Transit and Traffic Analysis

Maurice M. Carter, *chairman*

Participants: J.D. Carroll, S. Zimmerman, H. Desai, D. Williamson, C. Goodman, D. Ryan, C. Purvis, and P. Suokas.

The transit and traffic workshop focused its efforts on those planning areas that are more near-term in nature, including short-range planning, operations impacts, and alternatives analyses. The group contained representatives who are involved in transit and transportation planning and transit operations, but traffic operations were only marginally represented.

In its initial meeting, the group reviewed its expectations and preliminary findings of the 1980 census data and the Urban Transportation Planning Package (UTPP). Without doubt, there was a strong statement and consensus that the transportation planning data provided through the UTPP are essential to the urban transportation planner at all levels. Generally speaking, the data provided by the 1980 UTPP have been found to be useful and analyses have produced successful results. There was recognition that improvements are needed in place-of-work coding in order to achieve even greater success with the 1990 census data.

The group reviewed its findings for the 1980 UTPP versus its expectations in the major areas of transportation planning. The discussion that follows summarizes that discussion for each area.

UPDATING URBAN AND TRANSPORTATION PLANNING DATA SETS

Experience to date has yielded successful results. With general reductions in other data collection efforts, the census data are becoming the primary, and in some cases the only, source of information. The coding of the place of work in the 1980 data is far superior to that for the 1970 information. Even so, the group has encountered problems with this coding that should be investigated and addressed before coding of the 1990 information.

MODEL DEVELOPMENT, UPDATING, AND VALIDATION

The experience of the group suggests that the UTPP data are most useful for developing or validating distribution models. Attempts to use the data for trip-generation modeling have not been successful due to a lack of full travel information, but that shortcoming in no way diminishes the importance of the census data set. There were suggestions that the UTPP data may have enhanced value for trip-generation purposes by appending the public-use data (household level).

Mode-choice modeling does not lend itself to the data set. However, some mode-choice validation work has been conducted for the work trip. The group believed that the degree of difficulty in using the UTPP for mode-choice modeling will increase as the number of riders by choice (noncaptive)

increases. A primary problem is the lack of information on mode of arrival or departure and a recognition by the industry that the modes (e.g., automobile, walk, bus, rail) required for completing a trip are considered simultaneously.

Generally speaking, the expectations have been realized for trip-distribution models but success has been limited to updating and validation for the other transportation planning models.

RIDESHARE DATA SETS

This is an area in which success has exceeded expectations. Group members report that the data obtained from the UTPP have provided, in many cases for the first time, a clear snapshot of rideshare activity in a given urban area. In those states where rideshare data files have existed, the 1980 census data have been useful to validate those files. It was the consensus of the group that it is imperative that this feature and information be retained in the 1990 questionnaire.

SPECIAL GENERATOR INFORMATION

The UTPP cannot be used for special generator information except in certain cases. Supplementary data collection efforts are necessary for this purpose. Some group members stated that they have found the data useful for general trend analysis, however.

The primary difficulty in obtaining generator-specific data is that the coding geography is not fine-grained enough to permit acquisition of site data. However, in cases such as the central business district, the data are valuable for developing trends and understanding changes in subareas.

OBTAINING THE WORK-TRIP FILE

First, the group recognized that the file obtained from census data is a commuter file rather than a classical work-trip file. Given the form of the census survey, a true work-trip file cannot be generated directly.

Success has been realized in using the work-trip file, and the analyses it has permitted are invaluable. It is essential to the transportation planning community that the journey-to-work data continue to be collected because they provide not only information from the work-trip end but also destination data related to the residence end of the trip.

The companion information on travel time was not found to be useful for transportation planning. First, the times reported are subject to rounding (e.g., 15, 20, 25, 30 min), and they appear to be perceived rather than actual. One of the recommendations for the 1990 census is to obtain actual departure and arrival times rather than travel time.

There has been limited success in obtaining work-trip data by mode, due principally to the low incidence of transit trips in the survey. The group recognized that this shortcoming could only be remedied by altering the sampling methods in the 1990 census data gathering, probably by cluster sampling in areas with a high potential for transit use within any given SMSA. The group concluded that it is absolutely necessary to conduct on-board transit surveys, preferably in conjunction with the census, if transit planning is to be an essential element of transportation planning in a given urban area.

TRANSIT MARKET ANALYSIS

This is an area with high potential for successful use of census data that to date has not been fully exploited. With increased demands for productivity, transit operations are seeking information that will yield direction on when and how to spend transit dollars. The census data are most useful when augmented by locally collected ridership data.

The census data can be analyzed to determine those characteristics that determine why an area yields high work-trip transit ridership and then transferred to determine either ridership potential or appropriate levels of service for other new or existing areas. As the choice rider becomes a higher percentage of the total transit market, understanding the attributes of that market becomes increasingly important.

MODE-OF-ACCESS INFORMATION

The group did not find the census data useful in providing mode-of-access data but agreed that the data are essential to transit demand estimating and systems planning.

The group would like to have access-mode data collection considered as a part of planning for the 1990 census. The group also recognized how difficult it would be in a questionnaire to explain each mode in sufficient detail to obtain reliable information. If, however, the wording issue could be successfully resolved, the 1990 census would be an excellent vehicle for obtaining the information.

VEHICLE OCCUPANCY

There has been a reasonable record of success in using the census data to calibrate vehicle-occupancy models. Generally, the data are applied to a standard set (e.g., the Twin Cities models) of models until local calibration is achieved. Their use for vehicle-occupancy analyses supports the need to retain both rideshare and journey-to-work data questions on the 1990 questionnaire.

RESIDENTIAL AND INDUSTRIAL DEVELOPMENT PLANNING

The UTPP data are useful for both residential and industrial development planning. This is an emerging area with which the group has had limited experience to date. However, it was believed to be a planning area that is becoming increasingly important. With increasing dollar constraints, urban areas are required to plan developments (including mixes of development type within large development proposals) to get maximum benefit from the transportation systems.

Also, the UTPP data have been found to be useful for analyzing issues related to equity and Title VI requirements. Some of these issues are not directly transportation related but accessibility has become important when an urban area is determining, for example, the location of a new library.

GENERAL OBSERVATIONS

The group believes, without any reservation, that the UTPP data are a tremendous value for the dollars expended and very cost-effective. Further, these data are absolutely essential to the transportation planner today.

The cost of obtaining a classical home interview today is around $250 per household. San Francisco recently conducted a limited-sample origin-destination survey by telephone for about 7,000 households that cost $370,000. The UTPP for the Bay Area cost $51,000. The group believes that the foregoing example clearly speaks in support of collecting the data as a part of the general census effort.

In addition to the cost-effectiveness of the data, being able to say that the data were collected by the Bureau of the Census aids in establishing their credibility. This is helpful not only to the technicians but also to the elected officials who must justify decisions based on analyses performed using the data.

Generally, the group discussed the data derived from the UTPP. However, the group also recognized the value of the demographic data provided by the census through the general data collection effort. The group voiced its support for retaining those data.

DETAILED RECOMMENDATIONS

In its subsequent workshop sessions, the group looked ahead to 1990 in order to formulate its recommendations for improving the UTPP. The recommendations discussed in the following range from specific questionnaire changes to general administrative changes. In several cases, a need is recognized but a specific recommendation could not be devised within the time provided by the conference. In those cases, the group recommends that further analysis and evaluation be conducted before critical deadlines for the 1990 census.

The following recommendations are classified by major category.

Questionnaire Content

It would be desirable to tailor the questions by metropolitan area, particularly in the large areas where the public or popular name for a mode varies. An alternative to achieve this would be to use local mass media to educate the public on mode definitions. There is concern, however, over losing trend-analysis data.

The mode question (24b) should be revised as follows:

1. Separate the category "bus or streetcar" into "bus" and "streetcar or trolley." These modes have varying characteristics, and there will be several new rail systems in operation by 1990.
2. Add "ferry" or at least code it as a subcategory.
3. Code the "other" category (by metropolitan area) when a grouping specified $\geq$2 percent of the total. Currently, too many trips are falling into this category in some metropolitan areas. Guidance may be gleaned from a pretest.

In question 22b, instead of asking how many hours were worked, ask how many days the person left his home last week to go to work. The number of hours worked is flawed in terms of yielding frequency data. The number of weekly occurrences should yield more useful information to get an average weekday condition.

The travel-time question (24a) should be deleted and replaced with a question asking departure and arrival times. The travel-time measure will still be available for anyone who may wish to use it, and, more importantly to the transit and traffic professional, information would be available to conduct time-of-day analyses and home-based work distribution model validation.

The question on handicapped status (19c) should be revised as follows:

1. It should refer specifically to fixed-route public transportation, and the degree of limitation should be specified (e.g., no difficulty, minor difficulty, major difficulty, impossible rather than just yes or no). Public transportation includes demand-responsive modes and a need exists to determine the location of people with mobility problems who cannot use fixed-route service.
2. Questions 19c and 19a should be exchanged so that the disabilities related to work will not be confused with those related to transportation.

Question H28 should be changed to include a "4+ automobile" category. Higher automobile ownership is forecast, and just as the category was expanded around 1970 in urban studies, the correlation ability with other data is important.

A question on parking cost should be added to question 24 for those who indicate use of a vehicle for the journey to work. At least a yes or no response is desirable. A stratification of amount is preferred. Some pretesting of strata appears appropriate.

It is desirable to obtain information on nonwork transit trips. However, the group believes that the census is not a practical vehicle for collecting those data. On-board surveys are needed.

Access-mode and multimode transit information (additional data from question 24b) is necessary for transit planning. The issue was too complex for the group to resolve, but it recommends further study and pretesting of techniques in order to design a question that can be added. Access mode and mode transfer are essential to understanding mode selection for choice trips.

Procedures and Sample Size

On reporting the day or usual day for work trips, the group could not reach a conclusion but made several observations that should be studied further for 1990:

1. It is desirable to obtain information for a typical day. A typical day is best reflected by Tuesday, Wednesday, or Thursday. A typical day suggests specifying an actual day and date on the census questionnaire.
2. Specifying "usual" appears to minimize confusion to the respondent and will tend to maximize place-of-work reporting. It may tend to overstate the amount of carpooling (e.g., it might reflect the total seats or riders rather than reflecting absenteeism). It may tend to understate transit ridership (not accounting for the occasional transit rider, who represents about 15 percent of total transit ridership).

The group discussed sample size, particularly as it related to transit reporting, without discrete conclusions. In general, the user must recognize and respect limitations due to sample size, particularly with respect to the trip table. General agreement existed that the commute table is not statistically reliable at the zonal-interchange level. Also, the group recognized that it is not practical to increase the general sample size. The group recommends further investigation into a stratified sample to increase the potential of capturing transit commuters.

The TRB Committee on Transportation Information Systems and Data Requirements, through UMTA and FHWA, should prepare and distribute guidelines and procedures for conducting coordinated data collection efforts in 1990. Further, urban areas should be encouraged to prepare for those activities by designating funding in the Unified Work Program (UWP). Also, local areas should, as soon as possible, be encouraged to include geocoding update elements as a part of the UWP to assist the Census Bureau.

Geographic Coding

The Census Bureau should, to the greatest extent possible, code all data to the block level. The group recommends that the range of acceptable user materials fall between the block-group and census-tract levels of geography. Where difficulties are found in coding the place of work, the Census Bureau should use local area staff to assist or code the locations.

Data Products

Timeliness of receipt of the data is important. A goal of 2 years after collection is recommended for receipt of at least the county-to-county commuter summaries. The group recommends that the committee further evaluate the UTPP contents for 1990, working with UMTA, FHWA, states, and MPOs. Further, UMTA and FHWA should evaluate and define other related products such as program documentation, procedural guidelines and methods, and ancillary software to manipulate the census data.

Comparability

Temporal trends are important, and analyses should be performed to evaluate or preserve that capability based on any changes in survey content or data summary.

Other

The geocoding system (TIGER) should be available to users in computer-graphic form before April 1990. UMTA and FHWA should support local areas in appending supplementary data to census data through the development of procedures and methods.