Indiana War-Time Traffic Speeds

ROBERT E. FROST
Research Engineer, Joint Highway Research Project
Purdue University

This paper is a progress report of one of the co-operative investigations of the Joint Highway Research Project, Purdue University. The purpose of the report is to trace the trend in Indiana traffic speeds during the country's first two years of war. The report presents summaries of speeds of 17,066 cars and 5,670 trucks under various conditions at seventeen locations in Indiana. The speeds of all cars and trucks, from the various locations, have been combined and classified into various "speed-influencing" periods. These periods are:

1. The "No Speed Limit" Period (before March 18, 1942).
3. The 40 M.P.H. Limit Period (July 26, 1942, to September 30, 1942).
4. The 35 M.P.H. Limit Period (October 1, 1942, to November 30, 1942).

All ration dates and coupon values apply to Indiana.

During each of these periods except the first, speeds were recorded for Indiana cars, foreign cars, and trucks, and during the ration periods, car speeds were further divided into ration groups with speeds recorded for "A", "B", and "C" cars.

The report contains a series of curves showing the speeds of the various vehicle classes during each of these periods. In addition, the report shows the types of warning signs posted on Indiana's principal highways during the 40 M.P.H. and the 35 M.P.H. periods.
OBJECT OF STUDY

Because of a need for a more-refined piece of equipment that could be used in traffic research, the Photo-Velaxometer was developed in the Highway Research Laboratories at Purdue University. This apparatus is designed to measure small time intervals and sequences of small time intervals. In applying this instrument to traffic engineering it is possible to determine drivers' reactions to objects or hazards along the highway that may influence traffic speeds as well as the effectiveness of warning and regulatory signs. These reactions can easily be studied by obtaining a series of positive or negative acceleration patterns, thus showing in detail the influence and effective range of the object being studied. The Photo-Velaxometer has been used in conducting research to determine drivers' reactions to narrow bridges, steep hills, sharp curves, pavement widths, number of traffic lanes, day and night driving, "signed" speed zones, weather and pavement conditions, types and sizes of traffic signs, railroad crossings, transverse position of vehicles, urban speed conditions, and the war-time emergency.

Soon after December 7, 1941, the current study of wartime traffic speeds was undertaken to find the effect of the war on driving speeds. The purpose of this paper is to present this phase of the traffic studies and to trace the trends in vehicular speeds on Indiana's highways from the time of no speed limit, through the various speed-limit periods, and the various gasoline rationing periods. The report covers the period from February 9, 1942, to January 10, 1944.

SPEED-INFLUENCING PERIODS

The war-time speed study includes cars obtained from seventeen locations in Indiana (Fig. 1) with records of 17,066 cars and 5,670 trucks. The data from each of these locations have been combined into seven "speed-influencing" periods. These periods are:

1. The No Speed Limit Period (before March 18, 1942).

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2 The data from February 9, 1942, to December 1, 1942, were analyzed and presented at the Purdue Road School in January, 1943. See "Indiana War-Time Traffic Speeds" by R. E. Frost, "Proceedings, Twenty-Ninth Annual Purdue Road School, 1943", Engineering Bulletin of Purdue University, Vol. 27, No. 2.
3 All dates for the various speed restrictions, gasoline rationing, and changes in rationing apply to conditions in Indiana.
Fig. 1. Map showing locations of spot speed studies included in the war-time speed survey in Indiana.
2. The 45 M.P.H. Speed Limit Period (March 18, 1942, to July 25, 1942). This was in the form of a governor’s request in response to a presidential appeal to the Nation.

3. The 40 M.P.H. Speed Limit Period (July 26, 1942, to September 30, 1942). This was also in the form of a governor’s request.

4. The 35 M.P.H. Period (October 1, 1942, to November 30, 1942). This nation-wide speed limit was established by the Office of Defense Transportation.


During each of the “speed-influencing” periods, the public was kept informed by means of radio and newspaper publicity. Fig. 2 is a

Fig. 2. Montage of speed publicity contained in several of the newspapers serving Indiana.
montage of clippings from several newspapers serving Indiana. This illustrates the type of newspaper publicity that many of these restricting periods received.

**Traffic Speeds**

Before the war, the speed limit in Indiana was restricted to a "reasonable speed". However, the Nation's entry into war, the increased load on gasoline transportation facilities, and the loss of the source of the rubber supply made it necessary for the President of the United States, on March 14, 1942, to suggest that in order to conserve rubber, vehicular speeds in each state be restricted to a 40 M.P.H. maximum. Following this, the Governor of Indiana requested that vehicular speeds
within the State should not exceed 45 M.P.H., from March 18, 1942. In Indiana the speed restriction was in the form of a request by the Governor, and no legislative action was taken to design a legal limit. Violators of the limit were given warning tickets, and severity of punishment depended on the speed over the requested limit. Fig. 3 represents car and truck speeds before the speed restriction was in effect. During this period, average car and truck speeds were 49.56 and 41.20 M.P.H., respectively. The maximum speeds recorded were 92.14 M.P.H. for a car and 69.59 for a truck.

With the installation of the requested 45 M.P.H. limit in Indiana on March 18, 1942, the study was continued in order to find the effect

Fig. 4. Speed conditions during the voluntary 45 M.P.H. period.
of this restriction on speeds. The study was made during the period beginning March 18 and ending July 25, 1942, at which time speeds were further restricted. Fig. 4 covers speed conditions during the 45 M.P.H. Speed Limit Period and represents speeds of all cars, trucks, Indiana cars, and foreign cars. (Cars were not classed by states until April 16, 1942.) During this period, cars averaged 49.92 against 41.58 M.P.H. for trucks. Indiana cars averaged 49.16 and foreign cars 51.58 M.P.H. The highest speeds recorded during this period were 100.21 for a car and 68.22 for a truck. This maximum car speed was observed on March 19, the second day of the new speed limit! In addition to these high speeds, one interstate passenger bus was observed going 74.11 M.P.H. The curve further shows that during the 45 M.P.H. period, 68 percent of the cars and 27 percent of the trucks were exceeding the 45 M.P.H. limit. Also, 55 percent of the Indiana cars and 77 percent of the foreign cars exceeded the limit. In other words, comparing the records of the 45 M.P.H. period and the preceding No Limit period, the curves show that car and truck speeds did not change, indicating that the "voluntary" restriction had no measurable effect on driving speeds.

With the reduction of the speed limit to 40 M.P.H., the State Highway Commission of Indiana erected over 600 four-by-four-foot "patriotic speed" signs on all of Indiana's principal highways. These signs were posted at the edge of towns for outbound traffic. The 40 M.P.H. period lasted from July 26 to September 30, 1942, at which time the entire Nation was placed on a 35 M.P.H. speed program. Fig. 5 shows the type of 40 M.P.H. signs posted on Indiana highways. Fig. 6 represents speed conditions during the 40 M.P.H. speed limit, during which time average car and truck speeds were 46.74 M.P.H. and 40.26 M.P.H., respectively. Indiana cars averaged 45.62 against 48.82 for foreign cars. The highest speeds were 86.31 for cars and 67.50 for trucks. In addition, the curve shows that 78 percent of the cars and 52 percent of the trucks exceeded the 40 M.P.H. limit. Seventy-three percent of the Indiana cars and 87 percent of the foreign cars exceeded the limit.
The data collected during this period further show that the 40 M.P.H. signs were effective to the extent of lowering average car speeds three M.P.H. and truck speeds one M.P.H.

During the 40 M.P.H. period, a separate two-day survey was conducted using one of the regular four-by-four-foot 40 M.P.H. "patriotic speed" signs on portable standards (Fig. 5) for the purpose of finding the immediate effect of this type of sign. Observations were made with the sign placed 400 feet in advance of the speed check section.

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and with the sign removed. Comparing the two sets of data brought out the very interesting fact that the presence of the 40 M.P.H. sign caused a 16 percent drop in the percentage of both cars and trucks exceeding the posted limit!

At the recommendation of the Baruch Rubber Committee, the Office of Defense Transportation established a nation-wide 35 M.P.H. speed limit, effective October 1, 1942, for the purpose of conserving tires and gasoline. With the reduction in the speed limit, the 40 M.P.H. speed signs were replaced by four-by-four-foot 35 M.P.H. speed signs (Fig. 7). These signs carry the legend, "35 M.P.H. SPEED LIMIT BY ORDER OF U. S. GOVERNMENT". This period lasted from October 1 to November 30, 1942, at which time the gasoline rationing program was made nationwide. Fig. 8 shows speed conditions during the 35 M.P.H. period. The figure shows that during this period, car speeds averaged 42.32 M.P.H. and truck speeds averaged 39.78 M.P.H. Indiana cars averaged 41.38 against 44.88 for foreign cars. Eighty-six percent of the cars and 82.5 percent of the trucks exceeded the 35 M.P.H. limit. Eighty-three percent of the Indiana cars and 96 percent of the foreign cars exceeded the limit. The highest speeds recorded during the period were 74.11 for cars and 54.10 for trucks.

Comparing speeds of this period with the previous 40 M.P.H. period shows that average car speeds dropped 4.4 M.P.H., and that truck speeds dropped less than one-half M.P.H. Foreign cars were still moving over three M.P.H. faster than Indiana cars.

The next "speed-influencing" period lasted from December 1, 1942, to August 15, 1943, and during this period gasoline rationing was extended to include the entire Nation with Midwest "A", "B", and "C" gasoline ration coupons each having four-gallon values. The truck, or "T" coupons were each worth five gallons. The 35 M.P.H. speed limit remained unchanged. With the initiation of gasoline rationing in Indiana, one of the methods of enforcing the speed limit, in addition to fines, has been to forward copies of warning tickets to the offender's
35 M.P.H. SPEED LIMIT PERIOD

OCTOBER 1, 1942 TO NOVEMBER 30, 1942

Fig. 8. Speed conditions during the 35 M.P.H. limit.

local tire and gasoline rationing board. The speeds during this period (Figs. 9 and 10) were as follows: all cars averaged 42.14; trucks, 39.56; Indiana cars, 41.16; foreign cars, 45.82; “A” cars, 42.10; “B” cars, 42.94; and “C” cars, 42.79. The percentage of cases exceeding the 35 M.P.H. limit in each of the various vehicle classes were: all cars, 85; trucks, 80; Indiana cars, 82.5; foreign cars, 94; “A” cars, 84; “B” cars, 82.5; and “C” cars, 89.5.

These data show that adding gasoline rationing to the existing 35 M.P.H. speed limit had no effect on the average speeds of cars or trucks. (However, foreign car speeds increased one M.P.H.) Even the per-
percentage of cases exceeding the limit in each of these two 35 M.P.H. periods remained unchanged. In comparing the speeds of "A", "B", and "C" cars, the data show that there was no appreciable difference in speeds among any of these classes.

On August 16, 1943, the Midwest "A", "B", and "C" gasoline coupons were reduced in value from four to three gallons. ("T" coupons remained at five gallons.) This, then, was taken as a basis for a new "speed-influencing" period. This period lasted from August 16 to September 30, 1943, at which time "B" and "C" coupons were...

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**Fig. 9.** Speed conditions during the four-gallon rationing program.
further reduced in value. Figs. 11 and 12 show speed conditions during the three-gallon ration period. During this period, average speeds were: all cars, 41.82; trucks, 39.34; Indiana cars, 40.50; foreign cars, 45.20; "A" cars, 41.42; "B" cars, 40.82; and "C" cars, 43.06. The percentage of cases exceeding the 35 M.P.H. limit were: all cars, 82.5; trucks, 79; Indiana cars, 80.5; foreign cars, 93; "A" cars, 82.5; "B" cars, 79; and "C" cars, 90.

These data show that the reduction in "A", "B", and "C" gasoline coupon values from four to three gallons accomplished little in the way
GAS RATIONING. 35 M.P.H. LIMIT
3 GALLONS FOR "A", "B" & "C"

AUGUST 16, 1943 TO SEPTEMBER 30, 1943

Fig. 11. Speed conditions during the three-gallon rationing program.

of speed reductions. Average car speeds dropped three-tenths M.P.H. and truck speeds dropped two-tenths. Likewise, these data show that Indiana and foreign speeds remained unchanged. However, of the three automobile ration classes, the average speeds of "C" cars increased slightly, "B" cars decreased two M.P.H., and "A" cars decreased less than one M.P.H.

On October 1, 1943, the value of "B" and "C" coupons was reduced from three to two gallons each with the values of "A" and "T" remaining unchanged (three and five gallons, respectively). At the
Fig. 12. "Ration speeds" during the three-gallon rationing program. In the present writing* these values have not been reduced further, and Figs. 13 and 14 show speed conditions during this (present) period. The data recorded during this period show the following averages: 43.32 for cars, 40.14 for trucks, 42.64 for Indiana cars, 48.02 for foreign cars, 43.12 for "A" cars, 42.88 for "B" cars, and 44.70 for "C" cars. The percentage of cases in each of the various vehicle groups that were found to be exceeding the 35 M.P.H. limit is: all cars, 85; trucks, 77;
Indiana cars, 83.5; foreign cars, 91.7; “A” cars, 84; “B” cars, 83.8; and “C” cars, 88.6.

To recapitulate, the trend in speeds during these various “speed-influencing” periods is shown in Table I. This table shows the percentage of cases in each vehicular class going less than 10 M.P.H. interval speeds for the various “speed-influencing” periods. To illustrate this method of comparison, note the percentage of cases going less than 50 M.P.H. in each period for cars. It follows that before March 18, 1942, 51 percent were going less than 50 M.P.H.; during the 45 M.P.H. period, 51 percent; during the 40 M.P.H. period, 68 percent; during
In summarizing this speed survey, the most significant facts are:

1. Average car speeds on Indiana's highways have dropped from 49.56 M.P.H. to 43.32 during the first year of war, and speed has increased slightly during the second year to 43.80 M.P.H.

**Summary**

In summarizing this speed survey, the most significant facts are:

1. Average car speeds on Indiana's highways have dropped from 49.56 M.P.H. to 43.32 during the first year of war, and speed has increased slightly during the second year to 43.80 M.P.H.
2. Foreign cars averaged from three to five M.P.H. faster than Indiana cars during each of the "speed-influencing" periods.

3. The 45 M.P.H. limit had no effect on the speeds of either cars or trucks.

4. During the 40 M.P.H. limit, average car speeds dropped from 49.92 to 46.74 M.P.H. and truck speeds from 41.58 to 40.26 M.P.H., thus showing some effect in reducing speeds.

5. The 35 M.P.H. limit was effective in reducing average car and truck speeds to 42.32 M.P.H. and 39.78 M.P.H., respectively.

6. The four-gallon rationing program had no effect on the speeds of cars or trucks. (A one percent drop in the number of cars exceeding 35 M.P.H. was noted.)

7. There was very little difference between "A", "B", and "C" ration speeds in the four-gallon ration period. These speeds were: 42.10, 42.94, and 42.79, respectively.

8. The reduction of "A", "B", and "C" coupon values to three gallons caused average-car speeds to drop less than one-half M.P.H. with no change in truck speeds. Average car speeds were 41.82 M.P.H. and truck speeds, 39.34.

9. During the three-gallon period, the speeds of "A" and "B" cars dropped, while "C" car speeds increased slightly. Average "A" speeds dropped from 42.10 M.P.H. to 41.82. Average "B" speeds dropped from 42.94 to 40.82 M.P.H. Average "C" speeds increased from 42.79 to 43.06 M.P.H.

10. The most recent data show that during the present rationing program, average car speeds have increased from 41.82 M.P.H. to 43.32 M.P.H. and truck speeds from 39.34 M.P.H. to 40.14. The data also show that "A" ration speeds have increased from 41.42 M.P.H. to 43.12 M.P.H.; "B" speeds increased from 40.82 to 42.88; and "C" speeds increased from 43.06 to 44.70 M.P.H.
**TABLE I**

**INDIANA WAR-TIME TRAFFIC SPEEDS**
(Shows the Percentage of Cases Going Less than the Stated Speeds)

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