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Variability in Saturation Flow and Traffic Performance at Urban Signalized Intersection

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Abstract : At signalized intersections with heterogeneous traffic, the percentage share of different vehicle categories have a bearing on the inter-vehicle space utilization, which eventually impacts the saturation flow. This paper analyzed the impact of the percentage share of various vehicle categories in the traffic stream on the saturation flow at signalized intersections by video graphing major intersections with varying geometry in Kerala, India. It was found that as the percentage share of two-wheelers increases, the saturation flow at signalized intersections increases and vice-versa for the percentage share of cars. The effect of bus blockage and parking maneuvers on the saturation flow were also studied. As the distance of bus blockage increases from the stop line, the effect on the saturation flow decreases, while with more buses stopping at the same bus stop, the saturation flow reduces further. The study revealed that with higher kerbside parking maneuvers on the upstream, the saturation flow reduces, and with an increase in the distance of the parking maneuver from the stop line, the effect on the saturation flow decreases. The adjustment factors for bus blockage due to bus stops within 75m downstream and parking maneuvers within 75m upstream of the intersection have been established for mixed traffic conditions. These adjustment factors could empower the urban planners, enforcement personnel and decision-makers to estimate the reduction in the capacity of signalized intersections for suggesting improvements in the form of parking restrictions/ bus stop relocation for existing intersections or make design changes for planned intersections.

Keywords : signalized intersection, saturation flow, adjustment factors, capacity
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