Project Title: Safe and Efficient Pedestrian Accommodation at Coordinated Signalized Intersections

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Abstract:
Pedestrian injury and fatality rates in Nevada’s urban areas are among the highest in the nation, and the majority of pedestrian accidents occur at signalized intersections. Increasing mobility and safety for pedestrians has been a major initiative, particularly in light of recent federal focus on the Americans with Disability Act (ADA). The Manual on Uniform Traffic Control Devices (MUTCD) has adopted a new standard for determining pedestrian clearance times when crossing signalized intersections, where pedestrian walking speed is decreased from previously adopted 4 feet per second to 3.5 feet per second. This revised standard will yield longer pedestrian crossing intervals, which can negatively affect signal system efficiency and increase congestion. Therefore, the intent of providing pedestrian safety may be compromised by increased driver frustration and vehicle collision hazards. The impact could be more dramatic for coordinated signal systems where a choice must be made among two pedestrian handling alternatives: accommodating pedestrian timing (e.g., using a longer cycle length) or not while developing coordinated signal timing plans. These two alternatives affect coordinated signal systems in different ways. When pedestrian timing is accommodated, longer cycle length is generally needed. A longer cycle length results in longer delays under low volume conditions. On the other hand, when pedestrian timing is not accommodated due to use of a shorter cycle length, disruption to coordination can occur if a pedestrian crossing causes a signal going into transition. In order to achieve optimal system performance, the conditions when one alternative is preferred than the other must be clearly identified, based on which guidelines can be developed for practicing signal engineers. Currently, such guidelines do not exist in published literature.
The primary objectives are: (1) to address how pedestrian volume levels and pedestrian timing affect signal transition and efficiency; (2) to address how cycle length affect vehicle delay and driver perception in a context of coordinated operation; and (3) to develop guidelines for selecting the appropriate pedestrian timing alternative for best system performance.