Roundabouts

The modern roundabout is one of Federal Highway Administration's nine proven safety countermeasures. This designation is based on research that has shown roundabouts to greatly improve safety compared to traditional intersections (Proven Safety Countermeasures). The frequency of crashes resulting in injury are lower at roundabouts compared to traditional intersections with the crash reductions being most pronounced for motor vehicles, less pronounced for pedestrians and the overall the same for bicyclists [Rodergerdts et al., 2010]. When injuries do occur, they tend to be less severe than those sustained in crashes at traditional intersections.

The modern roundabout is a form of circular intersection in which traffic travels at low speeds counterclockwise around a central island. Vehicles entering a roundabout must yield, or stop if needed, to circulating traffic. Roundabouts allow for more continuous traffic flow compared to conventional stop or signalized intersections. Additionally, compared to conventional stop or signalized intersections, roundabouts reduce and simplify the number of places where motor vehicles would potentially conflict with other vehicles (cars and bicycles) and pedestrians. Roundabouts are designed to slow vehicles as they enter, travel through and exit the circular intersection. The lower design speed of roundabouts is likely to improve yielding, safety, and comfort for pedestrians and bicyclists. In settings with large numbers of children, lowering vehicle speed has great potential for injury prevention. Pedestrian crashes involving a child most often result from the child's error, thus slower speeds give motorists more time to react and can lessen injuries when crashes do occur [Retting, Ferguson, & McCartt, 2003]. Roundabouts can be single-lane or multiple-lane. Near elementary and middle schools, single-lane roundabouts are generally preferable to multiple-lane roundabouts due to lower vehicle speeds, simpler crossings for children and the greater comparative crash safety benefit [Rodergerdts et al., 2010].

At locations where it is determined a multi-lane roundabout is necessary to accommodate traffic volumes, it should be anticipated that vehicle speeds through the roundabout may be higher during non-peak periods, motorists may be less likely to yield to pedestrians in crosswalks, and pedestrians are exposed to the multiple threat crash. To mitigate these challenges, consideration should be given to providing a pedestrian crossing island and/or an actuated rapid flashing beacon or pedestrian hybrid beacon (PHB) at each crossing.

Well-designed modern roundabouts that have replaced traditional two-way stop, all-way stop, and signal controlled intersections have reduced motor-vehicle crash frequencies and crash severity in urban, suburban, and rural settings [Shroeder et al., 2010]. Vehicle collisions in modern roundabouts are typically less severe than those that occur at signalized intersections because the roundabout lowers vehicle speeds and helps prevent certain types of crashes such 90 degree ("T-bone") collisions and head-on crashes.

Compared to traditional intersections, single-lane roundabouts, typically offer the following safety benefits and features for pedestrians:

- Lower motor vehicle speeds and increased yielding behavior [Rodergerdts et al., 2010].
- Fewer conflict points (Rodergerdts et al., 2010).
- Higher visibility of pedestrians in the crosswalk [Rodergerdts et al., 2010].
- Shorter wait time for pedestrians to cross than at signalized intersections
- Lower exposure to motor vehicles because of the shortened crossing distance [Rodergerdts et al., 2010].
- Simpler crossing due to the splitter islands, which provide mid-crossing refuge and allow the pedestrian to focus on traffic from one direction at a time [Rodergerdts et al., 2010].

While roundabouts offer the general pedestrian population certain crossing and safety benefits, there is a dearth of research about the ability of child and elderly pedestrians, and those with mobility impairments to cross safely at roundabouts [Rodergerdts et al., 2010]. Children face special challenges to safely crossing a street. Factors include: impulsiveness, slower walking speeds; small body size that limits their visibility; less experience with traffic; still-developing cognitive abilities that

make it difficult to accurately judge vehicle speed and traffic stream gaps; and a general perception drivers will be able to stop instantly [Rodergerdts et al., 2010; Fitpatrick et al., 2006]. These factors lend support for considering the need for adult supervision such as parents, caregivers or crossing guards at roundabout and other street crossing locations near elementary schools during arrival and dismissal times.

Bicyclists face similar conflicts as motor vehicles at roundabouts. Additionally, bicyclists may experience uncomfortable passing or be cut off on roundabout entrances and exits if they ride on the right edge of a curb lane or in any lane of a multi-lane roundabout [Rodergerdts et al., 2010]. As with conventional intersections, a bicyclist using a roundabout can proceed either as a motor vehicle or as a pedestrian using the sidewalk and marked crosswalks (PBIC). Given the varying cognitive abilities and bicycling skills of children, it is recommended that children dismount their bicycles and proceed through the roundabout as a pedestrian using the sidewalk and marked crosswalks. To allow bicyclists to operate as pedestrians through roundabouts, and in particular at locations near schools, consideration should be given to designing bicycle curb ramps and wider sidewalks to accommodate transitions for bicyclists between the roadway and sidewalk system [Rodergerdts et al., 2010]. Wider sidewalks and crosswalks can help mitigate potential conflicts between pedestrians and bicyclists.

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