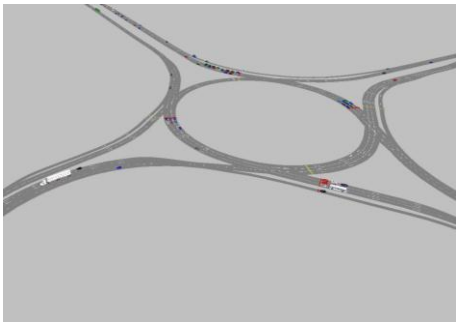
"I LIKE USING VISSIM BECAUSE IT ALLOWS YOU TO MODEL EVERYTHING IN DETAIL."

Spot on! In the early hours of May 21st 2012, the traffic lights were switched on at the Eelup Roundabout, making it the first signalised roundabout in Western Australia. What the public had only previously seen in a simulation was made reality. An essential part of the planning phase: the simulation software PTV Vissim.

Eelup Roundabout is on the northern route into Bunbury and links up four highways, with 40,000 vehicles passing through there every day. "Before the upgrade this roundabout was the State's worst black spot, which meant it had the highest accident rate of the whole state," recounts Graham Jacoby, Transport Modelling Analyst for Main Roads Western Australia. Even though most of the accidents were minor, the total cost added up to several million Australian dollars a year. "Signalisation of the roundabout was our main solution," confirms Graham Jacoby. This was a first for Western Australia, marking the debut of an approach already widespread in Europe.

MODELLING COMPLEXITY

On top of signalisation, modelling requirements were made more complex by the need to factor in additional lanes and slip lanes for left turns. "We needed a software package that could model in sufficient detail to show vehicle interactions as well as modelling complex signal logic," says Graham Jacoby. It was also important for Main Roads that the software was able to realistically model heavy vehicle behaviour. "In PTV Vissim we knew we'd found a tool that met all those requirements," states expert Graham Jacoby.



PROJECT OVERVIEW

- Project name: Signalising and expanding the Eelup Roundabout
- Purchaser: Main Roads Western Australia
- PTV Group's role: Software supplier
- Implementation period: 2 years (including construction)

To improve the capacity, Main Roads signalised the Eelup Roundabout. Before implementation this complex node was modelled in PTV Vissim.

TURNING TARGETS INTO RESULTS

First of all, Main Roads modelled the existing situation by collecting data on aspects such as turn movements and queue lengths, as well as by taking aerial photographs. A base model was then created using this information. "Next we developed different project cases," explains Graham Jacoby. "These involved signalisation as well as adding an extra circulating lane and slip lanes." Additional project cases were developed to test the impact of different cycle lengths and coordination with another set of signalised intersection nearby.

Main Roads also paid special attention to traffic-heavy periods such as the Easter break. Hosts of cars pass through the roundabout during this period as people travel south from Perth, the capital of Western Australia. According to the expert, "the simulation of our model also delivered great results here."

SIMULATING SIGNAL CONTROLS

Main Roads used the Vissim module VisVAP to programme the signal logic. VisVAP stands for visual vehicle actuated programming. This module provides traffic engineers with a library of commands for their flow logic and then translates these into code. During the simulation, VAP interprets the programme commands of the constructed flow logic and generates appropriate switching commands for the traffic signals. The flow logic itself is then represented as an easy-to-understand flowchart. The user can then follow the control logic step-by-step during the simulation, identifying and optimising any discrepancies.

"The great thing about the control logic and cycle times that we modelled using PTV Vissim, was that we could use them outside of the final signalisation project," says Graham Jacoby. "The simulations were also extremely useful for showcasing the project and showing the general public how the signalised roundabout would operate. This really helped us to win public support for the project."

SATISFACTION ALL ROUND

Meeting high expectations: "The signalised roundabout has been in operation since 2012. This means we have been able to validate the model's results against the real-life outcomes," announces Graham Jacoby. "And as the model predicted, queue lengths and delays have improved dramatically. Queues that used to stretch back for whole kilometres every morning are now a thing of the past."

The number of accidents has been significantly reduced too: where there were approximately 150 accidents per year before the upgrade, there are now less than 50. "The resulting crash cost savings at the roundabout are around two million Australian Dollars per year," says Graham Jacoby. ■

The Eelup roundabout before...

... and after the upgrade.

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