

Saturation Flow Rates at Signalized Intersections with High Pedestrian Volumes

Abstract

The ITE Student Chapter at Portland State University collected saturation flow rates at signalized intersections with high pedestrian traffic in the Portland, Oregon metropolitan area to determine the influence of pedestrians on saturation flow rates. The *Highway Capacity Manual 2000* defines the saturation flow rate to be the hourly rate per lane at which vehicles can pass through a signalized intersection per hour of green indication. The HCM currently recommends an ideal saturation flow rate of 1,900 passenger cars per lane (pcpl). Many conditions have been identified that influence this ideal rate including pedestrian activity, lane width, transit activity, and traffic composition.

Analysis of the data reveals that pedestrians reduced the through capacity of a shared right turn lane by approximately 300 pcpl per hour of green indication. This value was measured by starting a stopwatch when the front axle of the 4th vehicle in the queue crossed the stop-bar and stopping a stopwatch when the front axle of the last vehicle in the queue crossed the stop-bar. Saturation flow rate measurements were only taken when one of the observed vehicles was required to yield to a crossing pedestrian. Additionally, it was found that pedestrians generally only affected the first three vehicles in the queue. The average flow rate for the first three vehicles beginning at the start of green was measured to be 953 pcpl per hour of green indication.

The results of this data collection did not capture the findings that were anticipated. Due to lack of measurements, the influence of pedestrian activity on saturation flow rates was not estimated. It is concluded that additional research and data collection should take place to estimate the true impacts of pedestrians on saturation flow rates and in particular, intersection capacity. Finally, it was found pedestrian influence on start up times should also have been measured.