

Highlights of the TPB Travel Forecasting Subcommittee Meeting Held September 17, 2004

Mona Sutton of Maryland State Highway Administration chaired this meeting.

Item 1: Approval of July 23, 2004 Meeting Highlights

The highlights were approved as written.

Item 2: FY2004 Arterial Travel Time Survey

Daivamani Sivasailam distributed a hard copy of his presentation slides entitled “Arterial Highway Travel Time/Speed Monitoring Study.” The purpose of the study is to identify the location, severity and extent of congestion on the major arterial highway routes in the region. He began the presentation with a brief overview of the monitoring program. A total of forty three major arterial highway routes totaling three hundred and sixty three miles were monitored of which fourteen routes were monitored in years 2000 and 2003, thirteen in years 2001 and 2004 and sixteen in years 2002 and 2005. Two or three cars, equipped with GPS and/or data storage devices, were used to record travel time and speed data on each route during the PM peak period and off-peak period. Speed and travel time monitoring occurred between 1:00 – 8:00 pm on weekdays.

The Level of Service (LOS) for the routes is determined using speed data and the 2000 Highway Capacity Manual. LOS was determined at the segment level and route level during the PM peak hour, peak period and off-peak period.

Mr. Sivasailam discussed in detail the performance analysis for the thirteen arterial highway routes studied during FY2004. In conclusion, the overall travel conditions are at an acceptable level. Eighty three percent of the system studied operated at LOS “D” or better during the PM peak hour.

Questions and Comments

Mr. Moore questioned why the peak hour operated better than the peak period on Virginia Route 7 between International Drive and Spring Hill Road. Ms. Vega responded that the peak hour was predefined as 5:00pm – 6:00pm. Congestion sometimes occurred before or after the predefined peak hour. Mr. Kirby suggested labeling each peak hour differently for each survey location to avoid further confusion.

Mr. Replogle suggested that since the Travel Forecasting Subcommittee and the Travel Monitoring Subcommittee have merged, it may be appropriate to step back and look at the Arterial Travel Time Survey with a fresh eye. Since this survey was initiated ten years ago, there is a whole new array of technologies that could be used to collect a much more comprehensive database of arterial travel with a larger sample that could be linked to the region travel model validation and calibration process. He urged that the report cover the uses of these data and their limitations.

Item 3: 2003 External Truck Survey

Patrick Zilliacus distributed a hard copy of his presentation entitled “2003 External Truck Survey”. He began the presentation by stating that it is a challenge to obtain data on truck travel; however, this data is needed to update COG/TPB travel demand and mobile emissions forecasting tools. These data will be combined with other upcoming counts and used to update the medium/heavy truck models and the external and through trip patterns. This survey was directed at capturing truck trips with at least one trip end outside the region. The last external truck survey was conducted in 1996 although some counts were taken at the truck activity centers in 2000. Truck counts with no surveys were conducted in 1992 at a series of locations around the region.

Some of the challenges/issues faced when conducting a truck survey include:

- Size of vehicles;
- Safety of survey personnel;
- Time limitations;
- Location of survey stations; and
- Getting the appropriate support from sworn law enforcement.

A significant number of pretests were done at Hyattstown in advance of actual survey work. Once those pretests were completed, roadside surveys (two-way surveys when possible) were conducted at fifteen locations. Most survey days started at 6:00 am and were twelve to sixteen hours long. Twenty-four hour truck classification counts were conducted at locations on the external cordon line.

Once the surveys were completed and the medium and heavy truck counts were conducted at the external cordon boundaries, the surveys were geo-coded to the TPB system of travel analysis zones (coded to an external “zone” when a trip-end was external to the modeled region). All trip-ends that ended in the District of Columbia, Delaware, Maryland, Virginia and West Virginia were coded to county level. Mr. Zilliaccus informed the subcommittee that geo-coding of the survey will continue until October 2004. The survey will be factored and technical documentation and file format will be created for use by TPB staff and others in the spring of 2005. The survey will also be incorporated with other data to form calibration files in FY2006. A new truck model is also planned for FY2006.

Questions and Comments

Mr. Pratt commented that the time-of-day distribution graphs for I-95 southbound truck traffic at Elkridge, Maryland in Howard County versus I-95 northbound truck traffic at Thornburg, Virginia in Spotsylvania County are remarkably different. Mr. Zilliaccus responded that there is more truck traffic during the early morning and day time hours between Baltimore and Washington, whereas the southern I-95 external station at Thornburg experiences predominately long-haul truck traffic continuously throughout the day.

Mr. Harvey questioned why the roadside truck survey was not conducted in the District of Columbia. Mr. Hogan clarified that the roadside truck survey is an external truck survey, to gain information on truck travel patterns into and out of the jurisdictions in the Washington region, including the District of Columbia.

Item 4: Version 2.1 Model (Update since July 23, 2004)

Ron Milone distributed a handout entitled “Status of the TPB Regional Travel Model, Version 2.1 D Draft #50”. He also distributed two reports:

- COG/TPB Travel Forecasting Model Version 2.1 D Draft #50 Calibration Report
- COG/TPB Travel Forecasting Model Version 2.1 D Draft #50 User’s Guide

Mr. Milone reported that the development of the TPB’s Version 2.1 D travel model, which began at the start of the calendar year 2004, is now completed. He reminded the subcommittee that earlier model drafts (#16, #18, and #28) have been presented to the subcommittee since last March. The finalized model is now referred to as Version 2.1 D Draft #50.

The Version 2.1 D model is an incremental improvement to the currently adopted Version 2.1/TP+, Release C model. The improvements were formulated as part of the recent TRB expert review of the TPB’s travel forecasting practice. The improvements include 1) improved model performance/validation, 2) improved bus network characterization, 3) a reduced use of adjustment factors, and 4) the inclusion of the mode choice model in the speed feedback loop. The TRB review committee also recommended two additional improvements that were not included in the draft #50 model but are nonetheless in the development ‘pipeline’. These include a commercial travel modeling capability and the integration of the mobile emissions post-processor hourly spreading procedures into the travel model. The TPB has retained the

services of a contractor to develop a commercial travel model and this project is already underway. The integration of the peak-volume spreading capability into the travel model is currently underway.

Mr. Milone stated that three key differences distinguish the draft #50 model from the draft #28 model presented in July:

- An explicit mode choice model execution was installed in each of the six speed feedback iterations; Method-of-Successive-Averaging (MSA) procedures were updated accordingly.
- Eight K-factors (used in trip distribution) were further dampened.
- Freeway volume-delay functions used in the traffic assignment were modified.

Mr. Milone presented the specific differences between the draft #50 model and the currently adopted Version 2.1 C model to the subcommittee. The differences are documented in the calibration report. He stated that the draft #50 model is superior in performance to the Version 2.1 C model and has the least number of model adjustments to date. The year 2000 regional VMT performance has improved from an 8% overestimation to a 3% overestimation. The RMSE has been reduced from 52% to 47%.

The Version 2.1 D model draft #50 will not be officially adopted until the TPB approves the TIP and CLRP (approval is scheduled for the November 17th TPB meeting). Copies of the draft #50 model with data on calibration in 1994 and validation in 2000 and 2030 are available upon written request.

Questions and Comments

Mr. Pratt commented that the mode choice model's implied elasticity of demand with respect to fare is reasonable and added that other mode choice models across the country are not always developed with a reasonable transit fare elasticity. He noted that the work purpose elasticity implied by the TPB model is between 0.3 and 0.4 which is within the expected range.

Mr. Replogle commented that the Version 2.1 D draft #28 model reflected a five-fold difference between the value-of-time (VOT) assumed in the mode choice model and the VOT assumed in the traffic assignment model. He commented that the difference raises troubling questions about internal consistency of the model. He questioned whether this issue was addressed in the draft #50 model. Mr. Milone replied that he did not have the mode choice/traffic assignment VOT differential readily available, but staff could easily make the information available. He also added that he did not believe that the assumed VOT between the two models should be the same.

Mr. Replogle referenced page 9-10, Exhibit 9-8 in the Version 2.1 D model draft #50 Calibration Report. The model continues to overestimate the amount of outbound PM peak period traffic crossing the Metro Core Cordon line by 27-32% and crossing the beltway by 9-21%. He questioned if the issue of building the feedback from the post-processor back into the trip table process was addressed. Mr. Milone replied that a great deal of research has gone into this area in recent weeks. At the current time staff has not completed the task of integrating the post-processor into the travel model.

Michael Replogle reiterated that there is a very robust time-of-day traffic count database available that could be used. Estimating more behavioral time-of-day models from the beginning of the modeling process is an involved exercise but is much more robust than applying the post processor. Mr. Kirby stated research is being done on that very subject area and it's very difficult to model. Based on the TRB review, TPB staff is working on integrating the volume-spreading process used in the current mobile emissions post processor into the travel model. A significant amount of effort was made to accomplish that with the draft #50 model, but we ultimately determined that it was not achievable without more time and effort. Conceptually, integrating the peak-spreading mechanism into the travel model to get more accurate time-of-day volumes is a promising approach and it will be done.

Mr. Kline asked if priorities are shifting to focusing on acquiring better count data. Mr. Milone replied that staff has recently spent more time reviewing coded traffic counts in the highway network. The refinement has actually led to improvements in model performance.

Mr. Replogle referenced page 9-6 in the Version 2.1 D model draft #50 Calibration report and noted that in the summarization of the traffic simulation by facility type, the higher volumes tend to be underestimated while the lower volume ranges are overestimated in terms of traffic assignment. Mr. Milone stated that the pattern of differences by volume range is similar to that observed previously but the magnitude of the differences has generally been reduced. Mr. Hogan added that observed traffic counts are subject to some degree of error. It should be noted that the Washington highway network has a higher proportion of highway links with coded counts than most other areas (most areas have a 20-30% coverage rate while the Washington network coverage for the year 2000 is about 56%). Mr. Clifford commented that the regional RMSE statistic looks reasonable (47%) in comparison with other MPO's. The RMSE statistics for freeways and expressways are about 27% and 37%, respectively, which are also reasonable. The RMSE statistics associated with the highest volume ranges of those facilities are in line with the average. Also the proportion of freeway and expressway links in the highest volume range categories is quite small (20 out of 1,072 freeway links and 23 out of 381 expressway links).

Item 5: Around the Table – Update on Regional Studies

The chair asked subcommittee members around the table to provide an update on regional studies. Representatives from Maryland State Highway Administration, Fairfax County, Montgomery County, Virginia Department of Transportation and the D.C. Department of Transportation provided updates to the subcommittee on ongoing and planned studies.

The next TFS meeting will be held on November 19, 2004.