5 Ways Departments of Transportation Can Protect Bicyclists on the Roadway

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Motor vehicles dominate the nation's roadways, but they must share the road with other, more vulnerable, users such as bicyclists. While cyclists only make up a little over 2% of U.S. roadway fatalities each year, they represent an important challenge as part of the nation's commitment to zero traffic fatalities.

Nearly 1,000 bicyclists die and over 130,000 are injured in crashes that occur on U.S. Roads, the Centers for Disease Control and Prevention (CDC) reports.

"The state of bike safety is shown by the numbers," says Ken McLeod, Policy Director for the League of American Bicyclists. "We've increased bicyclist deaths over 50% in the last decade — we are at a 45-year high — so the state of bike safety is not good."

The problem is that in a conflict between a cyclist and a motorist, the bicyclist is much more vulnerable and more likely to be injured or killed. "Cyclists are particularly vulnerable in the road environment, partly due to their physical lack of protection, perceptions of drivers about the rights of cyclists, and a lack of infrastructure provision to optimize their safety," according to a report from the World Health Organization (WHO).

1. Complete Streets

"Complete Streets is a great way to improve bicycle safety," McLeod advises. Complete Streets is an approach to planning, designing, building, operating, and maintaining streets that enables safe access for all people. A Complete Streets policy can change transportation agency culture so that all road users — including cyclists — are considered when planning the transportation infrastructure.

This blog will cite Texas Department of Transportation (TxDOT) as an example of a bicycle-friendly transportation agency. Aligning with the Complete Streets strategy, TxDOT supports the development of an integrated multimodal transportation system by planning for and constructing projects that address the needs of all road users.

2. Separated Bicycle Lanes

Bicyclists are safer when they are separated from motor vehicles. The Federal Highway Administration (FHWA) recommends, "To make bicycling safer and more comfortable for most types of bicyclists state and local agencies should consider installing bicycle lanes."

"The big point of emphasis over the last decade in the bicycle advocacy community has been protected bike lanes on streets," confirms Mcleod. "On streets where speeds and traffic volumes are higher, protected bike lanes ensure that drivers aren't interacting with bicyclists in ways that are dangerous."

Bike lanes can be separated from motor vehicle traffic horizontally with a designated space for bicycling along the street, often indicated by paint stripes. Bike lanes can also be separated by vertical elements, with a physical barrier — such as bollards, curbs, raised medians or vegetation — or a change in elevation from street level.

Bicyclist Safety on US Roadways: Crash Risks and Countermeasures, a report from the National Transportation Safety Board (NTSB), says separated bike lanes could prevent bicycle crashes involving motor vehicles at midblock locations.

The FHWA's Complete Streets Report to Congress confirms that adding a bicycle lane can reduce the number of crashes on certain roads by as much as 49%.

3. Intersection Treatments

While separated bike lanes improve safety for bicyclists, these lanes ultimately cross intersections. A common cause of collisions at intersections involves motorists or bicyclists failing to yield the right of way, and motorists turning left or right into the path of a bicyclist, according to the Governors Highway Safety Association (GHSA).

"Intersection treatments can be used to improve cyclist conspicuity, to minimize conflict time and opportunity, and to generally raise driver awareness of a cyclist's presence in an intersection," a spokesperson from TxDOT advises.

Bicycle-relevant intersection treatments include:

- Bicycle signal face—A signal to provide separate control of bicycle movements at intersections. The NTSB report on bicyclist safety cites an evaluation across 14 agencies showing this device could reduce bicycle crashes by up to 45%.
- Bicycle box - An advance stopping area for bicyclists before an intersection. The NTSB report references 25 experiments conducted by various agencies showing that bicycle boxes are successful at reducing the number of conflicts between cyclists and turning motor vehicles.
- Protected intersection - According to the MassDOT Separated Bike Lane Planning & Design Guide, a protected intersection, also called a refuge island, "maintains the physical separation through the intersection, thereby eliminating the merging and weaving movements inherent in conventional bike lane and shared lane designs."

4. Speed Management

Speeding vehicles are a well-known cause of traffic accidents, and they also pose a high risk for collisions with cyclists. The WHO report explains that speeding vehicles are a major risk factor associated with serious injury and fatal crashes generally and among cyclists in particular. The likelihood of a fatal injury to a cyclist increases 11 times with vehicle speeds above 40 mph and 16 times at 50 mph.

NTSB concurs that "reducing traffic speeds can improve bicycle safety by reducing the likelihood of fatal or serious injury in the event of a crash."

Ken McLeod suggests that municipalities can establish Bicycle Boulevards, which are streets designed specifically to improve bicycle safety by reducing motorized traffic volumes and speeds. A Bicycle Boulevard discourages through traffic via signs, markings, diverters, roundabouts and other roadway design elements.

5. Real-World Data

Real-world data is critical to making the right decisions on bicycle safety, but many transportation agencies do not have enough data on traffic accidents involving cyclists.

Laura Sandt, Senior Research Associate for the Human Sciences Research Council, said "For example, police-reported crash data are often the primary measure of a road's safety performance or need for improvement, but they notoriously undercount pedestrian and cyclist crashes and injuries."

According to the Safe Transportation Research and Education Center (SafeTREC) at the University of California, Berkeley, as much as 7-46% of bicyclist crashes may be missing from police-reported crash data.

Agencies must find innovative ways to collect more data on bicycle crashes, as well as the movements of bicyclists. Utilizing bicycle counters, traffic monitoring cameras, and even cell phone data can give transportation professionals a more accurate view of where cyclists are traveling on the roadway. In addition, connected vehicle data can be used to track volume and speed of vehicles — and driving behavior such as hard braking — on roads frequented by cyclists.

"Analysis that is based on real-world data ties theory to reality. While both theoretical and data-driven analyses can result in good decisions, the application of real-world data can increase confidence in such decisions," says a spokesperson for TxDOT.

In fact, TxDOT is currently completing a Vulnerable Road User Safety Assessment utilizing data analysis to identify strategies to reduce bicyclist and pedestrian fatalities and serious injuries. Efforts like these can save bicyclist lives, and help our nation reach the worthwhile goal of zero traffic deaths.

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