Traffic Solutions Constultancy Services

Case Study: Banbridge

Microsimulation with MOVA

Project Overview

In 2009 Siemens' Consultancy Services was commissioned by DRDNI Craigavon to carry out microsimulation modelling for three key junctions in the town centre of Banbridge, Northern Ireland.

The junctions are heavily congested in both peaks and lie on a main commuter route for the area. The locality of a large school and its associated morning drop off are major contributors to a morning queue regularly extending over half a mile.

The scope of the project was to assess the potential impact of applying MOVA control and various junction re-design scenarios at the three key junctions.

It was clear from the outset of the project that the solution had to be future proof and offer a real benefit to travellers by reducing queue times and providing good progression through the closely associated junctions.

The network to be modelled consisted of three closely associate signal junctions, these junctions are heavily interdependent and have heavy conflicting flows in both peak periods.

The site is constrained by the width of the Bann Bridge and the short lengths of the internal junction links.

The options tested included a 'do minimum' scenario with the introduction of linked MOVA signal control at each of the junctions and a 'do something' test including geometric junction changes.

For the latter, the proposals included an increase in the geometric capacity for the outbound right turn movement and the upgrade of the signals to MOVA control.

Data Collection

For this project the geography of the area made it cost effective to deploy an ANPR survey to collect flow data for the system. For closely associated junctions collecting the ANPR data gives a robust origin to destination matrix with the entry and exit points defined.

The sites have various crossing locations and the pedestrian movement in the area has a significant impact on the junction's operation. The crossings were included in the model coded with pedestrian flows from site surveys to give realistic pedestrian demand frequency.

For this small network the validation was performed using stopline counts for each of the signalled stoplines as well as comparison between measured and modelled journey times. An important part of the process was liaison with the client and demonstration of the model running so that the build up and dispersion of traffic could be assessed. With both the written evidence for the validation and the statistical comparison the model fitted the validation criteria and was passed as fit for use.

Linking to PCMOVA

To assess the network for MOVA linking a comparison of the proportion of traffic making each movement (by origin and destination) was made to look at the difference in distribution for the AM and PM peaks.

It was clear that the main flows were different between the peaks and this analysis allowed the construction of the MOVA linking elements to be specific in design to each of the periods.

An experienced Siemens MOVA engineer assessed the scheme merits and prepared the datasets and linking forms to link the S -Paramics model to PCMOVA. All of the pre-planning work is vital to setting up a successful MOVA site and a lot of the 'offline' work carried out in this stage of the modelling is directly transferable to the on street implementation.

With the model linked to PCMOVA the MOVA operation was validated against the modelled traffic flow. This ensured that MOVA was operating most efficiently in the model; all of the validation screens are accessible when using the link so that the engineer can view the messages and amend the validation.

Option Testing

As well as testing a MOVA scenario some network changes were also evaluated. These included making changes to the movements allowed from some approach lanes and also changing the central layout of the junction.

Both of these changes could be coded in S-Paramics to provide an immediate comparison between the schemes before any investment in on-site infrastructure.

The PCMOVA tool was again used to place these new layouts under adaptive control so the full benefit of any scheme could be recognised.

Results

The model showed that implementation of MOVA will provide an immediately reactive system giving a more effective response to changing traffic profiles in the peak and achieving better management of the long queues currently building up under existing CLF plans.

The model has demonstrated where journey time and queue length savings can be made on the most congested arms, but also demonstrates where giving these approaches more green time has an effect elsewhere in the network.

A full design and implementation package is likely to be rolled out later in 2011.

Contact Information

Siemens Mobility, Traffic Solutions
Sopers Lane
Poole
Dorset
BH17 7ER

Tel: 01202 782000
Email: brian.a.carpenter@siemens.com