TBAG

TAMPA BAY APPLICATIONS GROUP

An Open Forum for Transportation-Related Issues

August 2006

TBAG and ITE Link Together

to bring you

Maximizing Capacity Within Limited ROW

August 24, 2006

Dates To Remember

TBAG Meeting
November 2, 2006

TBAG Annual Banquet
December 5, 2006
Landry's Restaurant

In This Issue:

"FROM THE CHAIR"

By: Michael Dorweiler, AICP
2006 Chairman for the Tampa Bay Applications Group

The newsletter for the Tampa Bay Applications Group (TBAG) has a NEW LOOK! Our layout welcomes you back from summer vacation with a bit of color and a great line-up of speakers. Our next meeting is August 24, 2006 and we are excited to be teaming for the first time with the local Tampa Bay Chapter of the Institute of Transportation Engineers (ITE).

Todd traveled a long way to share with TBAG.

I would like to thank our speakers who packed the house for the February 2006 meeting. Mr. Todd Brauer traveled from St. Louis, Missouri to present an overview of how transportation models can be used to mitigate congestion during construction. Mr. Brauer was one of the Consultant Managers for a project sponsored by the Missouri Department of Transportation (MoDOT) to redesign 12 miles of I-64.

Cassandra and Danny pause after her presentation to smile for the camera.

Ms. Cassandra Ecker presented on the Strategic Regional Transit Needs Assessment (SRTNA). The FDOT, Districts Seven and One, are working in cooperation to define regional travel patterns, traveler mode choice options, and transit needs and opportunities over the region's eight-county area. The ultimate objective of the SRTNA project is to design an assessment plan that assists the FDOT in prioritizing funding for regional transit infrastructure and service enhancements.

Rich and Hoyt made a great presentation on the West Coast Model.

Our third topic covered the Development of the West Central Florida Regional Planning Model (WCFRPM) and was presented by Rich Tillery and Hoyt Davis. A regional transportation model encompassing eleven counties has been developed to analyze regional traffic patterns. The WCFRPM is being used as the primary tool for alternative testing in two current regional studies.

We appreciate the time our volunteers spend to support TBAG and the transportation planning community. Let's keep that awesome commitment going with a great showing at the **August 24, 2006 TBAG and ITE meeting!**

Activity-Based Microsimulation Models for Regional Planning in the United States

By: Mark Bradley, Bradley Consulting, Inc.

Introduction

The development of activity-based models is increasing across the country as more emphasis by decision makers is placed on the use of travel demand models. Four models are in use and seven are under development by various metropolitan planning organizations (MPOs). This article provides a brief description of the difference between the original 4-step travel demand approach and activity-based modeling. The various model systems under development are also discussed. The information for this article was extracted from a paper by *Vovsha*, *Bradley* and *Bowman*. A full copy may be found onlline at http://jbowman.net/papers/VBB04.pdf.

Four-Step Travel Demand Modeling Approach

Although many improvements to the familiar 4-step travel demand modeling approach have been made since the 1960's, there are still aspects of that approach that limit its usefulness in many policy analysis contexts:

- **Person-trips as the unit of analysis:**
  - the interactions between trips made in the same trip chain (tour) are not captured,
  - the interactions between trip chains made during the same day are not captured, or
  - the interactions between the trips made by people in the same household are not captured.
- **Spatial aggregation:** All trip origins and destinations within a given zone are modeled as if they are located at the same point in space.
- **Demographic aggregation:** All house-holds within a given zone are treated as identical, or, at best, segmented along a few dimensions such as income, household size and car ownership.
- **Temporal aggregation:** Typically, only two or three periods of the day are considered (e.g. AM peak hour, PM peak hour, off-peak), and the proportion of trips made in each period is treated as constant and not sensitive to changes in traffic congestion or other factors.

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Coming This Fall to USF

TRANSPORTATION PLANNING AND ECONOMICS

Wednesdays
August 30 - December 13
5:00 - 8:00 PM
Location: CUTR
Taught by: Edward Mierzejewski

The course will include the four-step transportation planning process, aspects of environmental impact assessment, the basics of engineering economics, transportation corridor analysis, and basics of growth management. The course will present the fundamentals of transportation planning methods and will also discuss a number of classical and contemporary transportation planning issues.

The course is being offered through USF's Department of Civil Engineering; however, all are welcome to participate. The math requirements are limited to basic algebra. For information about the course content contact Edward Mierzejewski at 813-974-3120. For information about registration, contact Jackie Alderman, Program Assistant to the USF Dept of Civil Engineering at 813-974-2275.

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All three types of aggregation can cause significant bias due to the fact that logit models and gravity models are non-linear – i.e the probability shares at the average value are not necessarily equal to the average of the probabilities across all individual values. This fact is often overlooked.

Activity-Based Travel Demand Model Systems

Since 1995, a number of activity-based travel demand model systems have been implemented in the United States that address the issues mentioned above. These include model systems developed for the following MPOs:

- Portland (METRO)
- San Francisco (SFCTA)
- New York City (NYMTC)
- Columbus (MORPC)

Additional systems are being designed and developed in:

- Atlanta (ARC)
- Dallas (NCTCOG – the CEMDAP model)
- Sacramento (SACOG)
- Denver (DRCOG)
- Bay Area (MTC)
- Oregon State (ODOT)
- SE Florida (the FAMOS model)

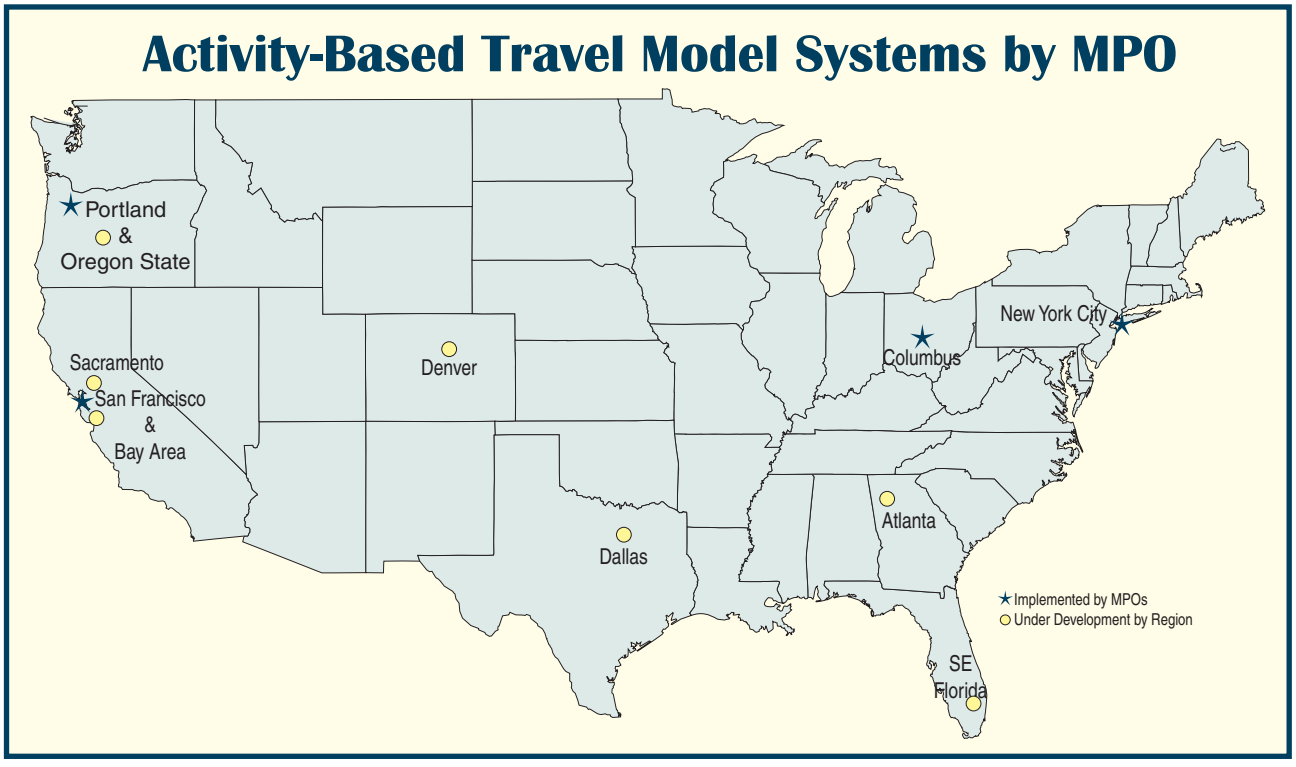
Important Features of Activity-Based Modeling

All of these activity-based models share the following six important features.

Consistent Modeling of all Trips Within a Tour

A "tour" is defined as all trips made between leaving home and arriving back at home. A simple tour consists of just two trips, while a more complex tour may visit multiple destinations along the way.

The main advantage of modeling at the tour level is that we no longer have to treat non-home-based trips as a separate "purpose" of trips. Mode choice for all trips along the tour, including any non-home-based trips, is modeled consistently (i.e. if a person drives to work, they also need to bring the car back home again). Also, the location of



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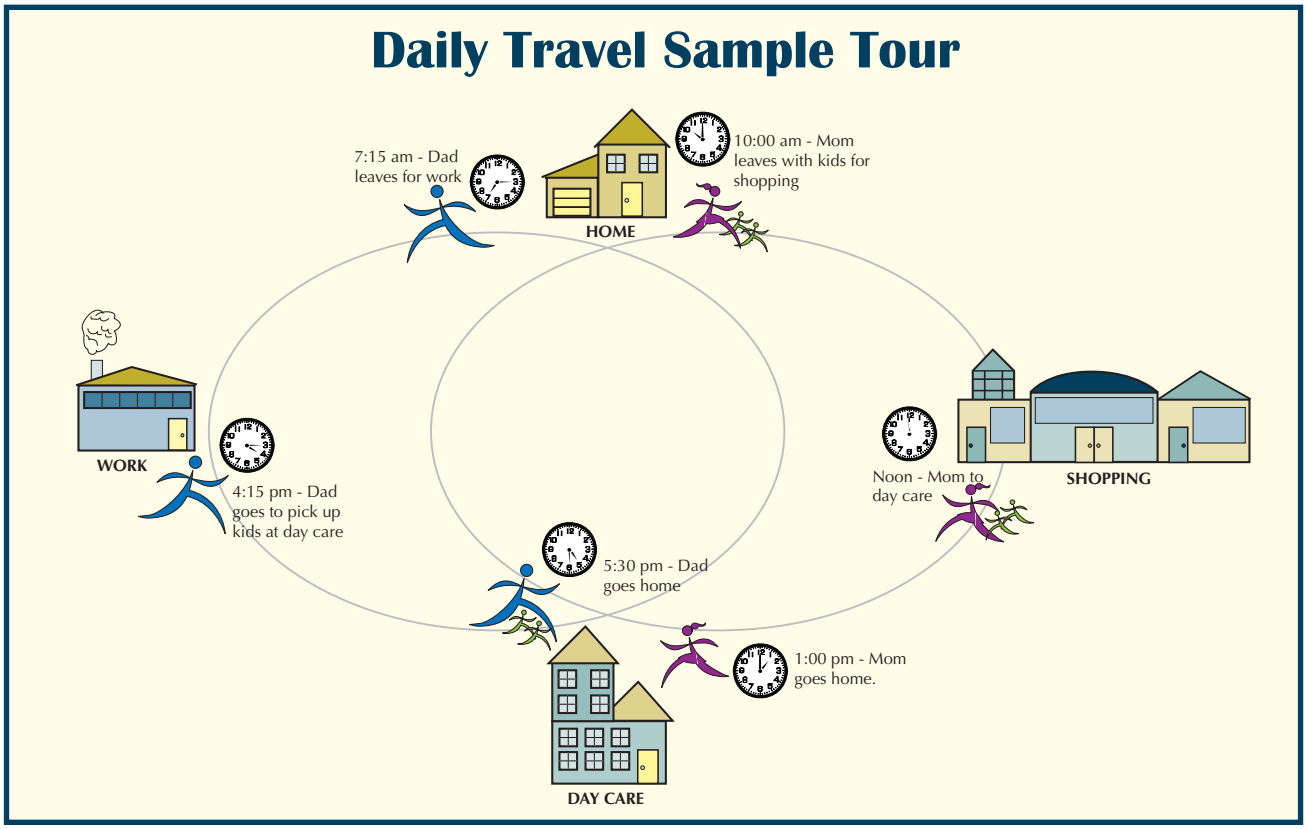

any intermediate stops on the tour is modeled conditionally on both the tour origin and the main tour destination.

Consistent Generation of all Tours and Trips Made During a Person-Day

The full day activity schedule approach introduced by Bowman and Ben-Akiva was the first operational discrete choice framework for simultaneously modeling the key aspects of an individual's day-long activity pattern:

- The purpose and location type of the primary activity of the day (subsistence, maintenance or discretionary; in-home or out-of-home);
- The number of intermediate stops made on the way to and from the primary activity (for out-of-home patterns only);
- The number of work-based tours made during the day (for work patterns only);
- The number and purpose of additional home-based tours made during the day.

The first application of this approach was for the Portland TROS model system, developed for the purpose of looking at the response to peak-hour congestion pricing, a type of policy that their 4-step model was not fully responsive to because trip generation and time-of-day distributions were not sensitive to travel times or costs.

Shortly afterwards, this same approach was adopted for the San Francisco County model system.

The San Francisco models treat the location of work activities as a longer term choice. So, the generation of the activities in the person-day is directly conditional on both the home and work locations, rather than just the home location.

The New York and Columbus models use more of a "cascading" model approach – first generating mandatory tours, then maintenance tours, then discretionary tours, then intermediate stops on all tours. The residual time window remaining after higher priority tours and activities are generated and scheduled can be used in the generation of subsequent tours and activities. The advantage of this approach is that it is

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simpler and more flexible, particularly when dealing with interactions between household members, as discussed below. A disadvantage is that it does not directly capture substitution between trip chaining versus making multiple tours, as is captured in the approach used in Portland and San Francisco.

The Shift to a Stochastic Microsimulation Model Application Framework

Compared to aggregate methods which continually apportion groups of "identical" individuals based on choice probabilities, the stochastic microsimulation approach simulates one specific sequence of choices for each individual. While the aggregate approach tends to force a quite simple overall model structure, the stochastic microsimulation approach allows model structures to be changed to more closely reflect theories of the way choices are made. For tour-based models, this issue is especially important because the locations of intermediate stops are conditional on the locations of both the tour origin and the tour primary destination. In a probability-based framework, this would require applying a stop location choice model for every possible combination of tour origins and destinations, while in a stochastic framework it is only applied for a single O-D pair at a time.

The stochastic microsimulation approach was adopted in New York largely because the aggregate 4-step approach proved infeasible. With so many zones, modes and population segments to consider, the sheer size and number of aggregate O-D matrices that would need to be calculated was impractical. Microsimulation, however, proved to be feasible and practical.

Stochastic microsimulation relies on the creation of a representative synthetic population for each TAZ for the base year and each forecast year. It is interesting that each region has used a slightly different set of control variables for generating synthetic

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WTS Celebrates Transportation Milestones

HONORED GUEST

Senator Jim Sebesta

Please join us as we recognize Senator Sebesta for his contributions to transportation in the Tampa Bay region.

GUEST SPEAKER

Robert S. Wright

Assistant Division Administrator, FHWA

"50th Anniversary of the Interstate System"

Date: Friday August 18th, 2006
Where: Hilton - Tampa Airport Westshore
Time: 11:30-1:30

Cost: Registration -- $25 members/$40 non-members (check website if after 8/11/2006)
NOTE: ***Public Sector Employees pay the "Member" rate of $25!!***

For more informtaion and registration visit the WTS website at **http://www.wtsinternational.org/sub.php?section=chapters&section_id=05.13&chapter_id=33**.

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populations from the National Census PUMS 5% sample, based primarily on which variables are available as forecasts from land use models or other regional planning agencies. In all cases, the control variables have included some combination of:

- Household income
- Household size
- Number of workers in household
- Age of the head of household
- Household type in terms of presence of children and senior citizens

Explicit Interactions Between Activity Patterns of Household Members

While all of the model systems above capture interactions between various activities and tours made by a single person, interactions between household members were captured only implicitly, by including variables related to household type and structure in the various person-level models. The Columbus system represents a major advance for applied activity-based models in that it captures intra-household interactions in three separate ways:

- The type of activity pattern of each individual is directly conditional on the type of activity pattern made by other household members.
- Home-based tours that are made by more than one person from the household are generated at the household level rather than the person level.
- Maintenance activities are generated at the household level and then allocated to individuals, rather than generating them separately for each individual.

Greater Spatial Detail for Land Use and Walk and Transit Accessibility

With modern GIS systems, data on land use and the location of residences and business is typically available at a much finer level than is used for transportation analysis zones (TAZ's). Although shifting to finer spatial detail is not strictly part of activity-based modeling, it was made possible by the introduction of the stochastic microsimulation approach. Because residences and trips are simulated one at a time, there is no need to store huge O-D matrices that include every possible location. Any inputs and outputs that still require storage as O-D matrices, such as travel times and costs for car and transit and output trip tables for assignment, can still be used at

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FTA Offers ALTERNATIVES ANALYSIS

September 26 - 28, 2006
Denver, CO

November 14 -16, 2006
Philadelphia , PA

An alternatives analysis is the planning requirement for projects seeking New and Small Starts funding. This course describes a number of elements of alternatives analyses, including FTA requirements.

The courses were last offered in Washington, DC and San Francisco, CA last August and October, respectively. These courses were well attended, so we encourage you to register for the new offerings soon as our space is limited.

A block of rooms has been set aside for the Adams Mark Hotel in Denver and the Radisson Hotel in Philadelphia.

Denver registration can be made at:
http://www.regonline.com/102215

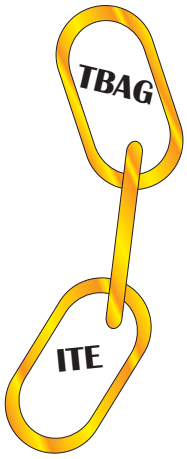
Philadelphia registration can be made at:
http://www.regonline.com/102221.

TAMPA BAY APPLICATIONS GROUP
in coordination with
THE TAMPA BAY CHAPTER OF ITE

Present the First Annual Link of TBAG and ITE
All Interested Parties Welcome

August 24, 2006

FDOT District Seven Office from 12:00 p.m. to 2:00 p.m.
(Auditorium Opens at 11:30 a.m.)



"MAXIMIZING CAPACITY WITHIN LIMITED RIGHT-OF-WAY"

U.S. Highway 19 Controlled Access Study in Pinellas County
Yvonne Arens, FDOT, District Seven
Frank Deluca and John Kenty, H.W. Lochner, Inc.

In November 2000, a Conceptual Study for Limited Right-of-Way Controlled Access for U.S. 19 from Gandy Boulevard to the Pinellas/Pasco County Line was completed. The purpose of the Study was to determine costs for grade separated interchanges at major intersections along the corridor. U.S. 19 is a Strategic Intermodal System (SIS) and Florida Intrastate Highway System (FIHS) corridor. Since the Study, the concepts have become a basis for the design phase for many of the projects completed or programmed in the SIS/FIHS Ten Year Plan. This presentation will cover the findings of the U.S. 19 Controlled Access Study.

Bus Rapid Transit Projects in West Central Florida
Bill Ball and Joel Rey, Tindale-Oliver & Associates, Inc.

Bus Rapid Transit (BRT) is rubber-tired light rail transit, but with greater operating flexibility and generally lower costs. BRT combines a variety of physical and operating elements into an integrated system that displays a distinct identity and high quality image. These elements include transit stations, vehicles, running ways, and advanced technologies. The implementation of BRT can improve speed, reliability, and the identity of transit services, increasing the likelihood of transit system usage. This presentation will review the status of BRT planning and implementation efforts in the West Central Florida region, including the Central Avenue BRT Preliminary Engineering Study being conducted by the Pinellas Suncoast Transit Authority (PSTA).

Reversible Lanes Concept for the LeeRoy Selmon Expressway
Marty Stone, Tampa Hillsborough County Expressway Authority

Scheduled to open August 31, 2006, the LeeRoy Selmon Expressway has been featured in presentations across the United States and internationally. The Expressway is an excellent example of how to nearly double the effective capacity of a facility with almost no additional right-of-way needs. This presentation will address the design and construction of the reversible lanes concept, as well as the layout and operating characteristics.

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the TAZ-to-TAZ level. The stochastic microsimulation framework is flexible enough to use two different levels of geographic detail for different types of data. These changes greatly improved the estimation of certain mode choice model parameters.

An attraction of approaches that use parcels or grid cells as the lowest level of geography is that the land use data becomes independent of the definition of the networks and the zone system. One can adjust the networks and zone system over time without having to redefine the land use variables each time.

Greater Temporal Detail for Activity and Travel Scheduling

The Portland and San Francisco model systems both introduced models of time of day choice in the form of a joint model of the time a person leaves the home to begin a tour and the time they return home to end a tour. In both systems, the day is broken down into 5 separate periods:

- Early (before AM peak)
- AM peak
- Midday
- PM peak
- Late (after PM peak)

The AM and PM peak periods were defined to be periods of up to 3 hours, specific to the traffic patterns in each region.

While those model systems provided a great improvement over most existing trip-based and tour-based model systems that had no time-of-day choice model, their time-of-day choice models can still be viewed as their weakest area. The reasons are:

- Most departure time changes due to traffic congestion, pricing, etc. tend to involve shifts within the greater 3 hour peak, e.g. from the "peak of the peak" to one of the shoulder periods. These shifts are not captured when the day is only broken into 4 or 5 periods.
- Using such long periods does not allow one to model shifts in activity scheduling or the inter-relationships between activity scheduling and activity generation in a very meaningful way.

The Columbus model system provides two major advances over the other model systems discussed above:

- The day is broken down into 1 hour time periods.
- Tours for various purposes are generated and scheduled in a consistent way. Each time a tour is scheduled, the hours of the day that tour uses are made unavailable.

For the Atlanta, Sacramento and Bay Area model systems, further enhancements to this approach are being developed. These include the introduction of "time pressure" variables to ensure that the activity scheduling and activity generation models are as consistent as possible—i.e those that participate in more activities will tend to participate in each activity for a shorter duration, and vice versa.

2006 Transportation Supersession

KEYNOTE SPEAKER

FDOT Secretary Denver Stutler, Jr.

September 28, 2006

Tampa Convention Center
333 S. Franklin Street

Reception at 4:30
Dinner at 6:00

For more information and registration, visit
http://www.wtsinternational.org/sub.php?section=chapters&section_id=05.13&chapter_id=33.

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