

0-6927: Evaluation of Bicycle and Pedestrian Monitoring Equipment to Establish Collection Database and Methodologies for Estimating Non-motorized Transportation

Background

The Texas Department of Transportation (TxDOT) currently has very limited count data on pedestrian and bicyclist usage of the transportation system. This lack of pedestrian and bicyclist count data affects transportation decision-making, including planning, design, and safe traffic operations.

The first objective of this research project was to recommend a count-monitoring process for pedestrians and bicyclists that can be sustained statewide. The second objective was to develop a consolidated database of pedestrian and bicyclist counts using data from the two pilot locations, along with readily available pedestrian and bicyclist count data from other locations.

What the Researchers Did

Texas A&M Transportation Institute (TTI) researchers worked with staff from TxDOT, metropolitan planning organizations (MPOs), and the Cities of Austin and Houston to define high-priority count locations for pedestrians and bicyclists. Researchers evaluated technology options for permanent and portable count equipment, and recommended a combination of equipment and locations for both permanent and short-duration counts. Researchers then demonstrated, as part of their field work in Austin and Houston, the installation of both permanent and portable count equipment.

To evaluate the potential for using crowdsourced data, TTI compared crowdsourced data to actual pedestrian and bicyclist counts at 100 locations. The crowdsourced data typically represent a

small sample of pedestrian and bicyclist trips and, in particular, recreationally based trips. The sample percentage of crowdsourced trips varies for different types of pedestrian and bicyclist infrastructure, making it difficult to estimate total pedestrian and bicyclist counts. TTI developed a model that uses the crowdsourced data and a few other influential and readily available data attributes to better estimate the total number of bicyclists.

To develop a consolidated database of pedestrian and bicyclist counts, researchers established a standardized data dictionary that is consistent with the Federal Highway Administration's *Traffic Monitoring Guide* but also includes additional attributes that were deemed necessary for TxDOT's and other agencies' monitoring needs. This standardized data dictionary provides a mechanism by which MPOs and local agencies can compile and submit count data into a single statewide pedestrian and

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bicyclist count database. TTI coordinated with MPO and local agency staff in gathering pedestrian and bicyclist count data and encouraging the use of the TTI/TxDOT standardized data dictionary. TTI also developed seasonal adjustment factors to annualize short-duration count data in Texas.

What They Found

Researchers concluded that it was important to combine a modest number of permanent, continuously operating pedestrian and bicyclist count sites with a larger number of short-duration counts gathered using portable equipment. The continuous count sites provide extensive time coverage at a limited number of locations, while the short-duration sites provide extensive geographic coverage for a limited duration. When combined in a systematic manner, the continuous and short-duration count sites provide a more comprehensive picture of pedestrian and bicyclist traffic levels, patterns, and trends.

Crowdsourced data represented a small portion of all pedestrian and bicyclist trips, varying widely by data source and location. For example, Strava bicyclist samples ranged from 0 percent to 63 percent on different facilities, whereas RideReport bicyclist samples were much smaller and ranged from 0.03 percent to 0.3 percent. Both Strava and RideReport bicyclist data had moderate correlation with actual ground counts, but RideReport data are not available statewide. Strava pedestrian samples ranged from 0.05 percent to 14 percent across the comparison sites in Austin and Houston, and had poor correlation with actual ground counts. To account for the range in Strava bicyclist samples, TTI's model can be used to better estimate the

total number of bicyclists (e.g., average annual daily bicyclists) on any facility in Texas. The Strava scaling model includes the number of Strava bicyclist samples, the functional classification of the roadway, and the density of high-income households (available from the U.S. Census) near the bicycle travel facility.

Researchers developed a consolidated database (using the aforementioned standardized data dictionary) that includes 350 unique pedestrian/bicyclist count locations in 11 cities, of which 84 locations are permanent continuous count sites and 266 locations are short-duration (i.e., at least seven days) count sites.

What This Means

Since several MPOs and local agencies are already collecting pedestrian and bicyclist counts for their own uses, researchers recommend that the most feasible roles for TxDOT include:

- Maintaining a statewide count data clearinghouse.
- Performing supplemental monitoring on high-priority state highways.
- Facilitating coordination and sharing best practices within Texas.
- Expediting counter deployment by local agencies and TxDOT districts.

Regarding the use of crowdsourced data, TTI recommends the use of the models (developed in this project) that expand the crowdsourced sample to better represent total numbers of bicyclists. Implementing these recommendations will help TxDOT improve the amount and availability of pedestrian and bicyclist count data in Texas.

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