

Travel Modeling 101

What is ridership estimation?

Ridership estimation, known as travel demand forecasting, is the process of projecting the level of ridership generated by and/or attracted to a proposed transportation project. These projections consider on the level of ridership the transit system or similar transportation project has had in the past and the historical travel behaviors of the region.

How is ridership estimated?

METRO and the Houston-Galveston Area Council (H-GAC) use a shared computer-based tool to forecast future usage of the highway and ridership on various transit services, such as local buses, commuter buses and light rail. This computer-based tool, also called a travel model is a mathematical representation of how travel occurs in this region today and how it will change in the future.



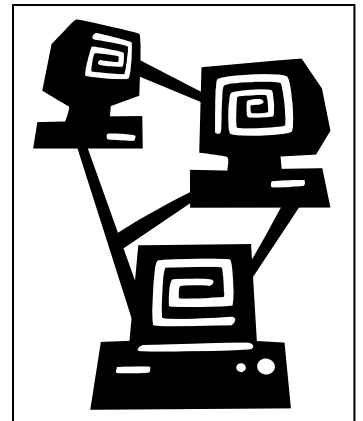
How does the travel model work?

The travel model has four major components and each component performs a certain type of calculation. All these components work together like a machine. The first two components determine:

- How many trips are produced in the region; and
- Where do these trips begin and where do people want to go.

The last two components determine:

- What percent of the total trips will be made using an automobile versus METRO's transit services;
- What transit routes will attract the most transit trips; and
- What highway routes will attract the most auto trips.



What type of information does the model need?

In order to estimate ridership, the model needs a large amount of data. Some of the important data are listed below:

- Where do people live?
- Where are the jobs?
- What is the average household income?
- How many autos does the average household have?
- What is the average number of persons in each household?
- How many schools, hospitals, shopping malls and other attractions are in the H-GAC eight-county region?
- What are the travel times and costs associated with auto travel versus transit travel?



The model needs this data not only for the **current year** but also for the future **forecast** year.

Are all these data produced by METRO?

No. The data for the first two components of the model are produced by the H-GAC. These data include population and employment forecasts, socio-economic data and land use data. H-GAC is also responsible for running the first two components of the model set, known as trip generation and trip distribution.

METRO handles the last two components, known as mode choice and trip assignment. METRO estimates the number of transit trips and determines what transit lines (local bus, express bus, commuter bus, rail) these trips will use.



What type of information can the model produce?

The model can:

- Estimate the number of boardings on buses and rail routes.
- Estimate how many passengers get to the transit system by walking or by driving to a park and ride lot.
- Estimate how many transit users transfer from one transit route to another.
- Forecast traffic volumes on the region's roadways.

- Estimate highway congestion and air pollution from all vehicles using the roadways (i.e. cars, trucks and buses).

How can models be used in Transit Planning?

Travel models can be used to analyze different transit alignments and technology options of a new service on the basis of projected ridership. For example, if you are exploring two technologies for a corridor, say **Bus** versus **Rail** on two different alignments, say **Oak Street** versus **Washington Street**, we can use the travel model to determine what the potential ridership would be for each of these options. Travel models are also used to estimate traffic congestion on streets and air pollution impacts from traffic. The travel models results are usually used as only one factor of the decision making criteria to determine the viability of a transportation project.

