

# An Epoch of Traffic Research

A. K. BRANHAM

Supervisor of Instruction, War Training Program  
Purdue University

Safety on the highway is one of the vital problems confronting most highway organizations in time of peace and in war. In order to meet this problem most highway departments have within the past few years added a bureau of traffic to their organization.

Traffic engineering is concerned with the study of the requirements for safety, utility, and mobility of traffic.

The war-time traffic conditions presented by Mr. Frost, and other problems requiring initial study, may include: narrow bridges, steep hills, sharp curves, pavement widths, number of traffic lanes, day and night driving, assigned speed zones, weather and pavement conditions, railroad crossings, transverse position of vehicles, urban speed conditions, and others of similar character.

Speed has been one of the more important causal factors of our highway-accident record. The accurate and economical measurement of speed has long been a subject open to investigation. Many significant advances in the techniques of recording traffic mobility have been made in the past few years. New devices have made possible the rapid collection of field data and have opened entirely new fields for the study of traffic.

On July 1, 1938, the Joint Highway Research Project inaugurated a research study in co-operation with the Division of Education and Applied Psychology of Purdue University. After experimenting with several speed-measuring devices, a completely automatic apparatus was developed by Mr. A. K. Branham in conjunction with Professor C. W. Caldwell of the School of Electrical Engineering. At the present time, nearly 25,000 vehicle speeds have been recorded and analyzed by Mr. Frost in connection with many of the previously mentioned studies. Since July 1, 1941, when the speed recorder was first put into operation, these thousands of readings were made without mechanical or electrical failure of the apparatus. This would indicate that the design is adequate and is easy to use, and that the rapidly obtained recordings may form permanent and economical records. It is superior to most speed-measuring apparatus because it records "successive speeds" as well as

“spot speeds”. In addition, the instrument incorporates portability, standard parts of construction, ease of operation, and precision measurement.

The pre-war studies made with this apparatus include:

1. “Spot speed” study on S. R. 100 between U. S. 40 and the Indianapolis Municipal Airport. This study was essentially an investigation of speed “before and after” the installation of assigned speed zone signs. The signs caused the speed of the motorist to concentrate near the posted speed.
2. An investigation of speed and traffic behavior at a narrow bridge in which speeds varied little revealed a pronounced shift in lateral placement of traffic toward the center of the highway.
3. In the study of traffic speeds and driver performance upon the Lafayette by-pass hill (U. S. 52) it was observed that trucks apparently reduced the speed of following cars and caused many passing violations.

The war-time use of this machine has been to trace the trend of driver reaction to speed restrictions, gasoline rationing, tire shortage, and various war-time economy measures. Since the war began, the recording and analysis of the speeds of 17,066 cars and 5,670 trucks at seventeen locations in Indiana have been completed. These data include speeds for Indiana cars, foreign cars, and trucks. Since gasoline rationing these recordings were further divided into A, B, and C ration groups.

Several dominating factors appear in Mr. Frost's report. During the no speed limit period (before March 18, 1942) cars and trucks averaged approximately 50 and 41 M.P.H. respectively. This was followed by a voluntary 45 M.P.H. speed limit period (March 18, 1942 to July 25, 1942). The public was informed of this restriction by means of radio and newspaper publicity in response to the Presidential appeal to the Nation, and to Governor Schricker's request for compliance by Indiana motorists. These data show that such voluntary restriction had little effect upon the average speed of cars and trucks. Early in the next period (July 26, 1942, to September 30, 1942) the State posted six hundred signs requesting motorists to use an economy speed of 40 M.P.H., thereby saving tires, cars, and lives. The average speed during this period dropped to about 47 M.P.H. for cars and 40 M.P.H. for trucks. A 35 M.P.H. speed limit was ordered by the U. S. Government which was in effect from October 1, 1942, to November 30, 1942. This nation-wide restriction was established by

the Office of Defense Transportation at the request of the Baruch Rubber Committee. The State Highway Commission of Indiana replaced the 40 M.P.H. signs with 35 M.P.H. signs. These signs are four feet by four feet and should be legible to the average motorist. The desired average speed was not obtained, but the average car and truck speeds were reduced to approximately 42 and 40 M.P.H., respectively. However, the State Highway Commission of Indiana is to be commended for providing adequate information on the requested speeds. The continued 35 M.P.H. speed limit and the introduction of a nation-wide four-gallon gasoline rationing program (December 1, 1942, to August 15, 1943) had little effect on the average speed of cars and trucks in Indiana. The reduction of the gasoline ration coupon values to three gallons also had little effect (August 16, 1943, to September 30, 1943). Since October 1, 1943, speeds have increased slightly in spite of a continued rationing of three gallons for A cars, a reduction to two gallons for B and C cars, and the 35 M.P.H. limit.

A few of the important results of the two-year war-time traffic-speed survey are:

1. Average car speeds in Indiana have dropped from 49.56 M.P.H. to 43.80 M.P.H., while average truck speeds were reduced from 41.20 M.P.H. to 40.82 M. P. H.
2. The greatest drop in average car speeds was during the 35 M.P.H. limit, just before the nation-wide gasoline rationing program. During the first year of the war car speeds gradually dropped from 49.56 M.P.H. to 43.32 M.P.H., and during the second year of the war, car speeds gradually increased to 43.80 M.P.H.
3. Foreign cars averaged from three to six M.P.H. faster than Indiana cars during each of the "speed-influencing" periods.
4. The rationing of gasoline had little effect on vehicular speeds.
5. When gasoline rationing was inaugurated, the average speed of A, B, and C cars was about the same. However, with the reduction of coupon values, B and C cars gradually increased their speeds. The A-car driver has been most consistent, but has increased his speed slightly. B and C cars have gradually increased their average speeds, and at present C cars drive faster than the other two groups.

These results indicate that, in spite of an appeal to patriotism and certain limitations set forth by the "speed-influencing" periods, the average motorist tends to exceed the desired speed limits. The appeal

for reduced speeds has been made, but the moral obligation has not been met by the motorist. Can the general morale of the people have a direct bearing on "speed behavior"? The rubber situation, the need for gasoline for the armed forces, and the dangerous ebb of the war situation in the early fall of 1942 may have been contributing factors toward a general reduction in war-time speeds. Can the increase in average speeds during the past year be attributed to a new confidence in winning the war and thereby eliminating the restrictions? Questions like these involve the psychology of the motorist as well as observance of physical factors.

Plans for future study should include the continuance of war-time traffic speeds, studies of highway signs and marking, and other psychological factors affecting the motorist. Such studies would perhaps alter the design and placement of traffic control devices to insure safe and efficient movement of traffic with a minimum amount of confusion to the driver.

Mr. Frost, the Joint Highway Research Project, and the State Highway Commission of Indiana are to be congratulated for their excellent studies, and should be encouraged to continue with increased vigor.