Research Recap

Mobility21
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Analysis of the Potential for Micromobility to Replace Short Car Trips in Urban Areas And Impacts on Congestion

Purpose: To develop a methodology for estimating the upper bound number of short-distance personally owned vehicles trips that could be replaced by micromobility – shared bikes, e-bikes and e-scooters – choices to provide first-and last-mile solutions for underserved public transit riders.

Approach: This paper focuses on assessing traffic impacts in Seattle, WA. The methods used by the team has two main components: 1) data analysis and 2) traffic simulation. The goal of the analysis is to estimate the upper bound number of private vehicle trips that could be replaced by micromobility when considering trip (e.g., trip purpose), person (e.g., age), and weather (e.g., precipitation) limitations. Various scenarios where a proportion of private vehicle trips were replaced with micromobility modes were incorporated into a static traffic assignment model and compared to base case traffic conditions.


Photo by Uche Chilaka on Unsplash

Key Findings: The team found that at the upper bound micromobility penetration rate the number of:

- *non-congested links increased about 4%*
- *severely and moderately congested links decreased by over 20%*
- *mildly congested links decreased by about 11%*

Results indicate that replacing short private vehicle trips with micromobility could significantly reduce congestion but the impacts to energy use and emissions are disproportionately low and other measures (e.g., vehicle electrification) are needed to meet climate change emissions targets.

Conclusion: For cities to meet climate change emission targets, measures beyond private vehicle trip reduction with micromobility are needed, such as:

1. Expanding commuter transit options
2. Electrification of light-duty vehicles, trucks and buses
3. Increasing the number of e-commerce deliveries done by cargo bikes

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Project Record:

- https://ppms.cit.cmu.edu/projects/detail/310

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