HIGHWAY TRAFFIC ANALYSIS AND TRAFFIC CENSUS PROCEDURE.*

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WITH traffic increasing at such an alarming rate, the street traffic problem, both with reference to the varying widths of streets and the wear and tear on the pavements, is one of the most serious ones the engineer has to contend with to-day.

With the present rate of increase, before very long it will be necessary to designate certain north and south and east and west streets for passenger traffic, and other ones for the business traffic, consisting of delivery wagons and trucks, both automobile and horse-drawn.

The number of automobiles in the city of Philadelphia in 1912 was less than 9,000; in 1914 nearly 17,000, while to-day there are over 35,000, or about four times the number there were in 1912, and twice as many as in 1914, and the traffic is from three to five times as heavy on a number of our main automobile thoroughfares as it was in 1914, and there is no reason why we should not expect traffic to practically double in the next two years, as the maximum will not be reached for some years. The cost of automobiles will gradually decrease, and in like proportion the number will increase. They are no longer a luxury, but more or less of a necessity. All the people are waiting for is a lower first cost, and a cheaper fuel, both of which are in store for the future.

Though the fundamental purpose of a highway is to carry surface traffic, the lack of foresight, due largely to the absence of studies relative to future traffic considerations, has resulted to a considerable extent in the conditions existing in most municipalities to-day where both the general plans and widths of many highways and the characters of their pavements are largely or entirely inconsistent with the traffic requirements to which the highway is subjected. Traffic planning is a problem in itself. Its purposes should be to develop closer and more consistent relations between probable traffic requirements and existing and proposed traffic provisions.

The operations constituting the general function of traffic study may be properly sub-divided into two general classifications as governed by the purposes and nature of the data to be obtained and of the methods of investigation involved.

Traffic Survey, which has to do with the investigation of the physical and other conditions influencing or relating to the carrying of proposed or existing highway traffic.

Traffic Census, which has to do with investigation of the quantity, character, weights and other conditions of traffic.

A system of traffic study, to be complete and comprehensive, should provide ample data for a full consideration of the following features:—

The Plan of the Highway: Including the consideration of the use of curved, rectangular or diagonal lines, and of the necessity and location of traffic circuit highways; the determination of the grade; the number and desirable width of the roadways and footways to accommodate present and probable future traffic requirements; and the possibility of devoting certain spaces to the purposes of temporary or permanent lawn or planting areas.

The Design of the Pavement: Including the advisability of improving the full legal width of the roadway and footways, and the selection of the types of pavement surfaces and base course construction best suited to the requirements of the prevailing traffic.

The Maintenance of the Pavements: Including the study of the depreciation and maintenance costs per unit of traffic and of the physical effects of traffic upon the pavement surfaces with respect to total and unit vehicle loads, width and character of tires, speed, and non-skidding and braking devices.

The Cleaning of Highways: Including the determination of the kind of cleaning best suited to the existing type of pavement and the prevailing character of traffic and of the hours during which the cleaning may be performed with the least interference or inconvenience to traffic.

Traffic Regulations: Including the assignment of definite highways for specific classes and directions of traffic; the designation of parking areas for automobiles and other vehicles; the establishment of pedestrian crossings and safety islands and zones; the determination of the most suitable location for proposed street railway tracks and the consideration of the advisability of relocating existing tracks; and the establishment of a general system of control by signal devices or otherwise to insure safety and to eliminate entirely or reduce to a minimum the congestion of both vehicular and pedestrian traffic.

Traffic Units.—Like many other engineering determinations, no standard methods have been universally adopted for the classification of traffic; for the taking of traffic census data; or for the reduction of the census data to definite units. While most traffic censuses are conducted along the same general principles, yet the absence of a uniformity of details and especially of a generally recognized standard traffic unit has confined the value of most traffic census data largely to the purposes of local comparison. The character of the data should, nevertheless, be such as to permit it, in addition to being used for local comparative purposes, being also studied in connection with data taken in similar situations in other localities.

In most traffic censuses conducted thus far, it has been the general practice to consider as a proper traffic unit the value expressed by the term "ton of traffic per foot width of pavement," which is based upon the total load passing over the entire width of the pavement in a measured period of time. This is misleading, and practically worthless, as a factor to be used in connection with the designing of a suitable type of pavement, due to the fact that in most cases only a relatively small portion of the width of a roadway carries the maximum traffic load, while the remainder carries comparatively little traffic.

A pavement to be used in any specific situation must, of course, be practically of a uniform character of material and this makes it all the more necessary that the selected type of pavement be capable of performing satisfactory service at the point of maximum wear which necessarily lies within the maximum travelled width of the pavement and especially in the tire paths.

The segregation of moving traffic is due to several causes, principal among which may be included the parking of vehicles along the curbs or in the centre of highways, and the presence or absence of railway tracks.

It is obvious, therefore, that the maximum travelled width or that width of the roadway subjected to moving traffic rarely equals the total width of the roadway. In each case, however, the approximate travelled width

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