Pedestrian and Bicycle Safety Research Brief

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PRACTICE-READY RESEARCH PRESENTED AT TRANSPORTATION RESEARCH BOARD

In January 2017, over 13,000 transportation professionals gathered in Washington, DC, at the Annual Meeting of the Transportation Research Board (TRB). In all, there were over 5,000 research presentations, 600 of which were about transportation safety. In this brief, we highlight some of the newest practice-ready pedestrian and bicycle safety research to come out of the conference.

In **"Vision Zero and Beyond: A Simple Yet Powerful Data Strategy for Evaluating Potential Engineering Solutions,"** Tim Black, Jacqui Swartz, and Tim Fremaux document how the City of Los Angeles is using a simple database to prioritize safety projects to meet their Vision Zero goals for eliminating fatalities. Their work builds on the City of San Francisco's collision database methodology to match police-reported collision records to street network data, city infrastructure, and public health data related to obesity, mortality, and other socioeconomic and demographic characteristics. Once they joined the data together, the team then developed programming scripts that used these data to identify appropriate safety interventions for grant applications. They offer tips for how other cities may adapt the methodology if they do not have the same extensive data that is available to Los Angeles. They have posted their processing scripts on GitHub (https://github.com/black-tea/VisionZero) for others to adapt. Read the full paper here: http://docs.trb.org/prp/17-06325.pdf.

In another Vision Zero-related project, Christopher Brunson and three colleagues at the New York City Department of Transportation write about their results after analyzing left-turn pedestrian and bicycle crashes in **"Don't Cut Corners: Left Turn Pedestrian & Bicyclist Crash Study."** They conducted a macro-analysis of citywide trends in left-turn collisions, a detailed analysis of locations with the greatest concentration of left-turn pedestrian and cyclist injuries, and an evaluation of tools the city could use to address these types of collisions. They found that pedestrians and bicyclists were three times as likely to be killed or severely injured in left-turn crashes compared to right-turn crashes, and that nearly nine in ten of those injuries or fatalities were pedestrians. Factors that promoted a disproportionate number of left-turn crashes include the intersection of two one-way streets, instances when a motor vehicle was turning from a minor street to a major street, and when the major street was over 60 feet wide or was a two-way street. Based on the results of the analysis, the city has prioritized implementation of leading pedestrian indicators and protected bike lanes at the incident-prone locations. Where those treatments are not possible, the city plans to pilot left-turn calming treatments, which will force vehicles to slow down when making the turn. They also plan to develop public information campaigns to encourage the driving public to take turns at 5 mph or less. The full paper is available here: http://docs.trb.org/prp/17-05455.pdf

Data-intensive efforts to improve pedestrian and bicycle safety are valuable when the data are available. But what if they are not, as is the case in about three-quarters of all incidents, including near misses? For example, incidents near university campuses may be hard to keep track of, as people cross jurisdictional boundaries to go from home to work or class, and experience drastically different built environments on and off campus and as injury collisions occurring on campuses are not generally reported to SWITRS. In **"Investigating the Underreporting of Pedestrian and Bicycle Crashes in and Around University Campuses: A Crowdsourcing Approach,"** safety researchers Aditya Medury, Offer Grembek, Anastasia Loukatiou-Sideris, and Kevan Shafizadeh explored how crowdsourced safety information could fill in the gaps in data available from official sources. They compared hazardous locations reported in a two-month survey to police-reported collisions from the previous 11 years near three university campuses. They found over seven times as many unsafe locations in the survey as they did in the official data. Most reported incidents occurred more recently than the off-campus incidents reported to SWITRS, and far more were reported on campus than were available in the police data. Pedestrian and bicycle crashes were underreported compared to automobile-involved crashes. Collecting safety information via survey is not a replacement for police-reported data, the researchers reported, because they suffer from multiple forms of bias, are not corroborated by a third party, and do not undergo the same scrutiny as official records. However, they can supplement data provided by official databases to give a broader perspective on safety, especially in locations like college campuses where crashes are more likely to go unreported.

Finally, as cities implement policies and invest in resources to reduce pedestrian and bicycle crashes, they need to track the effectiveness of their programs to understand how they are saving lives and reducing injuries. Unfortunately, this requires good estimates of exposure, but count programs can be too time- and cost-consuming for resource-constrained cities. In "**'Ballpark' Method for Estimating Pedestrian & Bicyclist Exposure in Seattle: A Potential Option for Resource-Constrained Cities in an Age of Big Data,**" Rebecca L. Sanders and her colleagues at Toole Design Group describe a method they used in Seattle, Washington, to estimate pedestrian and bicycle exposure from already-existing data. They relied on the research literature to identify the land use, transportation system, and socioeconomic variables that would predict the number of pedestrians and bicyclists at a location. To estimate pedestrian counts, they developed a regression model calibrated to a modified annualized number of pedestrians as measured by manual intersection count data collected previously. To estimate bicycle counts, they developed a regression model calibrated both to bicycle counts on 50 road segments and to crowdsourced GPS data collected via Strava, a smartphone fitness app for bicyclists. They found that the pedestrian exposure model had good predictive power, and that the fit of the bicycle exposure model benefitted from using Strava data as a predictor variable. The authors point out that these back-of-the-envelope calculations still required some count data to estimate the models, but were much less resource-intensive than a more complete modeling effort. Read about their techniques here: http://docs.trb.org/prp/17-06409.pdf.

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