

FORECASTING HIGHWAY TRAFFIC.

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Knowledge of the future highway traffic is important in planning a state wide system of roads. These roads are to carry vehicles in the same sense as a town water system carries water. No engineer would lay out a system of pipe lines for a water supply unless he had looked ahead for a term of years to judge the growth of the city, so as to be sure his system would fit future conditions.

Likewise if we are to build roads wide enough and in the proper places to discharge the flow of traffic, we must look ahead and secure right-of-way and plan the roads according to our best estimate of the amount of traffic that is likely to flow over these roads.

There is another important reason for forecasting traffic. The total cost of highway transportation is made up of two parts—the cost of maintaining the road and operating the vehicles. We cannot calculate the economics of this business of road construction until we know the cost of operation which far exceeds the capital cost of the road.

The distribution of this future traffic over a system of state roads should be known rather than the immediate distribution. A paved road immediately draws traffic to it, and later on this peak of traffic may be dispersed to neighboring roads whenever these are surfaced.

Knowledge of traffic will also aid a wise allocation among the various parts of the system of the state funds which are to be spent on construction and maintenance. This can be done only approximately when there is only a general impression of where the traffic is now going and where it will go in the future.

These traffic problems are not confined to rural highways. The acute problems are those of the cities. Indeed city planning experts must study the automobile traffic. I know of one case where a bridge engineer had first to solve a traffic problem before he could design his bridge.

Another very important reason why traffic surveys should be made is that we may determine the proper place which highways should occupy in the structure of national transportation. As a rule people vitally interested in railways are not the friends of highway budgets, and with their present information they may be expected to attempt to slow down the flow of public money into highways. After all, there is only a certain portion of the

national income available for transportation, and what is put into one form to a necessary degree will act as a starvation of other forms. The railway men fear that they are paying taxes to create free highways for their competitors. Now a thorough survey of the origin and distribution of taxes used in highway construction operation is necessary to adjudicate questions of this kind. As a matter of fact, there is very little basis for the statement that the railway lines are largely contributing to establish a free highway for their competitors. It is also true that a long and painstaking transport survey in the state of Connecticut has shown that the amount of freight traffic carried over the highways in competition with the railroads is quite small. Professor J. G. McKay of the Bureau of Public Roads has reported these facts from the technical press, where they may be consulted. Traffic surveys of this kind are useful in quieting unnecessary controversies and bringing people together for a co-operative purpose.

We cannot predict highway traffic until we have such a collection of facts. The future can only be forecast from a knowledge of the present and the past. Here we have to do with such facts as the increase in population, the increase in the registration of automobiles and the growth of highway traffic as connected with population and automobile registration.

To the astonishment of most persons, the automobile registration in the United States increased from almost twelve and one-quarter million in 1922 to over fifteen and one-quarter million vehicles in 1923. Manufacturers expect to sell four million additional cars in 1924. There is now one car for every 7.2 persons in the United States.

In Indiana registration increased from 469,939 in 1922 to 582,882 in 1923, or one car for every 5.1 persons. In Indiana the increase in automobile registration was 24 per cent, while the population increase was less than 1 per cent. How long will this remarkable increase continue? Shall we have one car for every 3.8 persons as in the case in Iowa at present?

There are a number of obscure factors as for instance, the wealth of the state; the present distribution of cars as between the rural and city population; the progress of road building, which determines the use of the cars; the general prosperity of the state. There must be some limit to the number of persons per car, a so-called saturation point.

Some study of this future traffic has been made by Mr. Dillman, Deputy State Highway Commissioner of Michigan. He projects the population line in a uniform increase and compares this with the increase in motor vehicles. His predictions are based upon a period of ten years up to 1923. At the end of this

period there will be one vehicle for every $4\frac{1}{2}$ persons, and the rate of increase in registration will be one percent a year, or a parallel to the increase in population.

Applying this same method to the State of Indiana and allowing 1 car to 4 persons, we have the following result:

The estimated population of Indiana in 1932.....3,200,000.

One car for every 4 persons approximately800,000 cars.
But who knows? The data of population and registration are in Tables No. 1, 2 and 3.

Next it may be inquired if the traffic on the road will increase with the number of automobiles. If we double the number of automobiles, will we double the number of cars on the roads against which maintenance funds must be obtained to preserve the surface of the road? The laws governing the use of the roads are obscure. The best information at hand indicates that road use does not increase as fast as automobile registration. In New Jersey it is calculated that in 1940 there will be 2.7 times as many cars as at present, but only one and one-half times the present flow of traffic.

Traffic surveys are of additional value as a basis for legislation to govern the use of the roads with respect to axle loads and to the class of roads on which a given vehicle may run at various seasons of the year.

It is a curious thing that the three neighboring states of Ohio, Indiana and Illinois, that have such a vital interest in the scientific road development, have no extensive data on highway traffic. It is hoped that the Highway Commission will provide the necessary funds and forces to collect the needed information through a systematic plan for traffic surveys. I am sure Purdue University will be willing to co-operate.

Table No. 1.
Population of Indiana

Year	Number
1880	1,978,301
1890	2,192,404
1900	2,516,412
1910	2,700,806
1920	2,930,390
1932	3,200,000 est.

Table No. 2.
Automobile Registration in U. S.

Year	Number
1916	3,512,996
1917	4,983,346
1918	6,146,617
1919	7,558,848
1920	9,211,295
1921	10,448,632
1922	12,239,114
1923	15,250,000

Table No. 3.
Automobile Registration—Indiana

Year	Number
1913	44,738
1914	66,410
1915	96,615
1916	139,117
1917	192,195
1918	227,160
1919	277,255
1920	333,067
1921	400,342
1922	469,939
1923	582,882

Possible Registration :

1924	635,000
1925	680,000
1926	715,000
1927	740,000
1928	760,000
1929	775,000
1930	785,000
1931	795,000
1932	800,000