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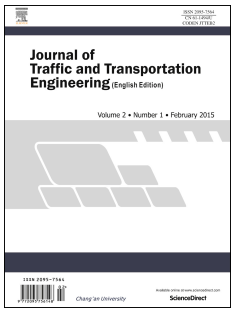

Estimation of vehicle queuing lengths at metering roundabouts

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Original research paper

Estimation of vehicle queuing lengths at metering roundabouts

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Highlights

- The inventive numerical model developed for queuing length estimation can predict queuing length on each approach at a metering roundabout.
- The numerical model can define the relationships between queuing length, detector location and signal phase time.
- The popular microscopic simulation model, AIMSUN, was introduced and used for network modeling and calibration methods applicable to metering roundabouts.

Abstract

Signalized metering roundabouts are equipped with advanced loop detectors and traffic signals that can reduce vehicle queuing lengths, especially on the dominant approach, when unbalanced traffic flow conditions occur. At a metering roundabout, changeable queuing lengths and the location of detectors determine signal phase times, which in turn affect queuing length on each approach. To date, most studies have focused on performance comparisons between normal and metered roundabouts, but have failed to evaluate the effect of detector locations on queuing formations. In addition, no guidelines have been developed to enable practitioners to select the appropriate detector location that would lead to optimum roundabout performance. This study, therefore, formulated a numerical model for the estimation of queuing length at a metering roundabout. The model consists of

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