servicebureau

TRANSPORTATION MODELING
FACT SHEET

SERVICES

- » *Analysis of local traffic patterns*
- » *Transportation impacts of proposed developments*
- » *Assessment of alternative scenarios*
- » *Production of Regional Transportation Plan*

The SANDAG transportation model is a useful tool for both regional and local decision making. It covers the entire San Diego region and uses the latest adopted circulation elements and land use plans for each local jurisdiction. The transportation model is critical in developing the Regional Transportation Plan, which is the long-range transportation plan for addressing mobility challenges in the region. The SANDAG Service Bureau uses the model to evaluate transportation impacts of proposed developments or changes to the street, highway, or transit network.

Proposed projects can be tested using an existing or future scenario. Under existing conditions, a project-only forecast would add just the new trips from a project to the existing network. The travel patterns can be easily shown on a map of the street network. Similarly, a transportation link can be added, modified, or deleted from the existing network to evaluate its impact on the system. Future year forecasts assess cumulative conditions where the proposed project is added to the expected growth and network improvements up to the full development capacity of the general plan(s) in the area.

The travel forecast models are based on extensive travel behavior surveys and the amount of travel generated by different land uses (offices, residential areas, retail centers, etc.). Another important input to the transportation model is the forecasted socioeconomic variables from the SANDAG 30-year Regional Growth Forecast. Confidence in transportation projections is achieved by first calibrating the model to replicate existing conditions.

Methodology

Transportation models are designed to compute transportation system impacts such as traffic volumes, traffic speeds, and transit ridership for transportation network and policy alternatives. SANDAG follows a widely used four-step transportation modeling process of trip generation, trip distribution, mode choice, and assignment to forecast travel activity. The process includes running the model in multiple stages and combining it with additional input and output functions to complete the modeling chain.

A proprietary modeling software package called TransCAD is used by SANDAG as a framework for performing much of the computer processing involved with modeling. Arc/Info also is used extensively in the modeling process to maintain, process, and display transportation, land use, and demographic data. FORTRAN and Visual Basic programs have been constructed that link TransCAD and Arc/Info and perform other modeling functions such as trip generation and mode choice.

Model accuracy is assessed by comparing estimated traffic volumes generated by the base year transportation model with actual traffic counts. Adjustments are made to future transportation model results depending on the calibration error of the base year scenario.

(Continued on reverse)

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Traditional four steps

The transportation model is divided into four main steps:

Trip Generation

» The trip generation model works by applying trip rates to zone level growth forecasts. The model calculates each of the trip ends separately as trip productions and attractions. Trip production rates are expressed as trips per household and vary by trip type and structure type. Trip attractions are expressed as trips per acre of nonresidential land use or trips per household. Trip attraction rates vary by trip type and land use category.

Trip Distribution

» After trip generation, trip movements between zones are determined using a gravity model form of the trip distribution model. The model simulates trip patterns in response to new development and reflects shortened trip lengths near Smart Growth, mixed-use developments. The model also modifies trip patterns as new facilities are added.

Mode Choice

» At this point in the modeling process, total person trip movements between zones are split into different modes of travel such as auto, transit, or non-motorized means such as bicycling and walking. The mode choice model links mode use to demographic assumptions, highway network conditions, transit system configuration, land use alternatives, parking costs, transit fares, and auto operating costs. Trips between origins and destinations are allocated to modes based on the cost and time of traveling by a particular mode compared to the cost and time of traveling by other modes.

Highway Assignment

» The highway assignment model works by finding roads that provide the shortest travel impedance between origins and destinations. Highway impedances consider posted speed limits, signal delays, congestion delays, and costs. The model computes congestion delays for each segment based on the ratio of the traffic volume to roadway capacity. Motorists may choose different paths during peak hours when congestion can be heavy and off-peak hours when roadways are typically free flowing. For this reason, traffic is assigned separately in three time periods: morning peak, afternoon peak, and off-peak periods.