REPORT OF COMMITTEE

ON USES OF HIGHWAY PLANNING SURVEY DATA

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The Committee on Uses of Highway Planning Survey Data, a joint committee representing both the Department of Traffic and Operations and that of Economics, Finance and Administration was formed in the summer of 1945. The aim of this committee is to develop plans for more fully utilizing all available information, and to enhance the value of the planning surveys to the highway organizations of which they are a part.

In order that all might capitalize fully on the opportunity offered by this committee, it was decided at the initial meeting which was held in Oklahoma City in January 1946, that all state planning survey organizations should be invited to pool their ideas concerning the use of this information. In accordance with the committee's decision, a letter was sent to each state highway department, and to other engineers interested in this work, asking them to submit full descriptions and discussions with samples, where available, of all uses of planning survey data which had been made in the state and which had proved of value in (1) the development of over-all programs, (2) the planning of construction projects, maintenance programs, and traffic operations, and (3) the guidance of highway policy and legislation.

The letter explained that by the term "planning survey data" reference was made to any and all of the original and continuing studies of traffic volume, composition and loading, origin and destination, road motor-vehicle ownership, use and tax payments, state, county, and local highway finance, and allied subjects.

Most of the states furnished complete and well-developed reports concerning the uses of this material that had been developed and tried by them. Several outlined new uses or variations in the old methods that they would like to try when time would permit, and a few volunteered some criticism concerning collection or analysis procedures with their suggestions for improving the quality of information or methods of collection which they censured.

The uses which have been made of the data collected in these surveys have been found to be many and varied. While the survey was planned primarily to furnish facts and figures for the use of the engineers and officials of the various states

and of the Public Roads Administration, much of the information has been used in arousing an interest in highway matters or in molding public opinion. Many other government agencies, chambers of commerce, consulting engineers, transportation associations, advertising agencies, educational, research, and scientific institutions, corporations, and others have requested miscellaneous survey information such as maps, traffic charts, and other related data. By furnishing the information requested, insofar as is possible, the planning divisions are able to act as public relations units and thus benefit their respective departments or commissions. This collateral use of the informations, while important and valuable to the general public might be said to constitute a "byproduct" of the prime purpose of the survey. The fact is that planning survey data form a reservoir of highway transportation knowledge of which many items are constantly being used, these adding to a significant total, although the individual items are often minor in nature.

While the states have varied in their uses and applications of planning survey data, several broad major categories may be defined.

Road inventory surveys have indicated the existing condition of road surfaces in an area, and by throwing the spotlight on critical deficiencies in width, gradient, alinement, and sight distance, have helped to guide the planning of highway improvements into the most useful channels.

Many valuable uses have been found for the several classes of data generally bracketed under the term "traffic studies" - volume counts, both manual and automatic; vehicle-loading or traffic-composition studies; and traffic-operations studies, including those of traffic capacity, lateral distribution, passing characteristics, gradability, highway signs, signals, striping, and speed. The greatest progress, perhaps, has been made in the application of traffic data to highway location and geometric design - the adaptation of the roadway to the functional requirements of the traffic which passes over it. The use of actual or predicted traffic volumes in the planning and design of individual projects has passed from the domain of research into that of accepted routine. In the field of structural design there is increasing recognition that studies of the magnitude and distribution of axle loads, first considered important in connection with size-and-weight restrictions, are essential to continued progress in bridge design, in the treatment of subgrades, and in the design of road surfaces, both rigid and non-rigid. Both weight and volume data have been found useful in determining the likelihood that individual road sections may soon require improvement, either through structural deterioration caused

by an undue frequency of heavy loads, or through functional obsolescence caused by an excessive number of obstructions to the free movement of traffic.

Origin-destination surveys provide the basic data for determining the desired directions of traffic flow. During the past two years the application of the origin-destination survey techniques to the problems of urban congestion and the location and design of urban expressways, other arterials, and distribution routes, has been an outstanding feature of planning survey work. Not all of the numerous city surveys have been equally successful, equally well-recieved, or applied with equal diligence to the problems of the individual cities. Nevertheless, there seems to be a widespread agreement that this type of study is one of the most promising fields of research in highway planning, both rural and urban.

The basic fiscal studies, supplemented by the continued annual collection of data on the highway income, expenditures, and debt of the state and its political subdivisions, provide the data for the long-range financial planning which must accompany engineering planning in order that the latter may be carried through successfully. Fiscal data alone are not sufficient for this purpose, but must be combined with data from such studies as the motor-vehicle allocation, road-use, and road-life surveys. A number of states, by combining data from these several studies, have made useful comparisons between the requirements for maintenance, replacement, and new construction over a period of years in the future and the highway revenues which may reasonably be anticipated during the same period. Another question which has engaged the attention of a number of the states, and to which highway cost and revenue data are directly applicable, is that of what proportion of the total highway plant can be adequately supported as a state highway system.

The motor-vehicle allocation studies have been found useful in determining the distribution, or incidence, of the motor-vehicle tax burden among vehicles of different types, sizes, and classes of use, and among motor-vehicle owners with respect to rural and urban residence, and size of urban place. Data of this sort are essential to the guidance of highway tax policy.

The road-use studies, which were designed primarily to determine the distribution of highway expenditures, have not been used as extensively for this purpose as was anticipated at the time they were put into operation. However, many states have found the results of the road-use studies useful in making estimates of total miles traveled, the distribution of travel over several systems of roads and streets, average annual mileage and miles per gallon by type of vehicle, and the

frequency distribution of trips of different lengths.

The road-life studies are essential to the analysis of highway costs. They provide an historical basis for estimating the rates at which the several elements of the highway plant--surface, structures, and grading--will require replacement. When combined with studies of maintenance costs, and evaluation of the standards to which replacements and new construction will be built, they furnish the necessary data for the prediction of future annual expenditure requirements.

From all of the different studies listed above, together with minor or collateral studies, facts have been gathered and combined in order to supply information to the administrative authorities and legislatures on which to base an equitable distribution of highway funds among the several classes of roads and streets. The allied problems of economic justification and the priority rating of projects also require the combination of all data from all branches of the planning survey work.

The main phases of highway planning research are, in general, included in the above subdivisions of the data-collection and analysis problem. Many other items containing valuable information may be obtained along with the more important data at little or no additional cost and generally should be collected if a possible or probable use of these can be foreseen. Many of these items that might ordinarily be classified as minor can sometimes be used to supplement and strengthen data of greater consequence. Generally, thought concerning minor items should be confined to a means of their integration into factors that indicate proper variables to be used in dealing with allocation and priority problems, and by this means provide a coordinated, factually determined, and continuous plan for the development of the highway facilities of the area.

The usefulness of the data when collected depends largely on the ease and length of time required to prepare them for any given purpose. It is commonly found that an arrangement of data for one study is unsuited for another so that rearrangement becomes necessary. Again, it is frequently necessary to blend data from two or more different studies. Accordingly, it has been found desirable that all basic information should be placed on tabulating cards since control of the work is simplified and consistent answers will be produced at different times from the same data with something approaching a minimum of effort.

One very simple suggestion that was made by several states and which should prove beneficial to all, is the advertising of the information stored in the planning survey files by means of indices published periodically, and listing

reports, maps, and miscellaneous data available. In such case, the highway department is establishing a library of such information from which any citizen, corporation, or governmental agency may draw the material available. Such an index appears to be an excellent idea to broaden the use of the information that has been gathered in these surveys.

One of the most generally accepted uses of the data was in connection with the establishment of the Interstate System, the Federal-aid secondary system, and of upward and downward revisions of the state system or systems. Selections and revisions generally were based on traffic volumes, mileage of rural roads carrying an excess of certain average daily traffic, vehicle miles, area in farm lands, rural population, motor vehicle registration, and other related data.

Rural highways are being divided into permanent control sections in several states, and the interest in this activity is spreading. The termini of control sections are most commonly placed at important intersections and at county lines (the latter for administrative as well as for analytical purposes). Subsections within each control section can also be established to provide for more detailed reporting where desired by a particular operating division of the highway department. Thus, subsection breaks may be made at points where there are surface type changes, differences in terrain, special construction features, city limits, etc. The control sections are used as the major units in the reporting and assembly of construction and maintenance costs, traffic volumes, accident frequency, critical features, and other data which are necessary for the proper planning, operation, and administration of the highway plant.

A clever device for demonstrating in a simple way the economic justification of any section of highway has been developed in one state. A map has been prepared showing the cost in cents per vehicle-mile of the traffic using the facility, and this information plotted on a map in a manner similar to that in which traffic volume is shown.

Many plans have been developed for calculating the proper sequence of road improvement by control sections or other subdivisions of rural highways of the country. These plans vary from elementary procedures based mainly on traffic and width of highway to more complex methods using a complete economic analysis. All of these methods have been used advantageously by the states sponsoring them. It has been suggested that a uniform plan should be prepared by which standard priority indices could be calculated for all construction projects. Such a plan, in all probability, would include many of the features of the present methods but with all of the

non-quantitative elements omitted, and the entire scheme standardized. It is believed by many that a formula of this nature is necessary in order to minimize guesswork and counteract the effects of political influence in the planning of construction programs. Such a method is being studied by a committee of the AASHO, who hope to publish it in the near future.

It has been found in some states that the use of the words "planning survey" is frequently misunderstood, not only by the layman, but in some instances by highway administrators who confuse these surveys with those made with transits and levels. A suggestion has been offered that the name of this work should be changed to "highway research". The term "survey" has quite generally been dropped from the title of the division handling this type of work, but there is a tendency to retain the concept of "planning", which is, after all, the justification for highway research.

Nearly all the states complying with the committee's request have emphasized the widespread and valuable use of both the traffic volume studies and the road inventory data. Next in order of frequency of use, 70 percent of the states have declared the worth of the origin and destination studies and the composition and loading data, while highway finance and use and tax payment information has been applied to fiscal problems in about two-thirds of the states. Half of those reporting have employed material concerning motor vehicle registration and ownership characteristics, and a lesser proportion have reported use of road-life, construction, and maintenance costs data. As a whole, the great majority of states appeared well pleased with the value of the data collected in the planning surveys and its present employment in the various phases of highway development. It is to be commendably noted that many of the states reported active planning for the more extensive future use of planning survey materials and methods. While in some areas it was thought that the function of the planning survey was to collect basic data and prepare it for study by the administrative officials, others completed the analysis of the data and recommended a division of funds and a sequence of construction priorities with mathematical reasons for the recommendations which could be accepted by the administrative officials or revised slightly in the consideration of social or other non-quantitative factors which are better known to the staff than to the planning survey.

The immense volume of data collected by planning surveys has provided information used as a basis for the findings of non-governmental investigating and research organizations. The various states have drawn heavily from this wealth of facts, have coordinated the results of the survey data, and have

prepared and published a number of comprehensive reports designed for informational purposes. These are often published exclusively for the use of the legislature in dealing in a more enlightened manner with proposed legislation pertaining to the furtherance of a system of highways adapted to the needs of today and foreseeing those of tomorrow.

USES OF HIGHWAY SURVEY PLANNING DATA IN HIGHWAY FINANCE AND TAXATION

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The mere collection and tabulation of highway survey planning data serves no useful purpose unless the information is analyzed and put to work on the primary problem of planning, designing, and constructing highway systems as elements of transportation, that such systems may inject new vitality into the economic and social life of America. Transportation is the new dynamic factor in modern American life.

The past thirty years have witnessed the rapid and magical development of the motor vehicle to a state of near perfection and a corresponding expansion from a standing start of a system of highways of national extent to such effect that the economy of the United States is irrevocably bound up with motor transport.

Early in the development of the motor age, highway planning was comparatively simple, for the need to connect centers of population with passable roads through rural areas was obvious, and instinctive engineering judgment was adequate to meet and promote the development of the motor car. That this task was well done is attested by the great highway network which stretches from the Atlantic to the Pacific, and from the Mexican border to Canada, and which is a tribute to American engineering.

But as motor transport integrated itself with American life and industry, the problem became more complex until today the instinctive approach will no longer suffice and more analytical methods are required in order that the highway transportation system will pace the tempo of industrial and social development. Thus it is vital that the continued development and expansion of this system should be wisely, carefully, and scientifically planned, utilizing all available data. Highway