Impacts of Growing Non-Motorized Infrastructure on Freight Operations and Accessibility

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Project Motivation:

- In recent years, New York City’s urban streets have undergone rapid redesign, with widespread implementation of pedestrian-friendly intersection designs, tremendous growth of on-street bicycle infrastructure, installation of dedicated bus lanes, and introduction of a bicycle share network with more than 500 stations.
- These changes have resulted in new accessibility challenges for commercial vehicles (CVs), including lost parking and travel lane capacity and increased interactions with non-motorized travelers; however, these impacts have not been well quantified.

Project Goals:

- To provide basic quantitative evidence of truck route impacts and of commercial vehicle—bicycle interactions on New York City’s recently redesigned urban street network through visualization and basic statistical analysis of NYC open datasets (see Figure 1).
- To identify data needs and potential approaches for future research to better quantify resulting impacts for goods movement.

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Analysis Method:

Network Overlap

- Evaluate the extent of overlap between the city’s designated bicycle and local truck routes to better understand the truck route mileage affected by bicycle lane implementations.

Collision Locations

- Examine locations of NYPD Collisions involving bicycles to identify their spatial distribution and the extent to which they occur on truck routes.
- Conduct difference of medians tests to identify freight demand-related predictors of CV-bicycle collision locations.

Parking Conflicts

- Map locations of parking violations for CVs “stopping, standing or parking within a marked bicycle lane” to identify critical conflict areas.
- Conduct field observations in three locations in Manhattan and the Bronx to examine the factors impacting driver decisions to park in the bicycle lane.

Figure 1. Data Inputs

Figure 2. Network Overlap in Lower Manhattan
**Results:**

- Approximately 89 miles of bicycle lane network overlaps the city’s 794 mile local truck network.
- About two-thirds of bike lanes installed on the truck network were installed after 2000.
- The majority of bicycle network implementations on the truck route network are lane types that require moderate to high allocation of dedicated space for bicycle use; more than 10 percent of all mileage installed on truck routes (and more than 12 percent installed since 2000) includes protected lanes.

**Areas of Future Research Need:**

- Urban street level data collection of commercial vehicle and bicycle volumes.
- Detailed accident causality on specific types of bicycle infrastructure (particularly protected lanes).
- Network level impacts of reduced lane capacities, and related costs to industry and the surrounding area.
- Parking strategies appropriate for implementation on multimodal streets that better take into consideration differences in behavior of specific types of operators.

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