

PROGRESS REPORT OF SUB-COMMITTEE ON TRAFFIC SURVEY METHODS AND FORMS

DR J G MCKAY, *Chairman*

Director, Cleveland Highway Research Bureau

STUDYING THE MOVEMENT OF VEHICLES

BY W GRAHAM COLE

Welfare Division, Metropolitan Life Insurance Company

Two sections of the report on Traffic Survey Methods and Forms have now been prepared. Section I, completed last year, discussed (1) the traffic problem, (2) the purpose of traffic surveys, (3) the organization of traffic survey commissions, and (4) recommendations for carrying out proposed plans. A popular summary of this section, emphasizing results rather than methods, has been prepared and distributed by the Metropolitan Life Insurance Company.

A review of some of the more important factors involved in studying the movement of vehicles is presented in the second section and is summarized in this progress report.

AVAILABLE INFORMATION

Land Use

The use which is being made of land in a community materially affects the traffic problem. Information regarding present land uses and anticipated trends or changes is necessary to a study of the traffic problem. Such records usually are obtainable from city records, particularly tax and insurance maps.

Industrial Development

The traffic requirements of industrial establishments are factors of importance. Data usually obtainable from city or association sources concerning the size and type of these establishments, the number of employees, present and anticipated volume of community movements are of material value.

Population

From population data not only the past and future increase of residents of the city may be obtained, but other distribution may be studied. When analyzed in conjunction with traffic flow maps, the rate of change indicates the probable variation in local traffic conditions.

Motor Vehicle Registration

A knowledge of the number and distribution of motor vehicles in a community provides one useful basis for an analytical study of the origin or distribution of vehicular movements

Condition of Street Paving

The amount and character of traffic on any street depends not only upon its location in the community but also on the type, condition, length and width of roadway. The remaining life of the pavement is influenced by the design, degree of wear and the future volume of traffic at points on these thoroughfares

Traffic Barriers

Parks, cemeteries, large bodies of water or marsh land and properties used by railroads, industries or the government are some barriers which divert traffic from the natural route causing a large number of turning movements and a concentration of traffic.

Mass Transportation

The type of common carrier service and directness of route between various sections of the city and the number of passengers boarding or leaving vehicles at various points usually are studied to visualize the extensiveness and influence of transportation facilities and to locate points of concentrated activity

Traffic Counts and Accident Data

Previous traffic counts may be obtained from municipal, state, street railway, ferry, bridge or tunnel traffic studies or records

Motor vehicle accident records are analyzed by distribution, types of vehicles, condition of pavement, effect of traffic control devices and human habits and characteristics, resulting in improper operation of vehicles or careless pedestrian practices. These records also are used to study the effect of corrective measures

Regulation and Enforcement

The effectiveness of enforcement is indicated by the number of tickets served, officer's judgment, discretion and courtesy when issuing tickets, the use of courtesy cards and the volume and disposition of cases. The need of a traffic court or violations bureau may be indicated by the percentage of traffic to all court cases.

Coordination

While the police, engineering, legal and judiciary departments may be operating satisfactorily as unit agencies, the degree of coordination may be inadequate. If so, this may be demonstrated through corre-

lated studies of the number and types of arrests and convictions and the extent and effectiveness of traffic control devices

THE FIELD SURVEY

In addition to the collection and analysis of existing information affecting the traffic situation, it is essential that field surveys be conducted to determine the existing use and capacity of streets

The Type and Object of Information Collected

The majority of the field surveys include observation of the volume, direction and turning movements of vehicles, the speed at which vehicles are operated, delays encountered, unnecessary and repeated movements of vehicles in their specific districts and volume and type of moving vehicles entering or leaving certain areas

As traffic moves irregularly the number of vehicles passing a given point varies constantly so that the hourly fluctuation of traffic is studied to ascertain the period of morning and evening peak of traffic flow. Daily, weekly and monthly variations also occur

In addition to twenty-four hour observations used for studies of the hourly variation of traffic, the duration of counts in some cities ranged from several one hour counts at different periods of the day to sixteen hour counts in Chicago. Eight, ten and twelve hour counts are frequent. Proponents of the twelve hour counts from 7 A. M. to 7 P. M. claim that such a count has considerable merit for municipal traffic studies since it includes the morning and evening rush hours

As average traffic conditions generally occur during April or May and September or October, counts of vehicles preferably are made during these periods

The Selection of Observation Points

It is essential that the number of traffic count stations be ample but not excessive. Volume and direction counts usually are made on the principal thoroughfares of the city at intersections through which large volumes of traffic pass, where traffic signals or other devices have been installed or have been requested, or where accidents and heavy traffic movements of a particular type occur

Smooth operation and successful completion of the work depends largely upon advanced planning and preparation. The type of plan developed depends upon the number of intersections, the type of information to be collected, the number of observers, the length and frequency of the count and the methods to be used in recording data. When a large number of field observers are not available at one time, traffic is recorded at a key intersection to obtain periodical fluctuations of traffic for the reduction of all non-simultaneous observations to a common basis

Traffic Flow Studies

There are two principal types of studies made of vehicular flow to obtain the basic characteristics of motor vehicle movement. These are. (1) origin and destination studies, and (2) volume and turning movement studies.

Based upon such studies, flow maps and intersection diagrams are prepared to indicate graphically the amount of traffic flow, the principal arteries used, the general origin and destination of vehicles and the relative importance of intersections from the standpoint of traffic control and regulation. Turning movement studies in particular reveal the points at which the number of right and left-hand turns are exceptionally high and the effect of poorly designed thoroughfares, traffic barriers, poor paving and improper control or regulation of traffic.

The Design and Use of Field Forms

As the Committee believes that standardization of field forms is beyond the scope of the research study, no attempt has been made to develop standard forms. Those included in the report are presented purely to illustrate the principles involved and the type of information required. They are not suggested as models or standards.

Methods Used in Selecting, Training and Equipping Field Workers

It is usually necessary to select available workers and give them proper training. In some instances observers are hired as a method of aiding the local unemployment situation. In many communities, however, expenses have been saved by securing volunteer services of college students, members of organizations, or the donated services of the employees of local companies interested in the survey. Because older observers naturally are better qualified to withstand the physical and mental strain of constant concentration required in making counts of heavy traffic movements, some traffic engineers prefer to use adult observers. The interest and enthusiasm of the younger and less experienced observers may be used to advantage, especially if simple traffic count forms are developed to offset the possibility of error.

During the training period, the director of the survey reviews the experience and classifications of the observers and assigns the most experienced or efficient men to the more heavily traveled sections. After stressing the general purpose of the survey, the importance of the field counts and the type and classification of information to be collected, and explaining the forms to be used, it has been found desirable to have the men visit a few intersections and make sample counts under the supervision of the director and his assistants thus developing questions which cannot be brought out in any other way. This procedure offers an opportunity to rate the ability of an observer.

During the count, supervisors move about the city by automobile and motorcycle to assist observers, to supply additional forms, to collect completed forms, to check attendance and to supply relief

Other Studies

In addition to the traffic flow studies other characteristics of moving vehicles are analyzed. Observations are made of the speed of operation of vehicles, delay encountered at different intersections, the volume of through-traffic and the number of cruising vehicles. As these studies are more specific in character and are intimately related to traffic congestion, they have not been included in the second section of this study but shall be incorporated in a more appropriate place.

Coordination of Traffic Studies

After a separate analysis is made of each phase of the traffic problem, it is customary to compare the facts obtained and prepare them for suitable presentation to the proper city officials. For this reason it is desirable to analyze and present all information on a uniform basis. To do this, of course, it is necessary that the field forms be designed with this point in mind.

Attempts to compare traffic information obtained from some cities and states indicate certain instances where a surprising lack of uniformity exists not only on studies similar to those described today but on other types to be covered in subsequent sections.

DISCUSSION

ON

STUDYING MOVEMENT OF VEHICLES

MR J ROWLAND BIBBINS. The speaker brought up one very important thing, origin and destination counts. I wonder if he will be so kind as to say how those origin and destination counts from the start to the end of the trip of the individual motorist are obtained, and what percentage of samples he considers, or any engineers who have contributed consider, should be used to determine the characteristics of the entire flow.

MR COLE. There is considerable variation in the samples that are necessary. It is difficult on heavily travelled streets to stop traffic and obtain that information. In many instances it is obtained at traffic lights or other points where traffic is stopped, and the number of samples will depend very largely upon the number of observers which it is possible to place at that intersection.

MR. BIBBINS In a recent highway case litigation, I was challenged vigorously on that point. The first information I had, was what I obtained in Chicago on Michigan Avenue at the Bridge. About 16 or 18 per cent reported and by serving pre-paid mail-back postcards to all motorists, the Day and Zimmerman Survey, New York, over the various East river bridges worked out at about 18 per cent over the Queensboro bridge, somewhat less than that on others. I was challenged on the percentage sample by both City and Railway Company engineers who demanded 100 per cent. Personally, I do not know how we are going to stop the traffic for questioning except to serve them with tally cards on a thoroughfare carrying 50, 60 or 70 thousand vehicles a day. Incidentally, that percentage of reply is much higher than obtained in the Literary Digest Presidential poll, which turned out to be quite accurate.

MR. L. E. PEABODY, *Bureau of Public Roads* Most of the samples of the Bureau have been around 20 per cent. They have run as high as 30 per cent in some states and not under 18 per cent in any case. There is a tendency for the percentage of reply to decline as the length of the survey goes on, being usually around 25 per cent at the start and dropping to 15 or 16 per cent at the end.

MR. BIBBINS Was that by mailed back cards or by questioning the motorist?

MR. PEABODY Mailed back cards