motorcycles	Trucks	Buses	All Vehicles
(1)	(2)	(3)	(4)	(5)
1940	15.0	31.3	....	16.9
1941	9.6	21.5	....	11.1
1942	7.9	39.1	....	17.1
1943	6.2	18.6	....	11.5
1944	15.3	27.2	....	19.6
1945	10.7	26.3	....	14.7
1946	7.3	12.2	....	8.2
1947	7.6	15.4	....	9.2
1948	6.5	24.1	....	11.1
1949	10.7	17.2	....	12.5
1950	10.0	25.9	....	14.7
1951	8.8	17.3	19.8	11.1
1952	7.6	15.8	29.5	9.7

SOURCE: Records of the Pennsylvania Turnpike Commission.