WHAT IS A TRANSPORTATION MODEL?

A model is simply a representation of a real object or process. Physical models are used to represent objects or structures; while mathematical models are used to represent established relationships which evolve from some process such as the interactions among speed, flow, and density in a traffic stream. Transportation models are mathematical rather than physical in nature. The use of a transportation model does not necessarily require a computer; however, models that describe complex relationships or multiple operations are usually easier to incorporate into a computer program than to calculate manually.

There are two general approaches to transportation modeling in engineering.

1. **The first is the empirical approach, in which answers to engineering questions are developed using actual measurements rather than mathematical simulations. For example, the traffic carrying capacity of a roadway has been addressed empirically to determine the effect of such factors as roadway width, parking, etc. Results similar to this have been incorporated into the "Highway Capacity Manual." The main advantage of the empirical approach is the credibility resulting from making direct measurements of a specific process under specific conditions. There is no need to rely on approximations or other factors that may reduce confidence in the validity of the solution to a given problem.**

2. **The second is the mathematical simulation approach, which makes use of available information on the process being studied to generate additional information, generally in the form of specific answers to specific questions. Compared to the empirical approach, mathematical simulation offers some important benefits in certain areas, especially when applied to complex problems which do not lend themselves to simple empirical analyses. The specific advantages include:**

   (a) **Cost:** it is usually possible to model a complex situation such as a moon landing at much lower expense;
   (b) **Safety:** computer specialists are seldom injured in the course of their duties;
   (c) **Speed:** many processes such as weather patterns can be simulated at many times their actual speed;
   (d) **Scope:** it is possible using computer modeling to examine hypothetical problems such as a proposed road or to develop future traffic volumes; and
   (e) **Controllability:** it is usually easier to constrain the parameters of a model; consequently, the effects of each parameter may be independently controlled.

All of these advantages are of some interest to the traffic engineer who is concerned with transportation systems that are costly to install, which may involve safety related problems, and/or which may require data analysis over long periods of time, often under hypothetical conditions.

A few popular transportation models are:

- **SOAP (Signal Operations Analysis Package)**
- **PASSER (Progression Analysis and Signal System Evaluation Routine)**
- **TRANSYT-7F (TRAffic Network StudY Tool)**
- **CORSIM (CORidor SIMulation Model)**
- **FSUTMS (Florida Standard Urban Transportation Model Structure)**