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## Pedestrian-vehicular interactions in a mixed street environment

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### Abstract

In this study, we develop a methodology to analyze pedestrian-vehicular interactions in urban streets in a mixed environment, and then apply it to Bliss Street, an urban street adjacent to the American University of Beirut (AUB). Data on the street was collected before and after a crosswalk was installed using videography, radar speed guns, surveys, and manual counts. Initial investigations indicated that installing the crosswalk resulted in significant reductions in pedestrian waiting times and in the speeds of approaching vehicles. The data was also used to model pedestrian gap acceptance and examined how the crossing maneuvers were undertaken (whether a pedestrian waited for a suitable gap or forced a crossing thus delaying the traffic stream). The model indicated that installing the crosswalk did not have any significant effect on the pedestrians' sensitivity to factors including waiting time, gap size, or the speed of the approaching vehicles. However, it caused reductions in the speed of approaching vehicles which in turn encouraged pedestrians to accept shorter gaps. Moreover, a micro-simulation model was used in order to test the effect of the crosswalk on vehicular speed and delay for a mixed street environment similar to that of Bliss street and indicated that the crosswalk would reduce the speed on the street slightly, and thus it will have a minimal effect on motorized traffic. However, significant reductions in vehicular speed might be observed if more pedestrians who currently cross at mid-block locations shift to use the crosswalk. The results of this study can be used to explore and test interventions for enhancing pedestrian safety in Lebanon, and are generalizable for similar contexts in developing countries characterized by mixed traffic conditions, inadequate infrastructure, minimal enforcement, and poor compliance with traffic laws.

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