

TRAVEL DEMAND MODELING AT SCTA

The Sonoma County Transportation

Authority (SCTA) uses a combination of digital databases, computer software, and scientific theory to replicate the real world transportation system (roads, intersections, traffic control devices, congestion delays, transit use, road capacity, speed limits) in the Authority's travel demand modeling program.

SCTA's travel demand model can be used to forecast future travel patterns and demands based on changes in the transportation system (new roads, changes in capacity, etc.), land use changes (changes in residential densities, or locations, new job sites, etc.), changing demographics (more or less people in a certain area).

DATA REQUIREMENTS

The two basic inputs for applying the travel demand models are:

- 1) Land use inputs, representing estimates of current and future development; and
- 2) Transportation inputs, including the current transportation network and planned changes (increases or decreases in capacity, new roads or highways, new transit lines) These inputs are housed in a countywide land use database called TRANSLAND, and are assembled and updated in conjunction with local jurisdictions.

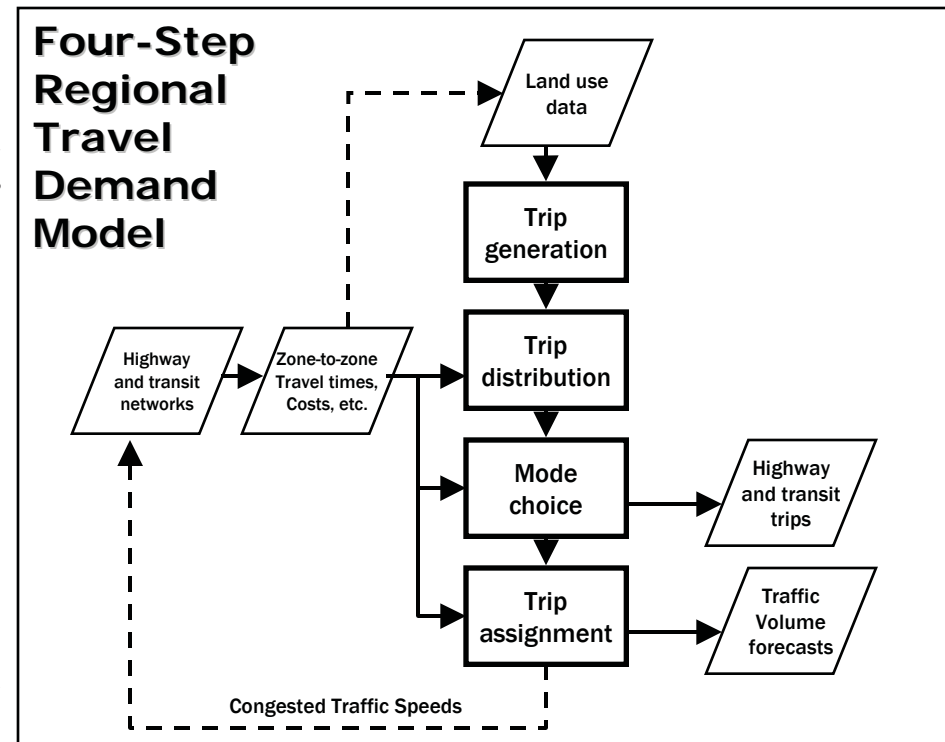
FOUR STEP PROCESS

SCTA uses the traditional, four-step travel demand model process to replicate and forecast countywide travel behavior. These four steps are: Trip Generation, Trip Distribution, Mode Choice, and Trip Assignment steps.

TRIP GENERATION: HOW MUCH TRAVEL?

Sonoma County is first divided into 400 traffic analysis zones (TAZ). A zone could be as small as a few city blocks in central Santa Rosa or as large as 100 square miles in rural areas. The travel demand model estimates the number of trips going to and from each zone. Trips are divided by purpose – work trips, shopping trips, etc. Each of these zones attracts and produces a certain number of trips based on the amount of residential and commercial development in the zone. Zones with high levels of residential development produce many trips, zones with high levels of commercial, office, or industrial development attract many trips.

The output of this step is a list of TAZs and the number of different types of trips produced by and attracted to each zone.



TRIP DISTRIBUTION: WHO GOES WHERE?

The trip distribution step allocates produced trips to the zones that they are attracted to. For example, after the model estimates the number of commute trips produced by a zone in Windsor, this step matches these produced trips to other zones around the region, such as zones in Santa Rosa or other regional employment centers. These linkages are called origin/destination pairs.

A Gravity model is used to determine where trips are distributed. The larger two zones are in terms of employment and/or population, and the closer they are in distance, the more trips will likely be generated between them.

This step produces an origin/destinations table, which is a matrix showing the number of trips moving between the different zones.

MODE CHOICE: HOW DO PEOPLE TRAVEL?

In the third step of the four-step modeling process the model uses observed travel mode usage rates to estimate which proportion of total trips made are made using different modes of transportation (drive alone, car-pool, transit, walk, bike, etc.)

The output of this step is a breakdown of what travel modes are being used for trips within the region.



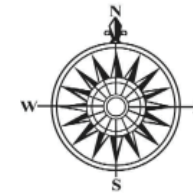
Travel Demand Represented as line thickness. This is a visual representation of the output of the Trip Assignment step.

TRIP ASSIGNMENT: WHAT ROUTES DO PEOPLE TAKE?

In the final step, the model selects the best path for travelers to take. The model assumes people will take the fastest route, avoiding traffic and congestion where possible. Each trip is examined and a best path is determined while minimizing the time and distance needed to travel from zone to zone. This final step of the travel demand process produces a “loaded network”, or a roadway network with attached travel/traffic demand for specific road sections (see Figure 2).

MODEL IMPROVEMENT

SCTA is committed to improving its travel demand modeling program, and as such continues to upgrade and improve the input data that is used in the model and the modeling assumptions and methodologies.



SCTA SONOMA
COUNTY
TRANSPORTATION
AUTHORITY

Keeping Sonoma County Moving

For more information call Chris Barney at the SCTA, 565-5373.