



RESEARCH SERVICES

OFFICE OF POLICY ANALYSIS,
RESEARCH & INNOVATION

TECHNICAL SUMMARY

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PROJECT COST:

\$65,500



Video footage was statistically analyzed to aggregate information about pedestrian/driver interactions.

Pedestrian and Bicyclist Safety in Minnesota Roundabout Crossings

What Was the Need?

Roundabouts are relatively new to roads in the United States. Many cities in Minnesota have recently begun installing them because of evidence that they reduce fatal and severe injury crashes compared to traditional signalized intersections.

Despite this evidence, however, roundabouts are viewed negatively by some members of the public, who have expressed concern about pedestrian safety when crossing roundabouts, particularly for people with disabilities. Research was necessary to explore safety issues at roundabout crossings for pedestrians and bicyclists.

What Was Our Goal?

This project investigated safety factors of roundabout crossings for pedestrians and bicyclists through direct observation of driver and pedestrian behavior.

What Did We Do?

Researchers studied two roundabouts with significantly different properties. One roundabout, at 66th Street and Portland Avenue in Richfield, Minnesota, has two-lane entrances and exits. It serves approximately 27,500 vehicles per day, with about 155 pedestrian crossings and 46 bicycle crossings per day.

The second roundabout is at Minnehaha Parkway and Minnehaha Avenue in Minneapolis. It is an older, single-lane roundabout, located next to a park and regional trail. As a result, it has significantly less vehicle traffic—about 16,000 vehicles per day—but greater pedestrian and bicycle traffic, with approximately 424 pedestrians and 875 bicyclists crossing daily.

Researchers collected information about behavior at these roundabouts through custom-made surveillance equipment that could collect seamless 360-degree video of the roundabout lanes and each of the four pedestrian crossings. This equipment recorded video at the Richfield site from August 7 to September 4, 2010, and captured 1,203 pedestrian crossings and 232 bicycle crossings. The equipment recorded video at the Minneapolis roundabout from September 18 to October 11, capturing 4,730 pedestrian crossings and 7,302 bicycle crossings.

Researchers then processed and analyzed these videos to examine interactions between vehicles and pedestrians or bicyclists.

What Did We Learn?

This research strongly suggests that roundabout crossings are safe for pedestrians and bicyclists. Investigators had originally planned a separate research phase to scrutinize accidents and near-accidents involving pedestrians or bicycles and vehicles. There were no such incidents during the study period, so further study was impossible.

Investigators found that roundabouts do produce a new kind of interaction between pedestrians and vehicles that may be frustrating for pedestrians and make them feel unsafe. At the Richfield roundabout, only 41 percent of drivers who should have yielded

Many pedestrians have expressed concerns about safety at newly installed roundabouts. Thousands of pedestrian and bicyclist crossings observed in this project, however, showed no evidence of reduced levels of safety, and wait times for pedestrians were significantly shorter than at signalized intersections.

“Roundabouts are safe. They can be frustrating for pedestrians because of the interaction with drivers, but the feeling of insecurity hasn’t resulted in actual danger.”

—John Hourdos,
Director, Minnesota Traffic
Observatory

“Pedestrians don’t experience significantly longer wait times at roundabouts than at other nonsignalized intersections, and experience shorter wait times than at signalized intersections.”

—Peter Buchen,
MnDOT Assistant State
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Surveillance trailers installed in the middle of roundabouts carried eight closed-circuit TV cameras and two digital video recorders to provide a clear view of the full roundabout with no blind spots.

to a pedestrian or bicyclist did so. Yield rates were much higher at the Minneapolis roundabout (83 percent), likely due to the influence of the nearby park and the larger number of pedestrians and bicyclists.

In both locations, vehicles were more likely to yield to larger groups of pedestrians or bicyclists. Drivers were more likely to yield to a bicyclist or pedestrian on the middle island than on the sidewalk, and less likely to yield when exiting the roundabout than when entering it. At Richfield, single vehicles were more likely to yield, while vehicles in groups were less likely. This pattern was not observed at the Minneapolis roundabout, but since there are no signals nearby, there were relatively few observations of grouped vehicles.

While drivers often failed to properly yield to pedestrians, pedestrian wait times were significantly shorter than would be expected at a signalized intersection. In Richfield, the average observed delay to cross when cars were present was 9.04 seconds, where it would be approximately 30 seconds at a signalized intersection with the same traffic level. Average wait times ranged from 2.48 seconds to 5.59 seconds at the Minneapolis site, depending on which of the four crossings were observed.

What’s Next?

This information has been and will continue to be used in local planning meetings as evidence of the safety of roundabouts.

One goal of this project was to evaluate roundabout crossing safety for people with visual impairments, but no crossings made by visually impaired people were observed. Given the relatively low yield rates in Richfield, however, safety at roundabout crossings for visually impaired people is likely a valid concern, at least in similarly commuter-focused areas.

Investigators recommend further research as roundabouts proliferate. Of particular interest would be roundabouts near schools, hospitals and other places likely to have pedestrians who are unaware of their surroundings.

This Technical Summary pertains to Report 2012-28, “Investigation of Pedestrian/Bicyclist Risk in Minnesota Roundabout Crossings,” published September 2012. The full report can be accessed at <http://www.lrrb.org/PDF/201228.pdf>.