Right-turn Traffic Volume Adjustment in Traffic Signal Warrant Analysis

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Abstract:

Right-turn traffic does not affect intersection performance in the same magnitude as through or left-turn traffic. Therefore, it is necessary to apply an adjustment to the right-turn volume when conducting signal warrant analysis. Without any reduction, an intersection with heavy right-turn volume might mislead the signal warrant analysis result, and could make a difference in whether a signal is deemed warranted or not.

This research involved development of a guideline for determining the amount of reduction for right-turn traffic while performing signal warrant analysis. The proposed guideline was based on the delay equivalent relationship between right-turn and through traffic, i.e., the right-turn volume that is equivalent to a number of through vehicles, which would produce the same control delay on the minor street. The equivalent factor was defined as the measurement of the reduction of right turns. Because equivalent factors were calculated based on delay, it incorporated major impact factors of the right-turn and through traffic inherently, such as conflicting flow rates, capacity, critical headways, follow-up headways, and pedestrian crossing impact. Case studies were also conducted to demonstrate the applicability of the proposed guideline.