

## CMAP TRAVEL MODELS – A BRIEF OVERVIEW

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Every trip has an origin and a destination. The most common trip is from home-to-work. To make the trip, travelers invest time and money. Travelers try to reduce both.

By definition, a model is a synthetic representation of reality. It is an equation (or equations) representing human behavior. The CMAP Model has four main models: (1) Trip Generation, (2) Trip Distribution, (3) Mode Split, and (4) Trip Assignment. CMAP subdivides each model to create homogeneous groups based on variables such as trip purpose, household type, income, vehicle ownership and type, and access to transit.

There are three major work tasks before running the models.

1. Divide the region into Travel Analysis Zones. The region includes Cook, Lake, DuPage, Will, McHenry, Kane, Kendall Counties and part of Grundy County. There are 16,819 subzones for the Trip Generation Model and 1,944 Travel Analysis Zones for the remaining three models. Zones range in size from one-quarter square mile in downtown Chicago to 36 square miles in farmland areas.
2. Collect Population, Employment, and Land Use data for each zone.
3. Identify the centroid for each zone. A simplifying assumption is that everyone within a zone lives at the centroid and all employment occurs at the centroid.

**1. Trip Generation Model** – estimates the number of trips to each zone, from each zone, and the purpose of each trip.

**2. Trip Distribution Model** – estimate how many trips from each zone are going to every other zone.

**3. Mode Split Model** – divides trips into road trips and transit trips.

**4. Trip Assignment Model** – is two separate models (road trips and transit trips). Each Trip Assignment Model has a network consisting of links and nodes. In the road network, a link is a section of expressway or arterial roadway and a node is an intersection where a vehicle can change from one link to another. In the transit network, a link is a track or route that connects one station or stop to another. CMAP represents links in each network by a straight line, and nodes in each network by a circle. The Road Model ignores collector – distributor and local residential streets. The transit network includes CTA Rail, Metra Commuter Rail, and CTA and PACE bus routes.

### Air Quality Conformity Analysis

The Chicago Region is a nonattainment region for two pollutants: ozone and Fine Particulates (PM<sub>2.5</sub>). Federal law requires every nonattainment region to have a Statewide Implementation Plan (SIP) and do a conformity analysis for each major transportation project to ensure it will conform to the SIP. The Conformity Analysis includes an Emissions Model to estimate the level of pollutants emitted from motor vehicles. A Line Source Dispersion Model can estimate the level of pollutants at major receptors, such as schools and hospitals.