Research Summary

Accessible Bus Stop Design in the Presence of Bike Lanes

Research Need

Floating bus stops are located adjacent to separated bike lanes of other bike lane configurations to avoid bus-bike conflicts during boarding and alighting of transit passengers, especially when bicyclist volumes are high. However, floating bus stops require transit riders to cross an active bike lane to access the bus boarding area, increasing the likelihood of bicyclist-rider conflicts, impacting the accessibility and safety of riders with visual, hearing, or mobility impairments.



Goals/Objectives

The goal of this project is to obtain a better understanding of the impacts of bicycle infrastructure on transit user safety (e.g., conflicts between bicyclists traveling on adjacent bike lanes and transit riders), on bus stop accessibility and the exploration of mitigation plans and designs that will ensure an accessible, equitable, and safe travel experience for all riders.

The objectives of this project are to:

1) investigate bus rider and bicyclist behavior and interactions when bicycle infrastructure is adjacent to floating bus stops, and

2) propose design improvements and guidance to mitigate conflicts between bus riders of all abilities and bicyclists.

Methodology

1. Review of relevant publications including research papers and guidebooks

2. Community outreach focus groups with transit riders from the disability community

3. Professional community input thourgh professional listserv emailing and interviews with city officials and professionals to document their practices and lessons learned

4. Detailed design characteristics inventory of floating bus stops in the MBTA service area

5. Behavioral analysis of left-turning bicyclists using trajectory data from LiDAR scans and manual observations from video recordings.

6. Recommendations on the design of floating bus stops

Key Findings

- Full-width platform bus stops are the preferred design for floating bus stops.
- Horizontal curves and fencing do not impact bicyclist speeds.
- Fencing encourages crosswalk use, limits the duration of pedestrians walking along the bike lane, and restricts potential for bicyclists to veer off to the sidewalk; however they do not prevent riders from walking along the bike lane.

Use of Findings

This study resulted in the following recommendations:

o Narrow or divert bike lanes to convert partial-width to full-width platform bus stops and relocate shelters on the platform.
o Implement fencing for physical separation, to manage platform access, encourage crosswalk use, and improve situational awareness.
o Ensure sufficient space on the platform for ramp implementation and navigation of mobility-assisting devices.
o Implement horizontal or vertical curves at bike lanes to improve situational awareness.
o Implement regulations and signage/markings to manage bicyclist speeds and yielding/stopping behavior.
o Align crosswalk and boarding areas, equipped with tactile pavement, install fencing and octagon-shaped flexposts or secondary bus stop sign poles for wayfinding.
o Place bus stop sign poles close to the shelter or bus door.
o Use the developed step-by-step assessment to provide recommendations for existing bus stop improvements.
o Pay attention to the LiDAR sensor selection,

Project Information

This project was completed as part of the Massachusetts Department of Transportation (MassDOT) Research Program with funding from Federal Highway Administration (FHWA) State Planning and Research (SPR) funds.

Principal Investigators:
Dr. E. Christofa, Dr. C. Ai, Dr. P. Furth
Performing Organization:
UMass Amherst
Project Champion:
Martha Koch
Project Start Date:
2/15/2023
Project Completion Date:
8/31/2024
MassDOT Research Project Number:
121272
Key Words:
Bike Lanes, Bus Stops, Accessibility.

Research and Technology Transfer Section
MassDOT Office of Transportation Planning
Planning.Research@dot.state.ma.us

massDOT
Massachusetts Department of Transportation