

Modeling Non-Motorized Travel in the Philadelphia Area

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Abstract

Most U.S. urban area travel demand model systems focus only on travel by highway and transit modes. Metropolitan planning organizations in the U.S. have recently begun to analyze non-motorized travel, which includes the walk and bicycle modes. Recent interest in reducing congestion and improving air quality, due in large part to federal legislation, and a recognition that non-motorized travel often serves as a substitute for motorized modes have stimulated interest in the analysis of non-motorized modes.

The Delaware Valley Regional Planning Commission, the MPO for the Philadelphia area, has studied ways of incorporating non-motorized travel in to their model system. The experience of other U.S. urban areas has been that non-motorized travel can be incorporated into model systems using modern household travel or activity surveys, which collect detailed information about non-motorized trips. However, the Delaware Valley last conducted a household survey nearly a decade ago, before it was common practice to include non-motorized trips in such surveys.

The procedures to incorporate non-motorized travel into the DVRPC model system include revised trip generation models to include both motorized and non-motorized trips and a binary logit mode choice model, applied to trip ends for each zone, which separates motorized from non-motorized trips. The motorized trips are then used in the trip distribution, (motorized) mode choice, and trip assignment models. Other than a small sample of walk to work trips in the DVRPC household survey, there was no local data on nonmotorized travel from which models could be estimated. Therefore, the trip generation and mode choice models were developed using a variety of alternate data sources, including the 1990 Census Transportation Planning Package and more recent household surveys from other U.S. urban areas which asked about walk and bicycle trips.

Pedestrian environment variables were developed and used in the mode choice models to reflect local differences in pedestrian friendliness through out the region. These zone level variables were developed by transportation professionals familiar with the region, including DVRPC staff. The pedestrian environment variable is a subjective index similar to what is used in a few other urban areas and considers sidewalk availability, ease of street crossings, and building setbacks.