CTPP Status Report

May 2010

U.S. Department of Transportation
Federal Highway Administration
Bureau of Transportation Statistics
Federal Transit Administration
AASHTO Standing Committee on Planning
In cooperation with the TRB Census Subcommittee

Census Transportation Planning Products (CTPP) AASHTO Update

Penelope Weinberger, AASHTO, Pweinberger@aashto.org

CTPP Oversight Board Meeting
The CTPP Oversight Board met on February 10, chaired by Jonette Kreideweis, Minnesota DOT, currently the vice-chair. The new chair is Jennifer Finch, the Director of the Division of Transportation Management and Planning at the Colorado DOT.

During the meeting the new budget and work plan were provisionally approved, pending adding some language to make it easier to understand the correspondence between the former budget and work plan, and the current plan. All sub-committees reported; the training sub-committee has done a tremendous amount of work on developing a framework for CTPP training. There is still a great deal to be done.

CTPP Access Software
A contract has been signed between AASHTO and Beyond 20/20 and Citygate for the development and production of the software. Work is moving along briskly; a time line has been developed, a functional specification for the software is approved, and licensing issues so the software may be used by unlimited users is resolved. Census Bureau has delivered empty tables shells for software testing, the work plan includes 12 weeks for data delivery from AASHTO to the operational web-based software. The software will primarily be a web-based solution, with a desktop solution using Beyond 20/20 Professional Browser. It is expected to be ready for users in fall of 2010.

CTPP Three-Year ACS Data Products
The Census Bureau's ACS Office (ACSO) is working on the tabulations using ACS records from 2006-2007-2008. The CB's Journey to Work and Migration branch is responsible for quality checking and getting any corrections made by ACSO before the data are delivered to AASHTO and FHWA by June 2010. AASHTO will then deliver the file to Beyond 20/20 to be imported into the CTPP Access Software.

CTPP Five-year ACS Data Products
The first CTPP using ACS with small area tabulation will use ACS records from 2006-2010. We expect the data will be modified in some fashion to reduce the use of data suppression to protect individual confidentiality. We are hopeful that the techniques developed resulting from NCHRP 08-79 *Producing Transportation Data Products from the American Community Survey that Comply with Disclosure Rules* will be used. The data are expected to be released in 2012.

CTPP Website:
http://ctpp.transportation.org
This website has been updated to include three archived webinars, including the March 11, 2010 webinar "CTPP Snapshot". In addition, two webinars from 2009, one on urbanized areas, and one on using Public Use Microdata Samples (PUMS) are available. Transportation profiles using 2005-2007 ACS data are also available at this website.

CTPP Data to Support Transit Ridership Forecasting

Ken Cervenka, Federal Transit Administration, Ken.Cervenka@dot.gov

FTA guidance for New and Small Starts projects requires that travel models used for preparation of forecasts be validated against data sufficient to describe current ridership patterns. See the June 4, 2007 Federal Register (pages 30910-30911) for more information: http://www.fta.dot.gov/documents/Final_Guidance_NewStartsSmallStarts_Policies_Procedures(2).pdf

An alternative to use of conventional travel models for estimating project ridership and travel time savings between alternatives is to apply data-driven analytical techniques. See the July 29, 2009 Federal Register (pages 37761-37762) for more information: http://edocket.access.gpo.gov/2009/pdf/E9-18096.pdf

For situations where conventional models are used for preparation of ridership forecasts, CTPP 2000 Part 3 worker flow data help us check how well the models represent the home-based work (HBW) trip markets. The models need to get these markets right, or there is no hope of understanding/predicting the number of workers who actually choose transit. The tests are somewhat case-specific and will be guided by the findings from the initial big picture analysis, so here are some general ideas:
If there have been significant local-area changes in population and employment between 2000 and the travel model base year, a back-cast to 2000 is a strong test of the robustness of the HBW distribution model.

The CTPP identifies workers while HBW models identify trips; to facilitate the comparative analysis of travel patterns, it is common to factor the regional CTPP flows to match the model flows.
Aggregation of travel model zones into districts and comparing district-to-district flows from the CTPP and the model will make it easier to find large differences worthy of more investigation.
HBW mode choice models are usually segmented to represent different markets of travelers (e.g., the mode choice decisions made by individuals from low-income households or households without any vehicles available are different from the decisions made by individuals from other households), so the analysis should include a comparison of observed and estimated travel patterns by market.

CTPP 2000 data have also been used to develop order-of-magnitude ridership estimates that are intended for use as quality control checks on real forecasts and, in cases where choice riders and park-ride access are rare in the current transit system, a way of calibrating mode choice models. An article in the April 2006 CTPP 2000 Status Report newsletter ("Use of CTPP 2000 in FTA New Starts Analysis") notes the development of the CTPP-based Aggregate Rail Ridership Forecasting Model (ARRF) for estimating weekday unlinked rail transit passenger trips for light rail and commuter rail systems. The CTPP flow data provide a nationally consistent description of the markets served by projects already built--for calibration of ARRF-- and of corridors in which new projects are being planned. The model was recently updated to include new rail systems opened since 2000.

The big question we all face in the near future is how well tabulations from the American Community Survey (ACS) and other Census products will serve as a continuation of the unique resource that the CTPP has provided for several decades. The first CTPP using three years of ACS (2006-2008) will be released later this year, but with limited geography: the county-to-county flows may be useful "control totals" for updating the more detailed CTPP 2000 flow data. The CTPP using five years of ACS (2006-2010) is scheduled to be available in late 2012 and is expected to offer a more detailed geography. The Census Bureau's Longitudinal Employment Household Dynamics (LEHD) also holds promise, but still needs to be critically assessed for its usefulness in transportation planning.

For more information about the topics in this article, please contact me, Ken Cervenka, at Ken.Cervenka@DOT.GOV, 202-493-0512.

Usual Journey to Work Commute Model Loyalty

Nancy McGuckin, Nancy.McGuckin@dot.gov

The new National Household Travel Survey data show a growing loyalty to driving alone, transit, and walk while the percent of loyal carpoolers has declined sharply. Table 1 shows the percent of commuters by their usual journey to work mode versus what those commuters did on the actual travel day. Table 1 shows that 93.1 percent of the commuters who said that last week they 'usually' drove alone to work, actually drove alone to work on the travel day.

However, for commuters who 'usually' carpooled, only 56 percent actually carpooled on the travel day (much lower than the nearly three-quarters who actually carpooled in 2001). On the other hand, commuters using both transit and walk showed slightly more loyalty; 73.1 percent and 81.3 percent respectively took their usual modes on the travel day (compared to 69.4 and 79.5 percent in 2001).

Overall, the 2009 NHTS shows more transit commutes than 2001, 4.1 percent of commuters actually took transit on the sample day compared to 3.7 percent in 2001. For a quick look at transit increases during the gas price spike in summer of 2008, see "Inklings 2: New Findings from the 2009 NHTS" which will be available at http://nhts.ornl.gov.

Table 1: Usual Versus Actual Commute Mode

'Usual' Commute Mode:	Actual Commute on Travel Day:						
	Drive Alone	Carpool	Transit	Walk	Bike	Other	All
Drove Alone	93.1	6.0	0.1	0.5	0.0	0.4	62.1
Carpool	41.9	56.0	0.7	0.8	0.0	0.6	14.6
Transit	10.7	9.2	70.6	6.8	0.6	2.2	4.7
Walk	5.4	9.9	2.8	81.3	0.1	0.5	2.5
Bike	14.4	2.9	5.2	3.0	73.1	1.4	0.7
Other	61.6	20.8	4.4	4.6	0.3	8.3	15.5
All	75.8	15.2	4.1	3.2	0.7	1.0	100.0

DRCOG Using ACS/CTPP data in Activity-Based Model Calibration

Suzanne Childress, Denver Regional Council of Government (DRCOG), schildress@drcog.org
Erik Sabina, Denver Regional Council of Government (DRCOG), esabina@drcog.org

Denver Regional Council of Governments (DRCOG) has calibrated their activity-based model, Focus, using the 2005 ACS data and 2000 CTPP data among other sources. Table 2 below shows the model components in which ACS and CTPP data were used for calibration/validation purposes.

Table 2: Focus Model Components in which ACS/CTPP data was used for calibration/validation

Model Name	Level	What is predicted
Population Synthesizer	Household	Household size and composition, household income, person age, gender, employment status, student status
Regular Workplace Location	Worker	Workplace location zone and point
Auto Ownership	Household	Auto ownership

The Focus calibration/validation plan, developed by David Kurth (of Cambridge Systematics) and Suzanne Childress, called for detailed calibration of the 16 Focus discrete choice model components individually, in addition to the usual trip-based overall assignment model calibration. Because many of the newly developed measures were not those used in traditional trip-based models, new data sources including the ACS were required to calibrate and validate the model.

ACS Use in Population Synthesizer and Land Use Calibration/Validation

The population synthesizer and land use models were calibrated and validated against several ACS data items, as enumerated below. Table 3 shows an example data summary comparing the number of households by county as estimated by the ACS and households by county as developed for the land use model. The differences between the ACS data and the population synthesizer outputs were used to suggest improvements to the population synthesizer and the land use model.

Data Summaries from the ACS Used to Calibrate/Validate the Population Synthesizer and Land Use Models.

1. Regional Households by Presence of Children
2. Regional Households by Age of Householder
3. Households by County (results shown in Table 2 below)
4. Households by County by Income Group
5. Households by County by Household Size
6. Employed Persons by Home County
7. Persons By Age Cohort by County

Table 3: 2005 Land Use Model/ACS Number of Households by County

County	2005 Land Use	2005 ACS	Difference	%Difference	ACS Margin of Error
Adams	145256	141383	3873.5	3%	+/- 1.8%
Arapahoe	211224	206250	4974.5	2%	+/- 1.4%
Boulder	118178	113405	4773.3	4%	+/- 1.7%
Denver	253764	241579	12185.2	5%	+/- 1.4%
Douglas	87807	87654	153.3	0%	+/- 1.1%
Jefferson	213322	211394	1928.0	1%	+/- 1.0%
Total	1029553	1001665	27887.8	3%	+/-3.5%

ACS Use in Auto Ownership Calibration

The ACS was also used to calibrate constants and coefficients in the auto ownership model. The specific target used was auto ownership level by households by county. Table 4 shows 2005 auto ownership percentages by household by county in the calibrated Focus auto ownership model. Table 5 shows, in comparison, 2005 ACS auto ownership levels by county.

Table 4: 2005 Auto Ownership Focus Model: Percent of Households by County by Auto Ownership

	% of Households in County						
Auto Ownership Level	**Adams**	**Arapahoe**	**Boulder**	**Denver**	**Douglas**	**Jefferson**	**Total 6 Counties**
No Auto	6%	7%	5%	9%	2%	4%	6%
1 auto available	25%	22%	27%	36%	16%	26%	27%
2 autos available	42%	38%	46%	35%	53%	44%	41%
3 or more autos available	28%	33%	22%	20%	29%	26%	26%

Table 5: 2005 ACS: Percent of Households by County by Auto Ownership

	% of Households in County						
Auto Ownership Level	**Adams**	**Arapahoe**	**Boulder**	**Denver**	**Douglas**	**Jefferson**	**Total 6 Counties**
No Auto	4%	5%	4%	12%	1%	4%	**6%**
1 auto available	32%	34%	29%	43%	20%	29%	**33%**
2 autos available	41%	41%	46%	33%	55%	42%	**41%**
3 or more autos available	23%	20%	21%	12%	24%	24%	**20%**

2000 CTPP Use in Work Location Calibration

Finally, 2000 CTPP data was used to develop a 2005 target for home district to regular work district distribution. This target was used to determine how to change constants and coefficients in the work location choice model. The target was developed using the following fratar process:

1. 2000 CTPP data district to district work trips were used as seed matrix.
2. The row sums by district 2005 targets for the fratar process came from the number of workers by district resulting from the Population Synthesizer.
3. The column sums by district 2005 targets for the fratar process came from the number of jobs by district from the land use model.
4. The fratar process was used for six iterations to grow the 2000 CTPP to match 2005 number of workers living in each district and number of jobs in each district.

In conclusion, the ACS provided several data items that proved useful to the calibration process. There are several data items we have not taken advantage of from the ACS, including average travel times to work and work mode shares that we would like to investigate in the future. We recommend that those who are calibrating or validating activity-based models look at what the ACS has to offer that may be uniquely helpful to their calibration.

The Spatial Patterns Affecting Home to Work Distances of Two-Worker Households

Julien Surprenant-Legault, McGill University, julien.s.legault@mail.mcgill.ca
Ahmed M. El-Geneidy, McGill University, ahmed.elgeneidy@mcgill.ca

Introduction

For the majority of North Americans, round-trips between home and work represent most of their daily commuting time; also, selecting home and work places involves more constraints for two- than for one-worker households and necessitates compromises within households. This research aims at providing some of the information missing in the location decisions and travel behavior of this important population group (19.8% of households and 43.6% of workers in Montréal, Québec, Canada).

Methodology

As of 2008, the Montréal Metropolitan region comprises 3.75 million inhabitants. The region's center is strong by its demographic weight, with 1.6 million people in the city of Montréal, while all employment sectors are close to the center. The data used in this research comes from the AMT 2003 Origin-Destination survey, a comprehensive travel behavior survey covering 4.70% of all residents in the Montréal metropolitan region living in 56,959 households. The data were refined to obtain 11,271 two-worker households as well as 20,725 one-worker households used as a comparison group. The distance linking a household's home to one of its workplaces is the dependent variable in the three logarithmic regression models.

Analysis and Discussion

The angle between home and the two different workplaces was calculated for each household to reflect land use patterns and transportation networks. The higher the values of the angle, the more opposite are the directions of travel of the two workers in the household. Figure 1 is a cluster and outlier analysis of the *workplace 1 – home – workplace 2* angle where clusters of high values are in the center (in blue; high accessibility to jobs) and clusters of low values are in the suburbs (in red; along major transportation axes). High values are also found in two regional centers.

Two logarithmic regression models ($R^2 = 0.36$ & 0.38) explain individuals' home to work distances with commonly used variables such as gender, income, age or trip mode. Notably, the partner's distance increases the other's distance by 0.16% when it rises by 1%, which is likely due to a home location that offers less accessibility to jobs for both partners. Besides, each member of a two-worker household travels 2.31% less to go to work when compared to a worker in a single-earner household, everything else kept equal.

The last logarithmic regression model concerns the sum of home to work Euclidean distances in a household. It adds spatial interrelationship factors that improve the explanatory power ($R^2 = 0.48$), which means that two-worker households tend to at least partially pool their commuting distances and try to minimize the sum of distances.

The first factor, the ratio of the minimal over the maximal accessibility to jobs by car within 15 minutes at workplace, yields shorter distances for households with similar accessibilities (up to -70% when compared to totally different ones), which could mean a more compact and thus more attractive set of workplaces. The second factor is the ratio of the minimal over the maximal Euclidean home to work distance. It involves that when partners travel different distances, the household's sum of distances decreases (up to -31% when compared to equal distances travelled), probably because one partner works close to home. The third factor, the *workplace 1 – home – workplace 2* angle, makes the sum of distances decrease by 0.09% for a 1% increase. While people who live and work in the CBD can easily move in many directions, workers living away from the center locate home and workplaces near a major transportation axis, creating a small angle. For them, it might be a strategy to minimize an already large sum of distances.

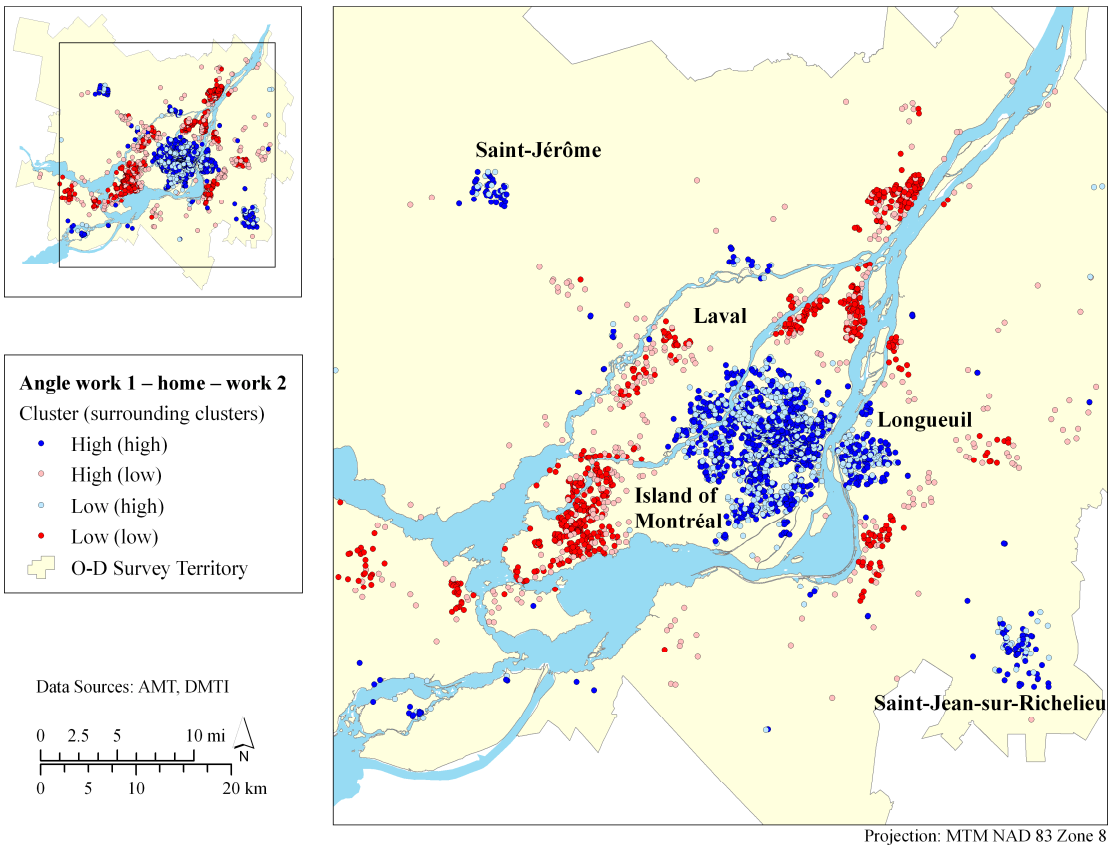

Figure 1. Clusters and Outliers of the *Workplace 1 – Home – Workplace 2* Angle

Conclusions and Recommendations

The three spatial interrelationship factors represent three strategies that two-worker households adopt to minimize the sum of home to work distances. Observed patterns in angles can inform policy makers on these households' needs. Therefore, effective transit improvements could include reinforcing the grid-like bus system in the center of Montréal and developing a high-capacity transit corridor or high occupancy vehicle lanes following the river. Finally, a land use providing jobs near residences could be effective in decreasing distances travelled, as two-worker households already indicate that they seek to locate at least one of the workplaces close to home.

Acknowledgements

We would like to gratefully thank Daniel Bergeron, from the Agence Métropolitaine de Transport, Assumpta Cerdá, Paul Lewis, and our funders, the Natural Sciences and Engineering Research Council of Canada, the Social Sciences and Humanities Research Council of Canada and the Fonds Québécois de Recherche sur la Société et la Culture.

The complete article is available at: http://tram.mcgill.ca/Research/Publications/Two_worker_household.pdf

CTPP Hotline – 202/366-5000

Email: ctpp@dot.gov

CTPP Listserv: http://www.chrispy.net/mailman/listinfo/ctpp-news

CTPP Website: http://www.dot.gov/ctpp

FHWA Website for Census issues: http://www.fhwa.dot.gov/planning/census

2005-2007 ACS Profiles: http://ctpp.transportation.org/profiles_2005-2007/ctpp_profiles.html

AASHTO Website for CTPP: http://ctpp.transportation.org

1990 and 2000 CTPP downloadable via Transtats: http://transtats.bts.gov/

TRB Subcommittee on census data: http://www.trbcensus.com

AASHTO
Penelope Weinberger
PH: 202/624-3556
Email: pweinberger@aashto.org

Jennifer Finch,
Chair, CTPP Oversight Board
PH: 303/757-9525
Email: jennifer.finch@dot.state.co.us

Jonette Kreideweis, MN DOT
Vice Chair, SCOP CTPP Oversight Board
PH: 651/366-3854
Email: jonette.kreideweis@dot.state.mn.us

Census Bureau: Housing and Household Economic Statistics Division
Melissa Chiu
PH: 301/763-2421
Email: melissa.c.chiu@census.gov

Alison Fields
PH: 301/763-2456
Email: alison.k.fields@census.gov

FTA
Ken Cervenka
PH: 202/493-0512
Email: ken.cervenka@dot.gov

FHWA
Elaine Murakami
PH: 206/220-4460
Email: elaine.murakami@dot.gov

Ed Christopher
PH: 708/283-3534
Email: edc@berwyned.com

Liang Long
PH: 202/366-6971
Email: liang.long@dot.gov

TRB Committees
Catherine Lawson
Urban Data Committee Chair
PH: 518/442-4773
Email: lawsonc@albany.edu

Clara Reschovsky
Census Subcommittee Co-Chair
PH: 202/962-3332
Email: creschovsky@mwcog.org

Kristen Rohanna
Census Subcommittee Co-Chair
PH: 619/699-6918
Email: kroh@sandag.org

CTPP Listserv

The CTPP Listserv serves as a web-forum for posting questions, and sharing information on Census and ACS. Currently, over 700 users are subscribed to the listserv. To subscribe, please register by completing a form posted at: http://www.chrispy.net/mailman/listinfo/ctpp-news

On the form, you can indicate if you want e-mails to be batched in a daily digest. The website also includes an archive of past e-mails posted to the listserv.