2. Person-based evaluation of Transit Preferential Treatments (TPTs)


Transit Preferential Treatments (TPTs)

Space Priority Strategies

Time Priority Strategies

Source: www.ottawa.ca

Source: www.mta.info


Source: www.tc.umn.edu
Research Objective

- Given the lack of a comprehensive person-based evaluation of TPTs:
  - Develop an analytical model to investigate the impact of TPTs on person delay and person discharge flow when implemented individually and in combination at signalized intersections
Analytical Model

- **Assumptions:**
  - The analytical model accounts only for uniform delay
  - Traffic operations follow the kinematic wave theory
  - There is no platoon dispersion

- **ITS Technologies needed for real-world implementation:**
  - Automated Vehicle Location (AVL) Systems

Source: www.tc.umn.edu
Analytical Model

(a) Delay illustration for platooned autos

(b) Delay illustration for bus b
Phase Extension

Distance

Bus Stop

Bus Stop

Bus Trajectory

Time
Phase Extension

Distance

Time

Bus Trajectory

Bus Stop

Phase Extension

Bus Stop
Phase Extension

- Bus detectors upstream intersection
- TSP is activated when a bus can pass the intersection by 10 seconds green extension
Queue Jumper Lane

Time-space diagram illustrating bus utilizing the queue jumper lane.
Queue Jumper Lane

Time-space diagram illustrating bus not utilizing the queue jumper lane.
Test Site: Four-intersection segment of San Pablo Avenue
Results: Percent Change in Person Delay

Analytical and Simulation Tests Results for the % Change in Person Delay of San Pablo Avenue Northbound Direction at the Intersection with Gilman Street
Results: Person & Vehicle Discharge Flow Rate

Analytical and Simulation Tests Results for the Person Discharge Flow of San Pablo Avenue Northbound Direction at the Intersection with Gilman Street
Findings

- The analytical model can be used to assess preferential treatments for various traffic volumes, bus frequencies, and signal timings.
- The proposed analytical model can be used to quantitatively assess the impact of space and time preferential treatments on person delay and person discharge flow.