Department for Transport

Traffic Advisory Leaflet 8/95
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Traffic models for cycling

Introduction

Cycle routes should aim to improve the quality of a cycle trip, reduce the likelihood of being involved in a road traffic accident, and create the conditions in which more people will choose to cycle.

The quality and value of any route or network of routes will depend in part on the tools used, and expertise invested in, the scheme design. Traffic modelling can be an effective part of this process.

This leaflet summarises lessons learnt from a study carried out by Allott & Lomax Consulting Engineers for the Driver Information and Traffic Management Division of the Department of Transport. The work compared use of a conventional desktop and field study for identifying a cycle network, with the use of a cycle traffic modelling package. It then sought to explain differences in method and results. The cycle modelling package in this case was the Dutch package QUOVADIS-BIKE (QVB). The study focused on the development of routes in Ipswich.

Application

Both manual and modelling approaches identified a cycle network which focussed on the main radial roads converging on the town centre.

There are clearly implications for the applicability in the UK of a model based on assumptions relevant to the Dutch cycling culture. Chief amongst these will be the modal share of 29% currently observed in the Netherlands.

The detailed trip assumptions in the model initially predicated that 30% of trips in Ipswich would be undertaken by bicycle. This is greatly in excess of current trip patterns in Ipswich, where the modal share is currently 6-7%.

One sensitivity test attempted to take account of this by reducing the trip generation for shopping trips by half. This reduced the total number of trips by 13%, and consequently reduced the intensity of demand in some of the trip corridors.

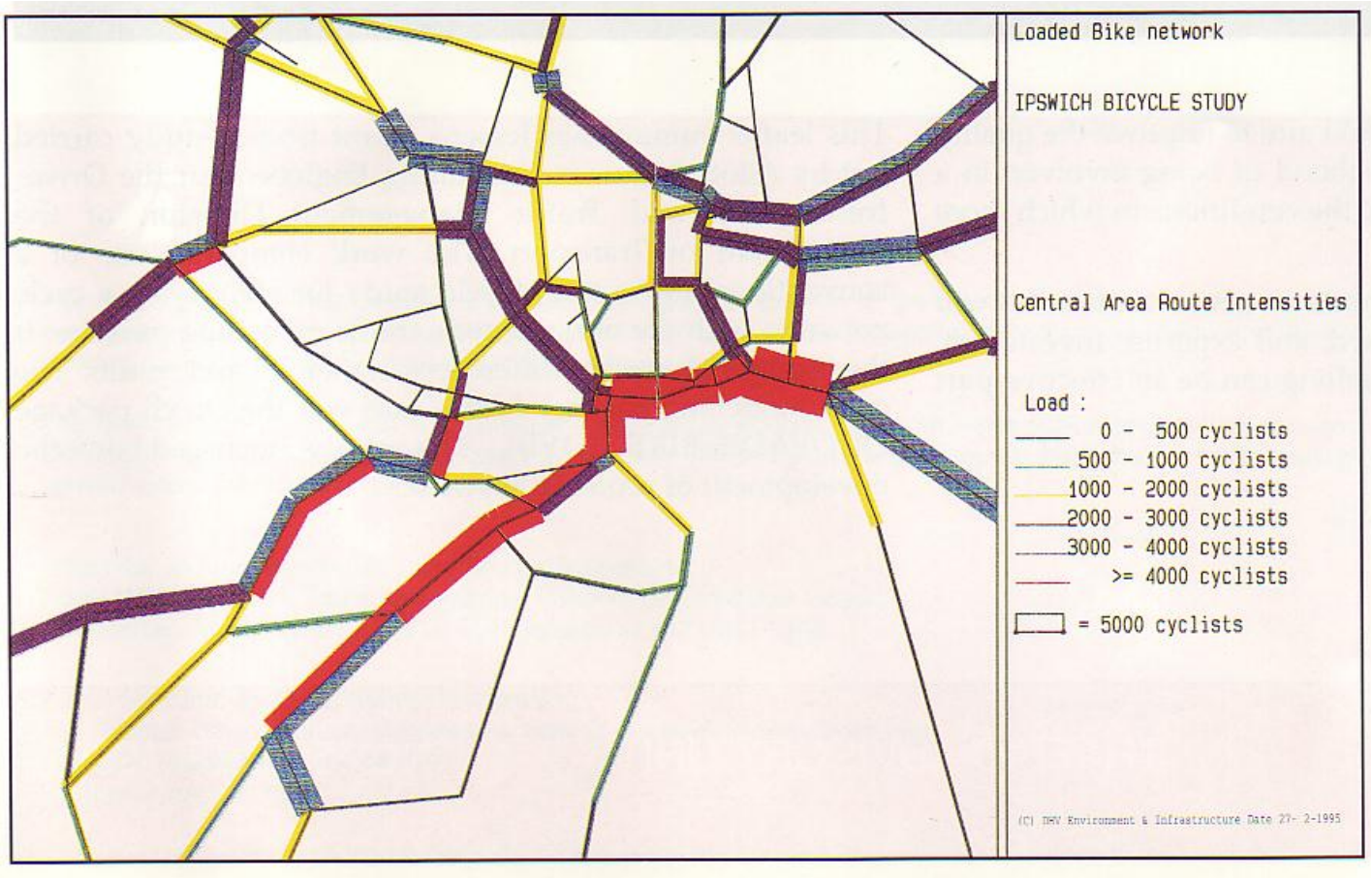
Another test sought to replicate observed patterns of cycle use in Ipswich, rather than estimate potential demand. A modal share of 10% of car journeys less than 7km was assumed. This resulted in a trip matrix containing 27% of the cycle trips which had been originally predicted by the model.

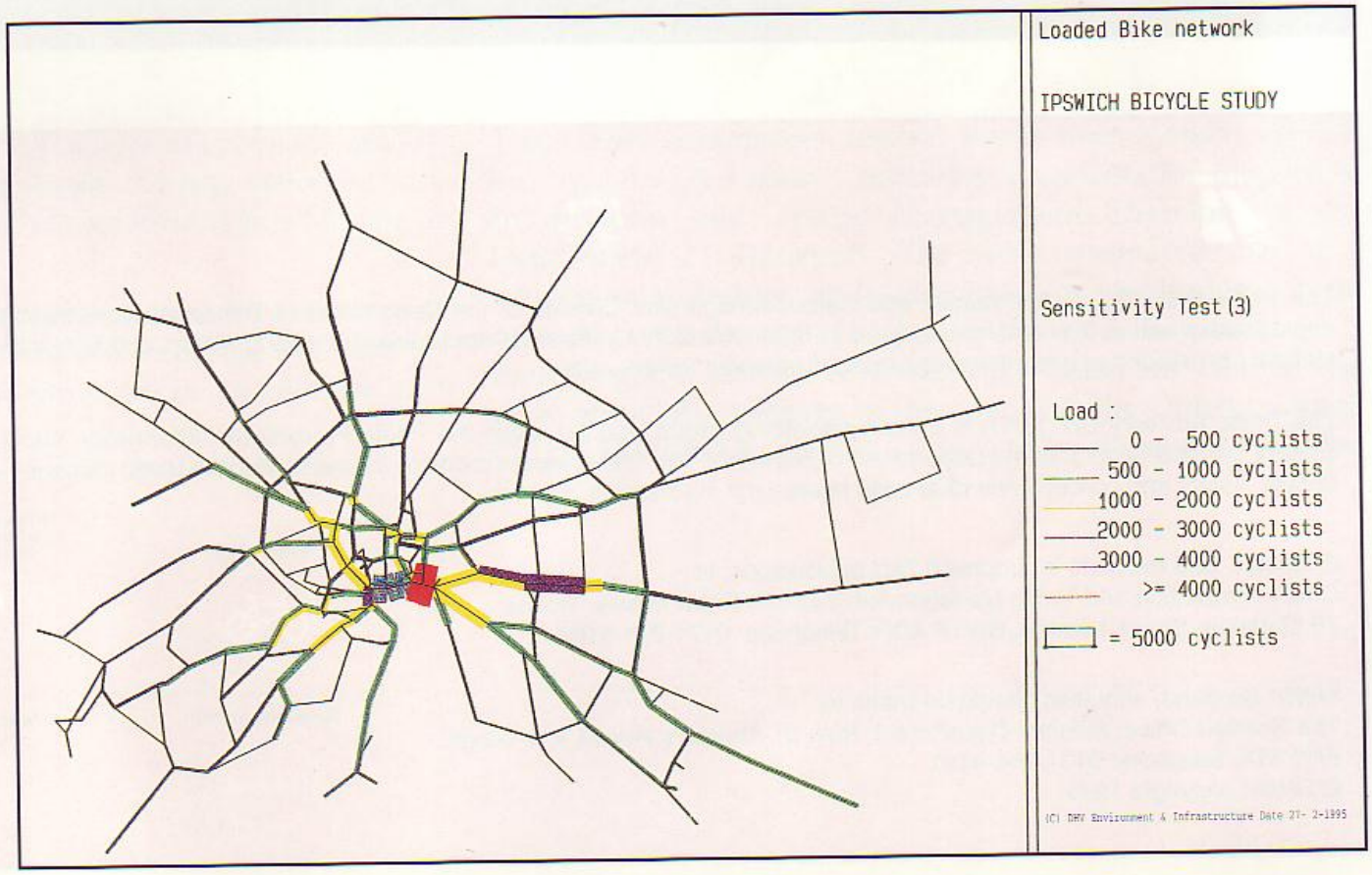
However, whilst overall cycle flows were lower, the particular routes identified as part of the cycle network remained broadly the same. This was the common conclusion from all the sensitivity tests.

Land Use Patterns

The complexity of model to be built will depend on the street layout and land use pattern in the local area. A radial street pattern with a dense urban fabric, and a single central area attracting a high proportion of trips, will result in a relatively straightforward model with flows concentrated on main roads into the centre. Features such as railway lines and rivers with limited crossing points will also serve to concentrate flows.

Where an area has attractive minor road alternatives for cyclists, or space available for off road facilities, a more complex model will be required. This situation is also likely to occur where there is a grid street pattern rather than a radial one; where a multi centred area is being modelled; and in other locations where the land use pattern is such that cyclists' flows are observed, or can be expected, to be more dispersed. In all these cases, information for additional links will need to be coded and input.





Methods

Manual Approach

Demand Identification:

* Collection of local traffic flow and accident data
* Reference to census information and the National Travel Survey
* Identification of cycle trip attractors and generators, and cyclists desire lines
* Consultation with local authority officers and groups representing local cyclists

Supply Identification:

* Inventory of existing facilities for cyclists
* Catalogue of speed limits, accident locations, road hierarchy, traffic calmed areas and other features in the road network relevant to determination of appropriate cycle routes
* Fieldwork to gauge both current conditions and the use made of existing facilities

Route Identification:

* Analysis and integration of demand and supply issues to draw up plan of cycle network

Modelling Approach

Demand Identification:

* Division of study area into zones.
* Input of socioeconomic data from census (or local source if available)
* Calculation of trip generation to and from each zone

Supply Identification:

* Input data on existing facilities for cyclists
* Input data on link lengths, junction types, vehicle speeds, accident locations, and other features in the road network relevant to developing cycle routes

Route Identification:

* Assignment of cycle trips to the network
* Use of sensitivity tests to assess variations in assumptions which can affect output

This approach will require input from, and cooperation between, staff with a background in traffic modelling, together with those having experience of the planning and design of cycling facilities.

Actual and Potential Demand

Routes along which the potential for additional cycle trips is greatest will not always be those where existing cycle flows are highest. The use of a cycle traffic model enables actual demand to be distinguished from potential demand, and the two to be compared. Reasons for any suppression of demand can then be sought and addressed.

Demand and Supply

Routes which appear from site investigation to be suitable for cycling, or along which conditions for cyclists could easily be improved, are not necessarily those which link cyclists' desired origins and destinations. The use of a cycle traffic model adds clarity by enabling demand and supply to be distinguished.

In determining the exact facilities to be implemented along a route, use of a model is not a substitute for analysis of a wide range of information, detailed fieldwork, and local consultation. A cycle traffic model can assist in the identification of routes, and provide valuable information to help determine the facilities to be implemented along these routes, but can not offer design solutions.

Link with Motor Vehicle Modelling

Development of a cycle model can be helped if it is possible to transfer data from an accurate and up to date car based traffic model. In areas where such a model is not readily available, a detailed survey and data collection exercise would be necessary to enable the cycle model to be built.

Methodological Framework

A cycle traffic model is most useful as a supplement to desk top study and field work, rather than as an alternative to it. A model enables some stages of work to be simplified, and improves analytical capabilities.

A model provides a useful framework, imposing a distinct and repeatable working discipline. It gives confidence in the final result by allowing assumptions to be varied and various options to be tested.

Assessment of Priorities

The model results provide a useful tool to assist in prioritising the schemes to be progressed. The exact form of prioritisation needs to be set within the context of the transport strategies and policies being pursued in a local area. If the priority is to encourage additional trips to be made by cycle, then the model aids the identification of those routes along which there is greatest latent demand. A different order of scheme implementation may become apparent where the priority is to improve the safety and comfort of existing cycle trips.

References

- Allott Transportation 1995: Computer Traffic Modelling as a Tool in Developing a Cycling Network
- Traffic Advisory Leaflet 3/95: Cycle Routes
- TRL Project Report 42: Cycle Routes

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