

Analysis and Use of 1990 Census Transportation Planning Package in Delaware Valley Region

THABET ZAKARIA

The 1990 Census Transportation Planning Package (CTPP) for the Delaware Valley Region is analyzed, with special emphasis on journey-to-work trips, employment, mode of transportation to work, travel time, vehicle ownership, employed persons, and other socioeconomic data essential to transportation planning and travel forecasting. A review of the CTPP computer tapes and data showed some programming, sampling, and bias problems, which were resolved before the data were used as a base for trend analysis, traffic simulation, highway and transit project studies, strategic planning, and economic development. The CTPP information should be adjusted before it is used for transportation planning. The errors in the 1990 CTPP data are generally small, but the package shows no improvement over the 1980 data. Most of the 1990 CTPP problems can be avoided in the future if the recommendations made in this paper are considered in the 2000 census.

INTRODUCTION

Information on 1990 census work trips, employed persons, employment, and many other socioeconomic variables is available in the 1990 Census Urban Transportation Planning Package (CTPP). The CTPP is a special tabulation of census data used in transportation planning at the state and regional levels. The tabulations and data items were specified by an ad hoc committee of transportation planners representing TRB's Committee on Transportation Information Systems and Data Requirements. Funding for the development and production of the CTPP was provided by the states through AASHTO.

On June 22, 1993, the Delaware Valley Regional Planning Commission (DVRPC) received the first three parts of the CTPP Statewide Element, but the first three parts of the Urban Element were not received until April 21, 1994, more than 4 years after Census Day in 1990. Work was initiated to process and print CTPP data for various levels of geographic units for purposes of transportation system planning analysis and evaluation and for project studies. Because the contents of the CTPP are extensive, work on the processing and evaluation of data is still under way and is continuing in 1995.

The purpose of this paper is to discuss briefly the experience of DVRPC with the CTPP data, with special emphasis on the journey-to-work information and other socioeconomic information required for transportation planning, such as population, households, employed persons, vehicle availability, and employment. Some specific problems found in the CTPP information are defined, and

some solutions are suggested. The data are evaluated and some figures are presented to illustrate the magnitude of the errors and discrepancies in the data selected. The use of CTPP data in several DVRPC transportation and nontransportation planning projects is described.

The DVRPC region includes four suburban counties in Pennsylvania (Bucks, Chester, Delaware, and Montgomery), four suburban counties in New Jersey (Burlington, Camden, Gloucester, and Mercer), and the city of Philadelphia. The Delaware Valley includes an area of 9,886 km² (3,817 m²) and a population of approximately 5.2 million. There are 352 municipalities, including such major cities as Trenton and Camden in New Jersey and Philadelphia and Chester in Pennsylvania (Figure 1).

Essentially, this paper is an update of a similar paper published by the author in 1984 on the 1980 Urban Transportation Planning Package (UTPP) (1).

CONTENTS OF 1990 CTPP

The CTPP information was selected from the responses to the 1990 long-form census questionnaire distributed to approximately 17 percent (one in six) of all households. The Bureau of the Census prepared two 1990 CTPP packages—Statewide Element and Urban Element. The Statewide Element consists of six parts, which contain information at the municipal level [Minor Civil Divisions (MCDs)]. These parts are labeled A through F:

- A. Worker and household characteristics by place of residence,
- B. Worker characteristics by place of work,
- C. Worker characteristics by place of residence to place of work,
- D. Worker and household characteristics by large place (75,000+ population) of residence,
- E. Worker characteristics by large place (75,000+ population) of work, and
- F. Worker characteristics by large place of residence to large place of work.

The Urban Element provides data at the traffic analysis zone (TAZ) level. There are 1,395 TAZs in the DVRPC region, which are for the most part equivalent to census tracts. However, census block groups are used in densely developed areas, such as the Philadelphia central business district, where census tracts are too large for traffic simulation and analysis. There are eight parts in the CTPP Urban Element, labeled 1 through 8 (part 5, however, has been eliminated):

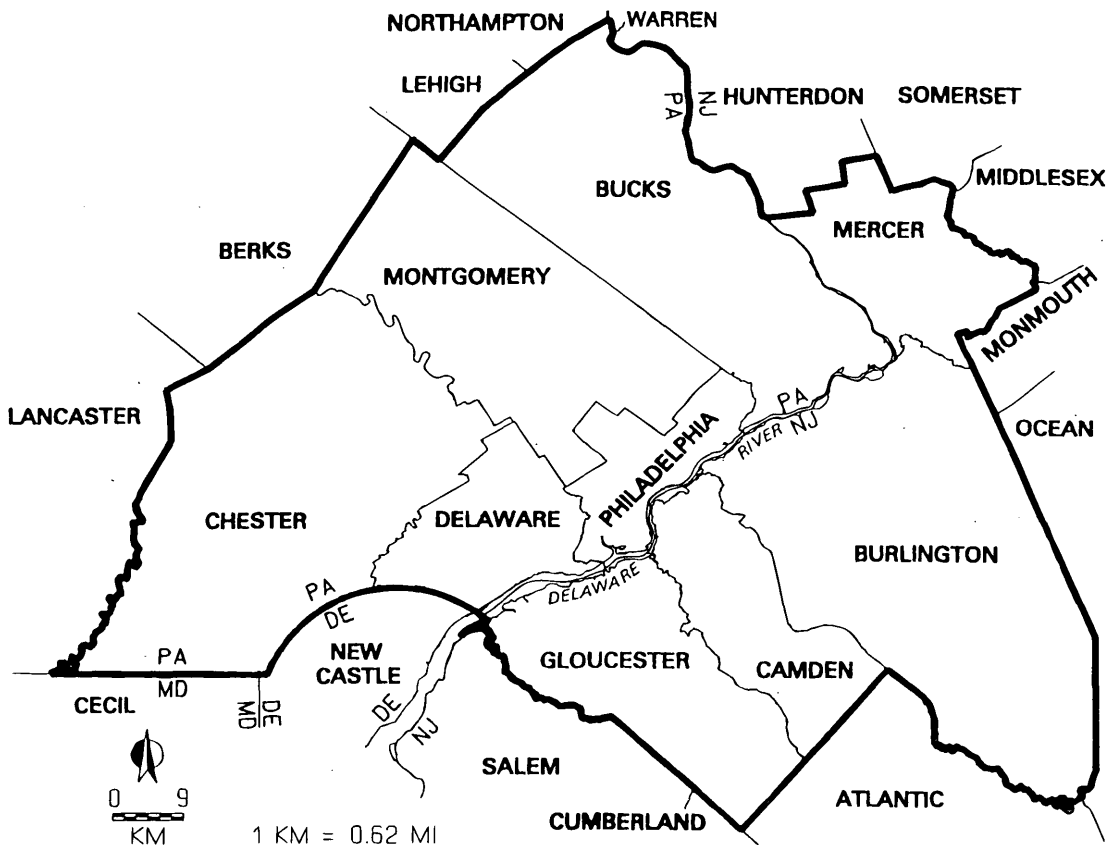


FIGURE 1 Map of the Delaware Valley region.

1. Worker and household characteristics by zone of residence,
2. Worker characteristics by zone of work,
3. Worker characteristics, zone of residence to zone of work,
4. Worker and household characteristics by superdistrict of residence,
5. Eliminated,
6. Worker characteristics by superdistrict of residence to superdistrict of work,
7. Worker characteristics by census tract of work, and
8. Detailed worker characteristics, zone of residence to zone of work (large regions of 1,000,000 population only).

It should be noted here that the 1980 UTPP included only six parts, as follows:

- I. Workers and household characteristics by zone of residence,
- II. Workers by zone of work for large geographic areas,
- III. Data by zone of work at the tract level,
- IV. Tabulations between zone of residence and zone of work at the tract level,
- V. Tabulations of the zone of work data at the block-group level aggregated to census tract; and
- VI. Data between place of residence and place of work at the county level, including 20 counties external to the DVRPC region that have a significant flow of work trips to and from the region.

The 1990 data were collected using census areal units consisting of block, block group, tract, enumeration district, MCD (township, borough, city, and village), county, and standard metropolitan sta-

tistical area. In 1975 the DVRPC zonal system, used for the collection of data in 1960 origin and destination surveys, was converted to the census areal system. This conversion has made it much easier to provide an equivalency table of all tracts, blocks, enumeration districts, and TAZs. The preparation of such a tabulation proved to be tedious, costly, and time consuming, as the Delaware Valley Region includes more than 74,000 blocks, 1,317 tracts, and 1,395 TAZs.

In March 1992, DVRPC prepared a correspondence table for use in the tabulation of the Urban Element information. This table includes the following:

- TAZ, ■ Superdistrict, ■ Census state code, ■ Census tract number, ■ Census block group number, ■ MCD, and ■ County.

In addition to this information, DVRPC specified all external counties that have significant community flow from and to the DVRPC region. Because of programming difficulties, this file was not used by the Census Bureau. Instead, DVRPC was asked in 1994 to prepare a revised correspondence table (equivalency file), which inserted the TAZs in each census block record.

ANALYSIS AND EVALUATION OF 1990 CTPP DATA

A review of the 1990 CTPP data of parts 1-3 for the Delaware Valley region indicated some programming, definitional, and statistical problems. Unlike those for the 1980 UTPP, the 1990 data on work-trip destinations contain trips not identified by block or tract. The

Census Bureau could not allocate all 1990 trips to TAZs, because the Topologically Integrated Geographic Encoding and Referencing (TIGER) file does not contain address ranges for some suburban and rural areas in the region. The Census Bureau provided a list of places that filed the census allocation process. Specifically, any place that has less than 70 percent address range coverage and less than 70 percent of the persons working in them coded to tract and block failed the test. For such places the Census Bureau allocated the work places to default zones and asked DVRPC to review the list and allocate the default data to the affected TAZs, including water tracts (Figure 2).

Programming and Format Problems

After receiving the 1990 CTPP tapes from the Census Bureau, DVRPC immediately started to extract the data needed for various air-quality and transportation planning studies. It was found that the format of the tapes is quite complex and unclear. There was no labeling on the tapes, and the names of the tables were confusing. No documentation of certain record types was available. The variations in recorded content should have been clearly documented both in the general documentation and in the data dictionary.

For example, review of the tapes of the CTPP Urban Element indicated that they do not have the same computer record size and block size at the tract and zonal levels. Part 3 has a record size of 1,180 and block size of 23,600, but Part 2 has a record size of 10,616 and block size of 21,230. These problems have caused some delay and duplication of effort.

Problems of Definition and Statistics

As stated previously, the Census Bureau obtained information on workers and not on trips; the latter information is usually collected

in home interview surveys for transportation planning studies. The questions about mode of transportation in the census for 1980 and 1990 are similar, as can be seen below:

1980	1990
Car	—
Truck	—
Van	Car, truck, or van
Bus, streetcar	Bus or trolley bus
—	Streetcar or trolley car
Subway, elevated	Subway or elevated
Railroad	Railroad
—	Ferry boat
Taxicab	Taxicab
Motorcycle	Motorcycle
Bicycle	Bicycle
Walked only	Walked
Worked at home	Worked at home
Other	Other

The analysis of workers' trip tables (Part 3) by travel mode indicated that some walking and railroad trips were unrealistic in terms of travel time or distance. It was found, for example, that some workers walked from Philadelphia to places a considerable distance from the city. Similarly, there were railroad trips for which no such service existed. These few irrational trips are due to errors in census coding, to sampling error, or to incorrect information returned by respondents who did not understand the census questionnaire. Many respondents confused the access mode with the principal mode of travel.

The evaluation of employment data by industry showed that some respondents misunderstood the census question that used the Standard Industrial Classification (SIC) system (Question 28). Some were not able to identify their industry correctly because some SIC categories are not easily defined. The public administration sector is especially complicated. Employees of a municipal utility authority, for example, may consider themselves members either of the public administration sector or of the public utilities sector.

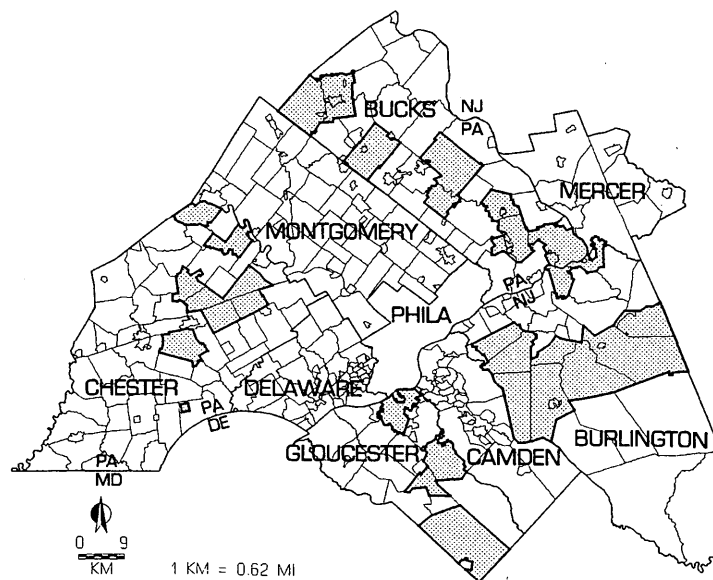


FIGURE 2 Location of default TAZs.

Accuracy of CTPP Data

Generally, the 1990 CTPP data are good for transportation planning purposes. The data on population, household, car ownership, employed persons, and other socioeconomic characteristics obtained from part 1 are quite accurate and do not require any major adjustment for sampling or nonsampling errors.

Part 1 data compare favorably with the 100 percent census counts. Table 1 shows the magnitude of difference between the population produced from Part 1 and from the 100 percent counts for a few TAZs, MCDs, and counties selected at random. As can be seen, the differences in population and resident workers are small and are acceptable for all planning purposes. However, the number of households in the CTPP is slightly lower than the total counts. Most of the difference, 2,319 of a total of 2,667, is found in the city of Philadelphia. All household zonal data were adjusted to be consistent with the 100 percent census counts, which are equal to those extracted from the tabulations on Standard Tape File 3.

As described previously, Parts 2 and 3 contain trip data at the place of work for various geographic units such as TAZs, MCDs, and counties. If trip destinations by resident and nonresident workers living in commutershed areas are summed, the total would be approximately equal to the number of jobs, or employment. A certain percentage of these work-trip destinations (employment) should be added to account for workers who were absent during the census week because of illness or vacation or for other personal reasons and for workers who had more than one job. Data from the Bureau of Economic Analysis, the Bureau of the Census, the Bureau of Labor Statistics, previous DVRPC employment files, and local wage records, were used to adjust the CTPP work trips (number of workers at the place of destination) four times to develop the employment file. The first adjustment was made to account for absentee rates reported by the census for each county (2.16 percent for the region) from responses to Question 21a on the long form used in 1990.

Second, all employment data were adjusted upward to reflect multiple job holding, using information from a survey conducted

for the Bureau of Labor Statistics with a national sample of approximately 60,000 households (2). It was found that the national rate for multiple job holding is 6.2 percent and varies by employment sector, ranging from 4.7 percent for construction workers to 9.3 percent for those working in government. Third, employment estimates at the municipal level were examined, and some were adjusted upward or downward to account for coding discrepancies and respondent errors. Such adjustments were necessary at the municipal level to bring the estimates into agreement with data from the Bureau of Labor Statistics, DVRPC files, and municipal tax records.

Finally, employment estimates at the TAZ level were examined to allocate the trips coded to default zones and water tracts. All zonal data were factored to county and municipal control totals by employment sector, and a new computer file was prepared for users of these data. DVRPC uses the following 11 SIC sectors in the travel simulation process: agriculture, forestry, and fisheries; mining; construction; manufacturing; transportation; wholesale trade; retail trade; finance, insurance, and real estate; service; government; and military.

Table 2 shows a comparison of CTPP employment before and after adjustments for selected TAZs, MCDs, and counties and for the total region. It also shows the percent difference between the unadjusted CTPP employment estimates and those adopted by DVRPC. As shown in Table 2, the differences between the two sets of employment estimates are small (approximately 10 percent). In general, because of sampling error and coding problems, the percent difference between the two sets of employment estimates increases as the size of a geographic unit decreases.

Most parts of the CTPP include information on the worker's mode of transportation to work. A respondent was asked to choose one of eleven travel modes that he or she usually took to work for most of the distance between the place of residence and work. The travel mode proportions appear to be reasonable because they compare favorably with DVRPC highway traffic counts and transit surveys for large areas and the region. Table 3 shows that the difference between the CTPP data and DVRPC estimates for total public transportation work trips is 1.5 percent. However, such a difference

TABLE 1 Comparison of 1990 CTPP Population, Households, and Resident Workers with Total Census Counts

Areal Unit	Population			Households			Resident Workers		
	CTPP	Total Count	Diff.	CTPP	Total Count	Diff.	CTPP	Total Count	Diff.
TAZ									
100	1,204	1,205	-1	476	515	-39	557	558	-1
400	9,030	9,030	0	4,279	4,319	-40	3,678	3,678	0
700	3,750	3,750	0	1,459	1,434	25	2,118	2,118	0
990	6,169	6,169	0	1,880	1,881	-1	2,780	2,780	0
Municipality									
New Hope, PA	1,400	1,400	0	811	810	1	964	964	0
Media, PA	5,957	5,957	0	2,876	2,867	9	3,243	3,243	0
Glassboro, NJ	15,614	15,614	0	5,069	5,019	50	7,422	7,422	0
County									
Philadelphia, PA	1,585,577	1,585,577	0	600,740	603,059	-2319	657,389	657,387	2
Mercer, NJ	325,824	325,824	0	116,777	116,941	-164	166,680	166,680	0
Total Region	5,182,705	5,182,705	0	1,891,614	1,894,281	-2667	2,496,292	2,496,215	77

TABLE 2 Comparison of 1990 CTPP and DVRPC Adopted Employment Estimates

Areal Unit	1990 Employment Estimates			% Diff. Adopted vs. CTPP Unadj.
	CTPP Unadjusted	CTPP Adjusted	DVRPC Adopted	
TAZ				
100	119	119	-	-
400	1,711	1,719	-	-
700	2,259	2,349	-	-
990	492	493	-	-
Municipality				
New Hope, PA	2,351	2,579	2,351	0.0
Media, PA	10,110	10,993	11,210	10.9
Glassboro, NJ	7,287	7,924	7,924	8.7
County				
Philadelphia, PA	761,244	834,335	836,874	9.9
Mercer, NJ	204,826	224,356	220,592	7.7
Total Region	2,433,682	2,697,229	2,693,879	10.7

TABLE 3 Comparison of 1990 CTPP and DVRPC Work Trip Estimates by Mode (thousands of trips per day)

Areal Unit	Mode	CTPP Data	DVRPC Estimates	Percent Diff.
Philadelphia CBD	Regional Rail	27.7	33.5	20.9
	Subway-Elevated	33.6	41.9	24.7
	Surface Transit	47.9	62.9	31.3
	Highway	117.9	74.8	-36.6
Total Region	Public Transportation	273.2	277.2	1.5
	Highway	1,954.0	1,792.0	-8.3

becomes large for travel submodes within smaller areas. In the Philadelphia central business district the difference between the CTPP and estimated subway-elevated trips is approximately 25 percent. Such large differences are due mainly to incorrect responses to the questionnaire. It appears that many respondents confused the access mode to a station with the principal mode of travel to work. For example, persons who live in Delaware County and work in the Philadelphia center city must take buses or trolleys to the 69th Street Terminal, where they transfer to the Market-Frankford subway-elevated line. Thus, some respondents reported bus or trolley as the principal means of transportation rather than subway, which was the correct response. As shown in Table 3, the surface trips (bus and trolley) are overestimated by 31.1 percent. The highway trips estimated by the DVRPC model are underestimated. This problem will be resolved when the model is calibrated with the 1990 census data.

Table 4 shows the 1980 and 1990 average travel time of commuters in selected counties and total region. The regional average travel time has changed slightly since 1980. The changes observed in travel times at the county level are also very small.

Despite the increasing traffic congestion in the region, the regional travel time of work trips declined by 2.8 percent in the 1980s. This is due to the decline of urban areas and to growth in the suburbs, where the private automobile is the predominant mode of travel. According to the CTPP data, it takes much longer to com-

mute by public transportation than by automobile. The decline of the share of public transportation in the region contributes to the decrease of commuting times because driving alone takes less time. Commuters in the region have shifted from slower to faster modes of transportation. The 1990 CTPP average regional travel time compares very well with DVRPC average community time, which is based on actual travel survey (24.6 versus 22.8 min).

These problems are similar to those experienced with the 1980 UTPP. For this reason the CTPP trip information should be adjusted before it is used for transportation planning. The adjusted CTPP employment and traffic data for the Delaware Valley region are quite reasonable.

TABLE 4 Average Travel Time of Commuters

County of Residence	Travel Time (minutes)		
	1980	1990	% Diff
Bucks, PA	24.0	24.2	0.8
Montgomery, PA	21.9	22.5	2.7
Burlington, NJ	24.0	24.1	0.4
Mercer, NJ	21.7	22.1	1.8
Total Region	25.3	24.6	-2.8

USES OF 1990 CTPP AT DVRPC

The uses of the 1990 CTPP in the Delaware Valley region are somewhat similar to applications in other metropolitan areas (3-6). DVRPC has already used census data in various transportation planning studies and will continue to use the CTPP in the future. As mentioned earlier, the CTPP includes many socioeconomic data items and trip information that are invaluable to local and state governments, transit operators, and private corporations for making a variety of transportation and locational decisions. These include such decisions as the locations of shopping centers, industrial parks, banks, and service industries and the estimation of highway and transit travel, parking requirements, transit fleet sizes, and service schedules.

There are at least six major uses for the 1990 CTPP in the Delaware Valley region. Some of these have been applied and some will continue in the future.

Development of Data Base for Transportation Planning

DVRPC has initiated a project to prepare a data bank for transportation planning at the TAZ, superdistrict, and municipal levels. This information includes population, vehicle availability, employment, work trips by mode, travel time, household income, and other socioeconomic variables required for traffic simulation and transportation analysis and planning. Such data have been extracted from Parts 1-3 of the CTPP. All data items have been edited for reasonableness and adjusted if necessary on the basis of other census data and DVRPC surveys, counts, and data as described in the previous section of this paper. These data will be used in most transportation system and project planning studies in the next 10 years.

Preparation of Data Summaries and Evaluation of Trends

DVRPC has completed three reports on the journey-to-work trends in the Delaware Valley region (7-9). These reports compare the 1970, 1980, and 1990 journey-to-work information, means of transportation for commuting to work, employed persons, and employment at the county and regional levels. They also analyze the commuting flow between the counties of the Delaware Valley region and surrounding counties and cities. The reports were well received by planners and decision makers because they provide factual information about trends in development and travel patterns in the region. For example, Table 5, taken from the regional report (7), gives the 1970-1990 trends in the distribution of Montgomery County resident workers by place of work. Other tables show the trends in employment and mode of travel for all DVRPC counties, cities, and selected municipalities.

Short data bulletins were also published. Each includes one or two information items obtained from Part 1, 2, or 3 of the CTPP. For example, a bulletin was prepared on vehicle ownership growth between 1970 and 1990 for the counties in the Delaware Valley region. It also includes households stratified by the number of vehicles owned (zero, one, two, or three or more cars).

Update of DVRPC Traffic Simulation Models

A project has been initiated to update the DVRPC travel forecasting models by using the 1990 CTPP. During the 1980s the 1980 UTPP was used to check and validate the DVRPC traffic simulation models (Figure 3). These models will be updated again using 1990 census data. The DVRPC travel simulation models follow the tradi-

TABLE 5 Montgomery County Resident Workers Distribution by Place of Work

Place of Work	1970	1980	1990	Percent Change	
				'70-'80	'80-'90
Bucks	8,488	14,325	20,986	68.8	46.5
Chester	5,900	10,525	17,920	78.4	70.3
Delaware	5,897	7,773	10,933	31.8	40.7
Montgomery	158,986	204,673	229,923	28.7	12.3
Philadelphia	54,489	55,598	55,956	2.0	0.6
Total PA portion	233,760	292,894	335,718	25.3	14.6
Burlington	1,632	532	1,484	-67.4	178.9
Camden	3,089	1,643	2,808	-46.8	70.9
Gloucester	883	225	474	-74.5	110.7
Mercer	1,877	354	1,024	-81.1	189.3
Total NJ portion	7,481	2,754	5,790	-63.2	110.2
Total Region	241,241	295,648	341,508	22.6	15.5
Berks	2,499	3,070	3,670	22.8	19.5
Lancaster	82	172	162	109.8	-5.8
Lehigh	633	773	1,390	22.1	79.8
New Castle	513	282	580	-45.0	105.7
Northampton	665	196	326	-70.5	66.3
Other	5,504	4,185	5,324	-24.0	27.2
Total External	9,896	8,678	11,452	-12.3	32.0
Total Trips	251,137	304,326	352,960	21.2	16.0

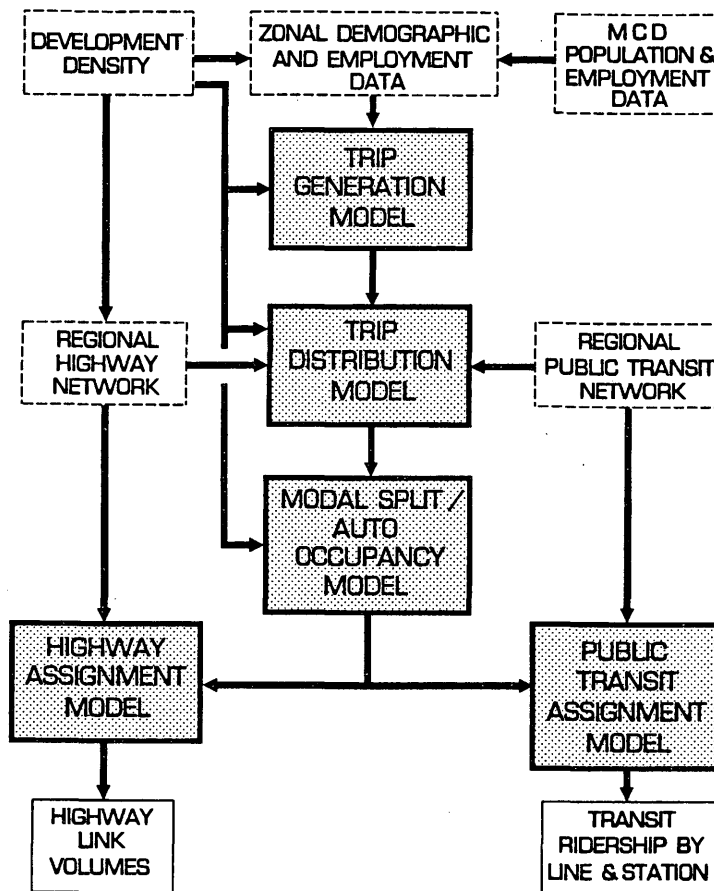


FIGURE 3 DVRPC regional travel simulation process.

tional steps of trip generation, trip distribution, modal split, and travel assignment and use the computer programs included in the Urban Transportation Planning System. In addition to this system, DVRPC is now using the TRANPLAN and TRANSCAD systems for travel forecasting and air-quality analysis.

Generally, the models are similar to those used in other large urban areas that depend on census data for system and project studies. Figure 3 shows the steps needed to update the DVRPC traffic simulation process. This work will be completed by the end of 1995. A careful review and evaluation of the results of each model will be conducted, and necessary adjustments will be made to achieve the most accurate calibration. The simulated traffic volumes will be compared with actual highway traffic counts and public transportation ridership to ensure that acceptable accuracy of the simulated results is obtained from these models. Specifically, DVRPC will use the CTPP data in the following activities:

- Development of accurate inputs on population, households, vehicle availability, resident workers, and employment at the TAZ level;
- Comparison and analysis of DVRPC trip rates for work with CTPP;
- Comparison and analysis of DVRPC trip length and travel time distribution for work with CTPP;
- Comparison and evaluation of work trips estimated by the DVRPC model with CTPP;

- Comparison and analysis of DVRPC auto occupancy model with CTPP; and
- Analysis and evaluation of DVRPC external work trips with CTPP.

Use in Highway and Transit Corridor Studies

The 1990 CTPP data, especially the journey-to-work information contained in Part 3, have been used in several transit corridor studies to check the travel demand or ridership for each transit submode, including high-speed rail line, express bus and park-and-ride service, and local bus service in the suburbs.

The 1990 CTPP data will also be used in many future highway and transit corridor studies, because it is the only information available for transportation planning at the regional level. The use of the CTPP minimizes any large-scale data collection in the Delaware Valley and decreases the rising costs of surveys required for transportation planning at the system and project levels.

Application in Strategic Planning and Economic Development

DVRPC is planning to use the 1990 CTPP information on employment, particularly Part 2, to evaluate the significant changes in the

type and location of industries and commercial establishments. This evaluation will result in recommendations and strategies aimed at attracting new industries and high-technology firms to the Delaware Valley. Also, employment information is useful to the redevelopment of declining areas of old urban centers and provision of the required physical improvements for their rehabilitation.

Based on the inventory of major employment centers, a project has been developed to analyze these centers' accessibility for workers. Existing access patterns will be examined in terms of origin-destination and model split. Access problems for particular labor populations such as low-wage workers will be studied. Access problems and opportunities will be identified based on data analyses, site analyses, and consultations. Both transportation and land-use-related solutions will be proposed to improve access to employment centers, as dictated by findings.

Provision of 1990 CTPP Data to Public Agencies and Private Corporations

Finally, DVRPC intends to provide the 1990 CTPP information to any public or private agency involved in planning or urban studies such as studies for housing, finance, real estate, health facilities, social services, economic base, and economic development. It appears that many planning agencies and private companies in the Delaware Valley region are very much interested in obtaining the CTPP information.

CONCLUSIONS

Generally, the 1990 CTPP for the Delaware Valley region contains valuable data for air-quality and transportation planning, economic base and employment location studies, urban development analysis, and planning and evaluation of transit services. However, the analysis of CTPP data indicates a few programming, statistical, and bias problems. Most of these problems were resolved before DVRPC used the CTPP as a data base for trend analysis, information purposes, traffic simulation, highway and transit project studies, strategic planning, and economic development. The errors in the 1990 data are generally similar to those found in the 1980 UTPP. Like the 1980 data, the 1990 employment estimates must be adjusted before they are used in transportation planning studies because they do not include all workers or jobs.

Most of the 1990 CTPP problems and errors can be avoided in the 2000 census by quality-control edits and a careful review of the census questionnaire as well as of the computer formats and programs required for processing the information. Specifically, the journey-to-work questions (22 and 23) should be simplified to prevent any confusion on the part of respondents on such questions as mode of travel and industry classification. Many confused the access mode to subway-elevated or railroad lines with the principal

mode of travel. The questionnaire should be redesigned to capture multimodal trip information from the place of residence to the place of work. Question 28 should be simplified to avoid any error or misunderstanding in the employment sectors.

The format of the 1990 CTPP tapes is rather complex and must be simplified and checked for consistency. The funding and development of two packages in 1990—State and Urban Elements—is an excellent idea, because these packages include better coverage of commutershed areas and could be used for checking and consistency of the census information. AASHTO should again provide the funding for the 2000 CTPP. Finally, DVRPC has not as yet received all parts of the CTPP; a more timely release of data is obviously important to all census data users.

ACKNOWLEDGMENT

This paper was financed in part by FHWA and FTA, of the U.S. Department of Transportation, and the Pennsylvania and New Jersey departments of transportation.

REFERENCES

1. Zakaria, T., Analysis and Use of 1980 Urban Transportation Planning Package in the Delaware Valley Region. In *Transportation Research Record 981*, TRB, National Research Council, Washington, D.C., 1984, pp. 95-102.
2. *Multi-Job Holding Unchanged in May 1991*. Report 91-547. Bureau of Labor Statistics, Oct. 1991.
3. Goodman, C., and E. Murakami. Using 1990 Census Data in National Policy Analysis. In *Conference Proceedings 4: Decennial Census Data for Transportation Planning*, TRB, National Research Council, Washington, D.C., 1995, pp. 105-114.
4. Purvis, C. The Decennial Census and Transportation Planning: Planning for Large Metropolitan Areas. In *Conference Proceedings 4: Decennial Census Data for Transportation Planning*, TRB, National Research Council, Washington, D.C., 1995, pp. 55-67.
5. Cervero, R. Use of Census Data for Transit, Multimodal, and Small-Area Analyses. In *Conference Proceedings 4: Decennial Census Data for Transportation Planning*, TRB, National Research Council, Washington, D.C., 1995, pp. 83-94.
6. Rossetti, M. A., and B. S. Enersale. *Journey-to-Work Trends in the United States and Its Major Metropolitan Areas, 1960-1990*. FHWA, U.S. Department of Transportation, Nov. 1993.
7. *Journey-to-Work Trends in the Delaware Valley Region, 1970-1990*. Direction 2020 Report 5. Delaware Valley Regional Planning Commission, Philadelphia, Pa., June 1993.
8. *Journey-to-Work Trends in Camden, Trenton, Chester, and Philadelphia, 1970-1990*. Direction 2020 Report 16. Delaware Valley Regional Planning Commission, Philadelphia, Pa., March 1994.
9. *Journey-to-Work Trends in Eight Suburban Townships, 1970-1990*. Direction 2020 Report 17. Delaware Valley Regional Planning Commission, Philadelphia, Pa. March 1994.

Publication of this paper sponsored by Committee on Transportation Data and Information Systems.