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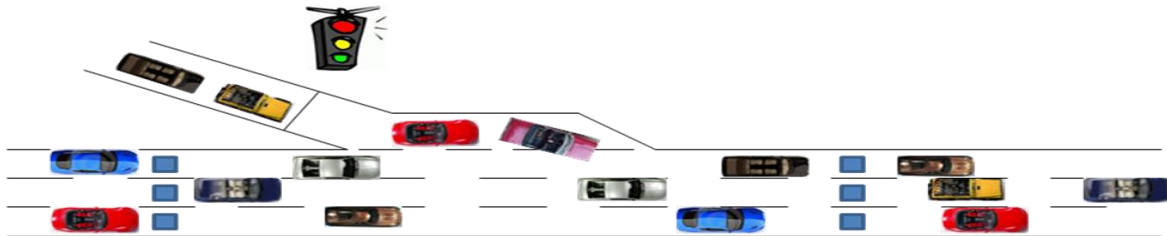
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Modelling Ramp Metering at Motorway Merges

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Abstract

Traffic congestion has increased rapidly in the past decades mainly due to a sharp increase in vehicles using the road networks. Recently, and to deal with motorway congestion, traffic signal devices (ramp metering) installed on motorway entrances were increasingly being applied on a part-time basis to regulate the entering traffic aiming at reducing congestion. However, there are still some questions which this research project is trying to address for justifying the use of ramp metering systems.



Questions to be addressed

- the effectiveness of ramp metering in reducing spill-backs on motorway and slip-road sections in congested conditions;
- the optimum positioning of traffic signals and motorway detectors;
- the effect of slip-road (ramp) length;
- the optimum algorithm for traffic signals timings; and finally
- the limits of the parameters used in triggering the ramp metering signals, such as occupancy, flow and speeds.

Methodology

In order to answer the above questions, it is obvious that conducting on-site trials will need extensive time and funding resources. Therefore, the use of micro-simulation models would be more appropriate as a tool in this research to evaluate the effects on delay and reduced road capacity for different conditions. A micro-simulation model has been developed for this purpose here at Salford. The model deals with general as well as more specific drivers' behavioural tasks such as their cooperative nature when they allow others to merge either by decelerating or shifting to other lanes. The developed model has been calibrated and validated using different sets of available electronic and videos data recordings. At this stage, the results from the process of applying the model to answer the above questions are under consideration.