Example: Task 2.15 Role of WTSM (Wellington Transport Strategy Model) and Project Models

Objectives

WTSM's role in project applications is discussed in this section, and the first task is to define the potential range of applications. A provisional list is:

- roading infrastructure projects, with or without tolls;
- public transport infrastructure projects (here it is assumed that the focus is rail because of the difficulties in modelling local bus services);
- policy projects (ie the detailed assessment of implementation of policy measures).

This paper raises the issues and need for procedures, to stimulate discussion and ensure that the scope is correct, but it does not attempt to resolve them.

Principles

Recognising current practice in Wellington, the aim is to make the best use of WTSM in project appraisal and to base most project models directly on WTSM, thus reducing the cost and effort involved in developing the project model.

For infrastructure projects, it is generally expected that the project models will:

- differ from WTSM in having greater representational detail in the project corridor or study area (finer zones and network);
- be single mode (ie either road or public transport);
- make use of supplementary data (ie more locally-detailed planning data and additional travel data – counts and other surveys – designed to increase matrix accuracy in the area of interest).

In addition, there may need to be specific model refinements to deal with issues particular to the project, tolling being just one example.

Road Infrastructure Models

Basic Option

The simplest approach to project modelling with WTSM is the following:

- define the project corridor;
- refine the WTSM zone system and road network in the project corridor[1]; expect that some intersections will be specifically modelled;
- disaggregate[2] the WTSM base year trip matrix to the project zone system;
- go through some matrix tuning procedure to get the best fit to specially collected data;
- apply future year growth based on WTSM[3];
- do fixed matrix assignments etc.

[1] There will be an issue of whether to restrict the study area or include all of the region.
[2] It would be possible to develop procedures to assist with this.
[3] Again procedures could be developed to disaggregate WTSM forecasts.

Induced Traffic

We would need to consider how best to address induced travel:

- either through elasticities, possibly inferred from WTSM,
- or some application of WTSM.

In principle, both are feasible.

Road Tolls

Road tolls raise new issues:

- the impacts on routeing, and
- the impacts on the level of travel demand.

For routeing, we need:

- an appropriate range of values of time to apply to model the responses of different user groups to the tolls;
- to be able to separate the vehicle demand into various user groups (at least by purpose and vehicle type);
- while multiuser assignment procedures will then respond to the tolls, there may be a need for more sophisticated methods of sharing traffic between tolled and untolled options (using for example logit share models).

For the impacts on travel demand, the same issues apply as for induced travel, although there may be merit in giving consideration in the future to whether formal links between a multiuser project model and WTSM would be useful, so that the differential demand effects on different user groups could be forecast.

Public Transport Infrastructure Models

In principle, there are parallels with the road project models in terms of the use of the networks and travel patterns, especially as the collection of rail intercept survey for WTSM has substantially improved its trip matrices.

Multimodal issues are however much more important, with forecasts of decongestion relief and induced patronage being a key factor in project appraisal. Given the good data collection underlying WTSM, there would appear the possibility of creating a Wellington equivalent of the Auckland Public Transport Model (APT)[4] out of WTSM. However, against this, the quality of the WTSM bus data (and therefore matrices) is less good and this will affect public transport corridors presently not served by rail.

If we were to move forward in this area, the discussion suggests that:

- we would design an approach not unlike that for road projects,
- but with a greater emphasis on dealing with demand changes and impacts on other modes, perhaps drawing on the APT ideas and/or forming a closer link with the WTSM demand models (similar to what was done in London for 'Railplan"),
- and with greater attention being given to issues of supplementary data collection in bus corridors and the use of bus electronic ticket machine (ETM) data.

[4] A very geographically detailed public transport network model whose travel patterns were derived from intercept surveys.

Functional Requirements in WTSM

To provide the necessary data for use in project models the following functions are required within WTSM:

- base year land use data at mesh-block level so that smaller zone systems can be designed using the same data as the WTSM zones (these base year disaggregation factors would be applicable for future years);
- a process for extracting demand matrices for sub-areas (the EMME/2 traversal assignment process is suitable for this task);
- an ability to separate vehicle demand by purpose and vehicle type[5];
- an ability to separate public transport demand by purpose;
- a process for disaggregating demand matrices to smaller zones; a process similar to that used with the Auckland strategic model is proposed, using simplistic production/attraction models to disaggregate the trip ends to the smaller zones.

[5] The process used for this will depend on what bias correction factoring is applied to the all-vehicle matrices after each purpose is combined.