FORECASTING FUTURE TRAFFIC FLOWS

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The following are the considerations and their effects on forecasting future traffic flows

1. TRIP GENERATION

   This provides a measure of the rate at which trips both in and out of the zone in question are made. It predict the total number of trips produced by and attracted to its zone. Centres of residential development, where people live, generally produces the trip, centres of economic activity, where people work, are the end points of these trips. The greater the number of office, factory and shopping space existing within the zone, the more the journeys terminating within it. These trips are a two-way excursion with the return journey made, some later stage during the day. It is an innately difficult and complex task to predict when a trip would occur.

   This complexity arises from the different types of trips that can be undertaken by a car user during the course of the day (work, shopping, leisure etc.). The process of stratification attempts to simplify the process of predicting the number and type of trips made by a given zone. Trips are stratified by purpose, be it work, shopping or leisure or Time or by person to person and different types of trips have different characteristics that result in them being more likely to occur at different times of the day. The peak time for the journey to work is generally in the early morning. Shopping are most likely during the early evening, stratification by time, termed temporal aggregation, can also be used, where trip generation models predict the number trips per unit time frame during any given day. An alternative simplification procedure can involve considering the trip behavior of an entire household of travelers rather than each individual trip maker within it. Such an approach is justified by the homogeneous nature, in social and economic terms, of the members of a household within a given zone.

2. LAND USE MODELS

   The demand for movement or trip making is directly connected to the activities undertaken by people. These activities are reflected in both the distribution and type of land uses within a given area, by utilizing relationships between the present-day land uses and consequent movements in a given area, estimates of future movements given on land-use projections can be derived. The derivation of relationships between land uses and people movements is thus fundamental to an effective transport planning process.

Effects in Forecasting Future Traffic Flows;

A land use model will estimate the future development for each of the zones within the study area, with estimate relating not only to predictions regarding the different land uses but also to those socio-economic variables that form the basic data for trip generation, the first of the four-stage sequential models.

Input by experienced land-use planners is essential to the success of this phase.

The end product of the land-use forecasting process usually takes the form of a land-use plan where land-use stretching towards some agreed time horizon, usually between 5 and 25 years are agreed.

3. DEMAND MODELLING

It requires that all parameters determining the level of activity within a highway network must first be identified and then quantified so that the results output from the model has an acceptable level of accuracy.

One of the complicating factors in the modelling process is that, for a given trip emanating from a particular location, once a purpose has been established for making it, there are an enormous number of decisions relating to that trip, all of which must be considered and acted on simultaneously within the model

4. TRAFFIC DEMAND ANALYSIS

If transport planners wish to modify a highway network either by constructing a new roadway or by instituting a programme of traffic management improvements, any justification for their proposal will require them to be able to formulate some forecast of future traffic volumes along the critical links.

In the construction of a new roadway, knowledge of traffic volumes along a given link enables the equivalent number of standard axle loadings over its life span to be estimated This leads directly to the design of an allowable pavement thickness, and provides the basis for an appropriate geometric design for the road, leading to the selection of a sufficient number of standard width lanes in each direction to provide the desired level of service to the driver. Highway demand analysis thus endeavours to explain travel behavior within the area under scrutiny and, on the basis of this understanding, to predict the demand for the highway project or system of highway services produced.

5. TRAFFIC ASSIGNMENT

The process of allocating given set of trip interchanges to the specified transportation system is usually refered to as traffic assignment.Traffic assignment concerns the selection of routes (alternative called paths) between origins and destinations in transportation networks. It is the fourth step in the conventional transportation forecasting model, following trip generation, trip distribution, and mode choice. The fundamental aim of the traffic assignment process is to reproduce on the transportation system, the pattern of vehicular movements which would be observed when the travel demand represented by the trip matrix, or matrices ,to be assigned is satisfied. The major aims of traffic assignment procedures are:

1. To estimate the volume of traffic on the links of the network and possibly the turning movements at intersections.
2. To furnish estimates of travel costs between trip origins and destinations for use in trip distribution.
3. To obtain aggregate network measures, e.g. total vehicular flows, total distance covered by the vehicle, total system travel time.
4. To estimate zone-to-zone travel costs(times) for a given level of demand.
5. To obtain reasonable link flows and to identify heavily congested links.
6. To estimate the routes used between each origin to destination(O-D) pair.
7. To analyse which O-D pairs that uses a particular link or path.
8. To obtain turning movements for the design of future junctions.

6. TRIP DISTRIBUTIONS

Trip distribution (or destination choice or zonal interchange analysis) is the second component (after trip generation, but before mode choice and route assignment) in the traditional four-step transportation forecasting model. This step matches tripmakers' origins and destinations to develop a "trip table", a matrix that displays the number of trips going from each origin to each destination. Historically, this component has been the least developed component of the transportation planning model.

Work trip distribution is the way that travel demand models understand how people take jobs. There are trip distribution models for other (non-work) activities such as the choice of location for grocery shopping, which follow the same structure.

7. MODAL SPLIT

Modal Split is the percentage of travellers using a particular type of transportation or number of trips using said type. In freight transportation, this may be measured in mass. Modal spilt is the third stage of the travel demand modelling. The trip matrix generated from the problem is divided into number of matrices each representing a node.

Types of Modal Spilt Modals

1) Trip end modal spilt models

The application of mode choice models over the population results in trips split by mode, hence modal split modelling. In the past (especially in the USA) personal characteristics were considered to be the most important determinants of mode choice and attempts were made to apply modal split models immediately after trip generation. In this way the different characteristics of the individuals could be preserved and used to estimate modal split. At this level there was no indication to where these trips might go, the characteristics of the journey and modes were omitted from these models. This approach was consistent with a planning view that as income grew – individuals would acquire cars and would want to use them. These modal split models of this time related the choice of mode to features like income, residential density, car ownership and the availability of reasonable public transport. These trips in the short run were accurate, in particular if public transport is available in an area. These models were seen to be defeatist in that any changes to the cost of a trip or the mode used would have no effect on modal split according to these trip-end models.

2) Trip interchange modal9split models

Modal split modelling in Europe are post distribution models. These are models applied after the gravity or other distribution model. This approach has the benefit of facilitating the inclusion of the characteristics of the journey and the alternative modes available to undertake these trips. The early models typically included one or two characteristics of the journey (in vehicle travel time). One important limitation of these models is that they can only be used for trip matrices of travellers with a choice available to them. This would mean the matrix of car available persons, although modal split can also be applied to the choice between different public transport modes.

3) Aggregate and disaggregate models

Mode choice could be aggregate if they are based on zonal and inter-zonal information. They can be called disaggregate if they are based on household or individual data.