Bicycle Crash Analysis for Wisconsin

Successful efforts have been made over the past three decades in Wisconsin to reduce the number of crashes and fatalities related to bicycle–vehicle crashes. However, a more complete understanding of these crashes was necessary in order to continue to decrease the number of serious and fatal crashes. This comprehensive crash analysis takes the first and most important step of “typing” bike-motor vehicle crashes for 2003. This report goes on to analyze these crashes in more depth and identifies commonalities between these crashes and crash characteristics, specifically related to traffic conditions, roadway attributes, and the users involved in the crashes.

REVIEW OF MAJOR FINDINGS

Based on the preliminary findings of previous smaller studies, some of this study’s findings are not surprising. In another regard, the study produced significant new contributions to crash evaluation in the state. This study made an enormous contribution by determining the crash types for all bicyclist-motorist (bicycle–vehicle) crashes during an entire year. It also researched the characteristics of roadway width in more depth than in previous works. Additionally, the evaluation of sidepath crashes was not done on a statewide basis until this study was performed. Here are the major findings of the report:

- Bicycle–vehicle crashes are declining in the State of Wisconsin. From 1999 – 2004, annual crashes have decreased by 14%. Ideally, this report will contribute to a continual reduction in crashes by increasing bicyclist awareness, providing countermeasures to avoid common crashes, and increasing education amongst bicyclists and motorists.

- Bicycle–vehicle crashes are almost twice as common during workweek days than on the weekend days. The majority of workweek crashes occur during the a.m. and p.m. peak travel hours. The lower number of crashes occurring on weekends may indicate that recreational bike trips occur more frequently on recreational trails or low volume roadways where exposure is less.

- Many bicycle–vehicle crashes had similar characteristics. A large concentration of crashes occurred within one of, or a combination of, the following environments: in an urban city, at an intersection, or on an urban city street or arterial roadway. Eighty-three percent of crashes occurred in a city (MV4000 Report), 93.6% of crashes occurred in an urban area (MV4000 Report), 65.7% of crashes occurred at an intersection (PBCAT), 71.7% of crashes occurred on a city street (MV4000 Report), and 56.1% of crashes occurred on an arterial street.

- Unfortunately, alcohol was a factor in some of the crashes. The MV4000 data does not declare whether the driver or bicyclist was under influence, only if alcohol was a factor in the crash. 4.2% of urban crashes reported alcohol as being involved and 4.6% of rural crashes reported alcohol as being involved. This is slightly lower than national percentages from the Crash Types of the Early 1990’s report and compares to a 7.0% alcohol involvement of all Wisconsin crashes.

- Bicycle–vehicle crashes occurred mainly during daylight hours, and when they did occur at night, most were in a location with lighting. Over 83% of crashes occurred during daylight hours, and of the 12.3% of crashes occurring at night, only one out of every ten occurred without some sort of lighting present.

Source: Bicycle Crash Analysis for Wisconsin Using a Crash Typing Tool (PBCAT) and Geographic Information System (GIS); Michael Amsden and Thomas Huber; June 2006
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- Male bicyclists were involved in almost 75% of all bicycle–vehicle crashes. Even crashes involving children reported over 70% of the bicyclists being male.

- Almost 80% of rural bicycle–vehicle crashes occurred on roadways with posted speed limits of 55 miles per hour. Crashes occurring at such high rates of speed will increase the likelihood of a bicyclist injury or death. This is evident in the higher percentage of rural crashes resulting in fatalities than in urban crashes.

- Four out of the top five crash types indicate that the motorist made the critical error. This may indicate that motorists are not fully aware of bicyclists on the roadway and that increased education is necessary.

- Urban areas and urban streets have much higher crash rates than rural areas based on all indices examined - miles of roadway, bicycle miles traveled, and vehicle miles traveled. Although crash rates were higher for urban areas, the rate of fatal crashes was double for rural crashes compared to urban crashes based on bicycle miles traveled.

- Milwaukee County has the highest average crash rate when bicycle miles traveled and vehicle miles traveled are averaged together. The rate is three times that of the lowest counties of Brown, Marathon, and Wood.

- The city of Madison has a low average crash rate based on bicycle miles traveled. A scattering of other cities – Appleton, Green Bay, and Wausau also have relatively low average crash rates based on bicycle miles traveled, but none of these communities come close to the total bicycle miles traveled as demonstrated by Madison.

- When bicycle-vehicle crash rate is compared to the overall crash rate for all vehicles, the rate was twice as high for bicycle-vehicle crashes compared to all vehicle crashes. The bicycle crash rate was based on bicycle miles traveled, while the comparison rate for total vehicle crashes was based on total vehicle miles traveled.

- For local rural roads, the greater the width, the lower the bicycle-vehicle crash rate. Twenty foot roadways had a crash rate that was double the crash rate of 22 foot roadways, but the 22 foot roadways had a rate that was over 40% higher then 24’ roadways. Overtaking-type crashes were significantly lower for 24’ roadways.

- Rural state highways had much lower bicycle-vehicle crash rates then local roads. Similar to local roads, 24-foot roadways had significantly lower crash rates then 22-foot roadways. Interestingly, having three foot paved shoulders did not improve the crash rate among these widths of roadways. However, the crash rate did significantly lessen when five [foot] paved shoulders were added (compared to three foot paved shoulders).

- Sidepath crashes are common crashes in urban areas. Twenty-nine percent of all urban crashes were recorded as such. Motorist drive-out from both sign and signal-controlled intersections are by far the two most common crash types. How significant a problem this is, is difficult to ascertain without knowing the frequency of bicycle use on sidepaths/walks and their connecting crosswalks.

Source: Bicycle Crash Analysis for Wisconsin Using a Crash Typing Tool (PBCAT) and Geographic Information System (GIS); Michael Amsden and Thomas Huber; June 2006