

Case Study Project: Roundabout Treatments

Managing user priorities and rationing capacity at roundabouts

Overview

Roundabouts can offer significant benefits to traffic flow. As a form of unsignalised intersection control they can minimise delays through the self-regulation of capacity and can improve road safety outcomes for vehicles through more forgiving deflection angles.

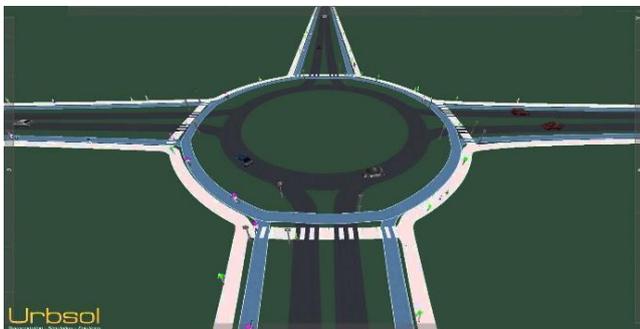
This efficiency however can mean movement of other road users such as cyclists and pedestrians is compromised or if unbalanced flow conditions manifest themselves that the equity of capacity among vehicles is no longer optimum.

The Study

This case study considers two possible treatments at these locations inspired largely by Dutch experience with the application of roundabout treatments:

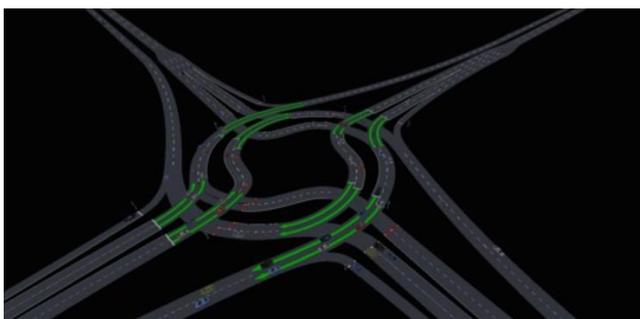
- o The "Dutch Style" cyclist roundabout
- o The signalised Turbo roundabout

The "Dutch Style" cyclist roundabout looks to move the potential vehicle/cyclist/pedestrian conflict point away from the entry and exit legs of the roundabout meaning vehicles can independently judge conflicts with vulnerable road users separate to vehicle - vehicle conflicts.



"Dutch Style" cyclist roundabout

The signalised Turbo roundabout implements internal geometric treatments that essentially segregate vehicle flows in the circulating lanes – this example also includes a signalised treatment.

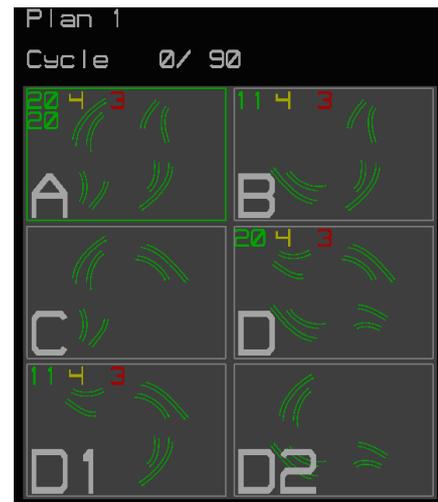


Signalised Turbo roundabout

Simulation

Urbsol used the nanosimulation software developed by Azalient, Commuter, to assess the effectiveness of the designs and identify potential operational issues and to increase awareness of alternative roundabout treatments.

The simulator proved indispensable for modelling both design alternatives, highlighting unique operational considerations and benefits.



Signal phasing options for the Turbo Roundabout

Commuter was chosen as the most suitable tool for this task for a number of reasons:

- o Spatially aware agent modelling
- o Cyclist simulation abilities
- o Realistic traffic signal emulation
- o Ability to emulate priority rules and agent behaviour/awareness at conflict points

The analysis has shown a number of treatment options for roundabouts that can:

- o Better manage user conflicts and improve road safety outcomes for all users
- o Better segregate vehicle movements through the system to effectively eliminate potential vehicle conflicts within the circulating lanes
- o Regulate vehicle flow to better ration scarce capacity through signalisation treatments

Considering performance from the user as opposed to vehicle perspective also means priorities can be set to optimise overall system operation.

Examples of the simulation models can be viewed [here](#) and [here](#).