

JOURNEY-TO-WORK STATISTICS

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The 1962 Federal-Aid Highway Act required the development of a comprehensive planning process as the basis for determining transportation investments in all urban areas with populations greater than 50,000. Since the passage of that act urban transportation study programs have been established and maintained in the urban areas where required.

The urban transportation planning process that has developed has certain uniformities and similarities from city to city. The process is typified by a systems analysis process including data collection, analysis and model development, forecasting of the location and amount of urban activities and the travel demand they generate, plan development and evaluation, and a continuing phase of update and reevaluation. A full run-through of the analytical and plan-building cycle typically takes as many as 5 years to complete. A general rule-of-thumb for the cost of the process is one dollar per resident of the region.

A great portion of this cost, frequently as much as 50 percent, is consumed by the collection of the necessary data and its processing. Even at that disproportionate scale, the investment has not provided more than bench-mark data that age quickly and are from a sample size inadequate for small area analyses. Further, it has not provided a consistent national urban data base that would permit comparison of cities and city types. This latter point has become increasingly important as the requirement to evaluate relative grant-in-aid requests at the national level has increased.

The interest of the U.S. Department of Transportation, then, in developing a way to assist urban areas with their data requirements stems from the desire to reduce the cost of current data collection and to free funds for expansion of the analytical and plan-development phase of the process. In addition, the census journey-to-work statistics provide more extensive data, frequently at higher quality than previously available and in a nationally consistent format.

DATA REQUIREMENTS FOR THE URBAN TRANSPORTATION PLANNING PROCESS

The kinds of data collected in urban transportation studies can be divided into 2 categories: bench-mark or base year data and continuing process data. The first category is characterized by a base year inventory process, basically cross-sectional in nature, in which major surveys are taken of static and dynamic characteristics of the study area. The latter category keys to the development of time-series data, frequently acquired from operating city agencies and other secondary sources. It focuses on system monitoring statistics.

Base year data collection includes inventories of existing transportation facilities and land usage, sample surveys conducted by field interviewers to acquire characteristics of the population, and dynamic surveys of travel patterns, trip demand, and facility usage. The major component of this process is the residential origin-destination survey. This survey is generally structured in the form of a diary of one day's travel activity by the subject household and also collects accompanying socioeconomic de-

scriptive data. As urban study groups completed the first full cycle through the urban transportation planning process, they have increasingly turned to continuing data collection techniques to develop monitoring and surveillance systems to detect change in the urban condition, specifically with regard to those variables related to transportation such as changes in population and household characteristics, shifts in employment locations, and changes in travel habits or transportation facilities. These data are developed by analysis of the information acquired from operating agencies such as automobile registrations, building permit files, and property assessor records.

THE 1970 CENSUS DATA

The census is a major source of bench-mark data. It is not necessary here to detail the breadth of demographic, economic, and housing data available. It is important to note that almost all of the variables crucial to transportation planning are obtainable in the census, including household characteristics such as family size, median income, automobile ownership, and stage in the life cycle; labor force and employment characteristics; and housing information. The journey-to-work questions that provide for travel mode use and actual work-site locations parallel origin-destination work-trip data very closely.

The advantages of these data are their extremely low cost relative to independent individual surveys in each urban area, their high quality in terms of definitional rigor and control (both in each individual city and throughout the country), and their larger sample size relative to typical urban survey procedure. The disadvantages of these data in the past, as typified by the 1960 census experience, were the fixed geographic aggregates in which the data were available and the slow and costly procedures for obtaining special tabulations for a given city.

Significant innovations in the technology of the 1970 census enhanced the desirability of the journey-to-work data as a transportation planning resource. The major innovation is the geographic coding of the residence and work addresses of respondents to the block level. This is a significant increase in analytical ability particularly in regard to work location statistics. Block level statistics will not be applied themselves, but they can serve as the basic building block in an aggregation process so that census data can be summed to any area system of interest. This is important to transportation planning because of the large amounts of data compiled by urban studies to small areas, called traffic zones. Traffic zones are defined by transportation characteristics and are usually incompatible with census tracts. They vary in size from city to city, but are typically enumeration district size. Census data aggregated to traffic zones will be a powerful new resource for the urban transportation planning process.

This new capability led us to think that a special program to develop standardized tabulations that would be suitable for analysis in each urban area might be feasible. Existing plans for reporting census data on summary tapes and published documents did not meet the specialized needs of urban transportation planning. Specifically, there was the need for additional cross-classified tables at the residence end, summaries at the work-location end, and zone-to-zone trip tables.

THE DEPARTMENT OF TRANSPORTATION STANDARD PACKAGE

The standard package will produce a special summary tape of a defined set of tabulations, generated by computer programs developed by the Bureau of the Census and funded by the Federal Highway Administration. The tabulations themselves were designed in draft form by FHWA personnel, submitted to the states, and sent from them to the urban studies for review and comment. Their comments have been received and incorporated in the final tabulation design.

The basic tabulations can be produced at the traffic-zone level for all urban areas. Those who request tabulations will pay the cost of processing only. These tabulations will provide the zonal data needed by urban studies at a reasonable cost and without the problems usually attendant on a special request. This standard package will accomplish programming time and cost savings and eliminate the delays of the past. It will also accomplish a wider dissemination and usage of this nationally consistent

bench-mark resource. It is designed as a minimum data set, almost a common denominator set, of those tabulations most frequently requested and utilized by urban areas. Those in urban areas who require additional tabulations can proceed through the usual special request process.

The delivery process on these tabulations is as follows: (a) a local agency, if it chooses to participate in the program, makes its request; (b) the request must be accompanied by a conversion file of census block numbers to traffic zones; and (c) the Bureau of the Census produces the summary tape and delivers it to the requester. This program is expected to begin in late 1971 or early 72.

The areas of summarization need not be traffic zones. The programs can develop summaries at any area level defined by block, consistent with disclosure and reliability constraints.

STANDARD PACKAGE CONTENTS

The package contains a trip table and tabulations at the zone of residence, zone of employment, and area-wide level. The trip tables give work trips from all zones to all zones. Tabulations at the zone of residence include summaries of person characteristics, head of household characteristics, household characteristics, and housing characteristics. Tabulations at the zone of employment include summaries of workers by occupation and by industry. Tabulations at the area-wide level include cross-tabulations of household characteristics, housing characteristics, and mode of transportation to work. Detailed formats of these tabulations have been circulated among the state transportation planning agencies and are available from the Federal Highway Administration (1).

PROBLEMS

A significant problem is the time delay in developing the data. 1970 data will be available in 1972. The processing delay is painful to have to accept. It points up the fact that ongoing monitoring systems with shorter time delays between observation and analysis are essential for the future.

There are problems of definition and area compatibility that must be resolved. These include differences at the edges of urban regions as to boundary. For instance, blocks may not extend out as far as the zone system does in some urban areas. Persons outside the SMSA boundary employed inside may not be counted. Further, the typical transportation study definition of a work trip differs from the census definition. In addition, we are dealing only with work trips; trips for other purposes have not been recorded. Because this is a growing segment of total travel, great care will have to be taken in drawing conclusions from the files.

Another set of problems are related to the processing and administration of the data. The geographic coding process has been expensive and difficult. Not all addresses received have been codable because of poorly reported information or inadequate source materials for coding. The pretest experience in Madison, Wisconsin, indicated that 80 to 90 percent of the addresses will be codable. Even with adequately coded addresses, the files are still based on the 15 percent and 20 percent subsamples from the enumeration. These sample sizes are larger than those typically used in transportation surveys, but reliability and disclosure rules will still require suppression of certain data cells.

SPECTRUM OF USES

The potential uses for these data are extensive. The most significant applications will be in their use to supplement or completely replace residential origin-destination surveys. This could be applied against some of the new and broader concerns of the planning process, i. e., environmental aspects, neighborhood impact, and land development.

To effectively replace the origin-destination approach will require that analysis and modeling of urban travel demand be developed by using census data. We know

that work trips generally account for 80 percent of peak-hour travel. Peak-hour travel models utilizing census work trips, therefore, seem entirely feasible. Another range of models relating work trips to total travel are also needed. The relationships here are more tenuous. In general, work trips have been a declining component of total urban travel over time.

Another valuable use of these data will be in their application as a check source and updating resource for existing urban transportation planning data bases. Many urban surveys were conducted in the early sixties. Even with problems of compatibility of definition and coverage, the standard tabulations will be valuable in updating work trip rates per household, work trip lengths, and the like. Some surveys used 1970 as a forecast year. The standard tabulations will provide a means for testing the accuracy of these forecasts and for recalibrating the forecasting models.

Finally, the standard tabulations, if generated for most or all urban areas, will provide the first uniform comprehensive set of urban transportation descriptors. This will be of major value in statewide planning programs, which are growing in use, and in national programs, particularly in evaluation of urban transportation needs on a city-by-city basis.

REFERENCE

1. Urban Transportation Package. Office of Highway Planning, Federal Highway Administration, FHWA Notice HP-22, Feb. 23, 1971.