

Impact of Signalized Pedestrian Crossings near Un-Signalized Intersections

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Abstract

Intersection control is the major function of the traffic flow. Its values increase when traffic flow becomes more severe. However, road authorities use some ad hoc methods to control intersections to reduce costs. Signalized pedestrian crossings near unsignalized intersections are one of the methods used by road authorities to control the intersection. This kind of arrangement can be found in Colombo and its suburbs. Some of the major issues observed at signalized pedestrian crossings near un-signalized intersections are as follows: Drivers coming from a by-road could not see the main road signal indications; vehicles from by-roads have to stop in the middle of the road due to vehicles queuing up in the merging lanes. In addition to the above, some other issues related to pedestrian signal operation are also identified. In situations where a push-button system for pedestrians is available, a significant delay for motorists can be experienced when the pedestrian flow is high. It creates delays and results in long queues. Though there are advantages with respect to pedestrian safety and partial control of intersections, some of the abovementioned issues result in many disadvantages as well. Therefore, this study aimed to evaluate the effectiveness of signalized pedestrian crossings near unsignalized intersections on both traffic and pedestrian movements. Five different intersection and signal arrangements are identified, covering four-way and three-way intersections, and issues related to each arrangement were identified based on the existing literature. A total of ten locations on Galle Road (A02) and Colombo Horana Road (B84) were selected for the analysis process. Geometric data of the intersection, manual and/or vision-based vehicle and pedestrian counts and queue lengths and details about the pedestrian phasing are collected during the data collection. Queue lengths and vehicle delay times, and safety considerations were analyzed to evaluate the effectiveness. These analysis results are to be validated using the open-source microsimulation software SUMO. It is found that it is better to go for a fully signalized intersection control for situations where pedestrian crossings are to be located on both sides of the minor road(s). For three-way junctions with single pedestrian crossings, it is better to locate the crossing at least 20 m from the intersection.

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