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## **8.0 VULNERABLE ROAD USERS**

As roundabouts began to appear in growing numbers across North America, the engineering community reacted with concern over the safety of vulnerable road users. The concerns stem from general unfamiliarity of drivers with roundabouts along with the problem of right-of-way priority at pedestrian crossings. Despite the safety evidence, agencies continue to remain cautious of their use and benefits. Pedestrians that use roundabout crosswalks acknowledge the need for vigilance, but are generally comfortable because of the conditions afforded by a shorter two-stage crossing in a low speed environment.

This section highlights the experiences of road agencies in attempting to educate vulnerable road users and provide optimal information to all users.

### **PROVISIONS FOR PEDESTRIANS**

#### ***Pedestrian Facilities***

Any roundabout where there is a reasonable possibility of pedestrian activity should be designed to accommodate pedestrians. This includes having sidewalk connections to the pedestrian crossings, curb depressions, and refuge areas on the splitter islands. These refuge areas should be wide enough, at least 1.8 metres, to accommodate a person pushing a stroller or walking a bicycle.

Pedestrian crossings at roundabouts should be located one vehicle length, or a multiple thereof, back from the yield line. This length is given in the FHWA guide as 7.5 metres, although many jurisdictions are now using a shorter 6.0 metre distance to better reflect the length of most passenger cars.

Many agencies install Pedestrian Crosswalk signs in advance of pedestrian crossings on both the entry and exit of a roundabout where pedestrians are expected. In Ontario, where the closest equivalent is the Pedestrian Ahead warning sign, the Region of Waterloo installs signs facing drivers indicating "Yield Here to Pedestrian", as shown in Figure 8.1. This indicates that a driver must yield to a pedestrian within a crosswalk at a roundabout.

#### ***Pedestrian Crosswalk Markings***

Most jurisdictions in North America install crosswalk markings at all pedestrian crossings at roundabouts. According to the FHWA guide, the intent of crosswalk markings is to channel pedestrians to an appropriate crossing location, since it is located away from the yield line, and to provide a visual cue to drivers of where pedestrians may be within the road. Marked crosswalks are generally not needed at locations where the crosswalk is distinguished from the road by visually contrasting pavement colours and textures.

**Figure 8.1**  
"Yield Here to Pedestrian" Sign at Pedestrian Crossing



Photo: Region of Waterloo

These markings should not be construed as a safety device, as data from other countries suggest that the presence of markings has no appreciable effect on pedestrian safety. A study done in 2005 by the FHWA entitled "Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations" concluded that under no condition was the presence of marked crosswalk alone at an uncontrolled location (not necessarily a roundabout) associated with significantly lower pedestrian crash rate compared to unmarked crosswalk. Furthermore, on multi-lane roads with traffic volumes greater than 12,000 vehicles per day, having a marked crosswalk was associated with a higher pedestrian crash rate compared to an unmarked crosswalk. Therefore, just adding marked crosswalks (with no engineering, enforcement, or education) is not expected to reduce pedestrian crashes.

If crosswalks are to be marked, a marking pattern using a series of lines parallel to the flow of traffic is generally recommended. Most jurisdictions use "zebra" markings with lines approximately 0.3 to 0.6 metres wide, spaced 0.3 to 1.0 metres apart, spanning the width of the crosswalk, or "ladder" type markings that add transverse lines to the zebra markings. These crosswalks are more visible than standard transverse crosswalks and less likely to be confused with the yield line of a roundabout. Regardless of type, when crosswalk markings are installed agencies agree they should cross both the entrance and exit of each leg and any by-pass lanes.

In addition to pavement markings, a few US jurisdictions are experimenting with in-pavement flashing warning lights activated by push button to enhance pedestrian visibility.

In rural areas where pedestrian activity is minimal, the FHWA guide recommends that pedestrian crosswalk markings be optional, and that they not be used at roundabouts without illumination because vehicle headlights may not be sufficient to illuminate a pedestrian in time to avoid a collision.

### ***Pedestrian Signals***

If pedestrian volumes are sufficiently high, it may be necessary to signalize one or more of the crossings. This can impact motor vehicle operations, mainly because exiting vehicles can queue back into the roundabout and block adjacent entries. Fortunately, minimum pedestrian walk times can be kept short since the crossing can be split into two stages with the presence of splitter islands and modern signal technology.

Figure 8.2 shows one of the only signalized pedestrian crossings of a roundabout in North America, in Gatineau, Quebec. This roundabout and one immediately to the west have signalized pedestrian crossings on all legs. Observations of the level of pedestrian activity suggest that the signals were not warranted. Nevertheless, each signalized crossing has the following characteristics:

**Figure 8.2**  
Signalized Pedestrian Crossing at Roundabout, Gatineau, Quebec

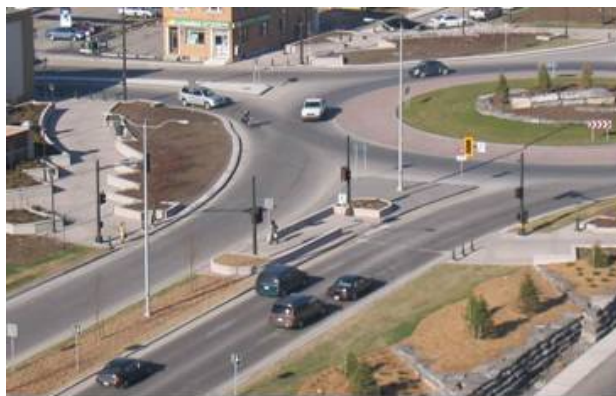


Photo: Ourston Roundabouts Canada

## WHAT DO THESE SIGNS MEAN?



There is a roundabout ahead – slow down.

There are three exits from the roundabout ahead – choose one. Do you want to turn right, go straight through, or turn left?



There are two entry lanes to the roundabout – choose the correct one. If you are turning left, get in the left lane.



Yield to all traffic in the roundabout.









Drive counterclockwise only in the roundabout.



June 2006

## IMPORTANT ROUNDABOUT RULES

-  Slow down
-  Choose the correct entry lane
-  Yield to pedestrians at the crosswalk
-  Yield to ALL traffic in the roundabout, including cyclists
-  Give large vehicles extra space
-  Never pass another vehicle in the roundabout



Region of Waterloo

For more information, call 519-575-4558  
or visit the roundabouts page  
on the Region's website



[www.region.waterloo.on.ca](http://www.region.waterloo.on.ca)

*All about*

**ROUNDABOUTS**

Region of Waterloo

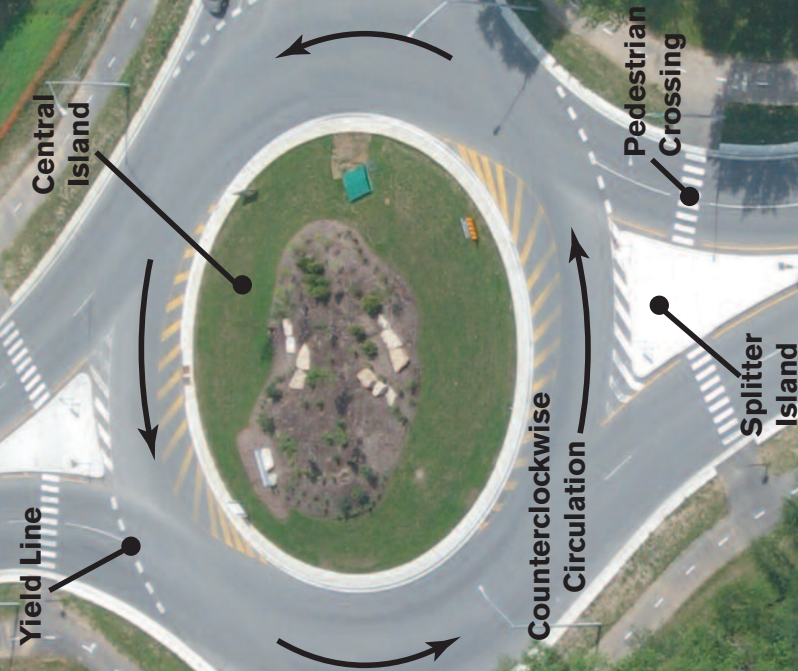
*How to*

**DRIVE, WALK**  
*and BIKE in a*  
**ROUNDABOUT**

[www.region.waterloo.on.ca](http://www.region.waterloo.on.ca)

## WHAT IS A ROUNDABOUT?

A roundabout is an intersection at which all traffic circulates counterclockwise, to the right of a central island. Entering vehicles must yield to all traffic already in the roundabout.

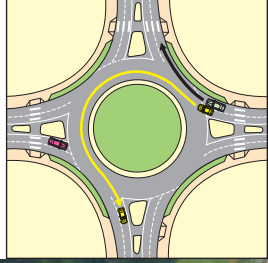


## ROUNDABOUTS:

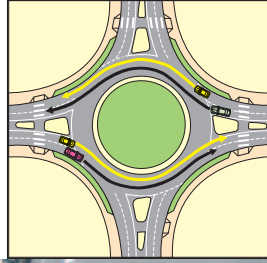
- Reduce injury collisions
- Keep traffic moving
- Reduce unnecessary stops
- Reduce unnecessary idling and air pollution
- Improve intersection appearance

## HOW TO DRIVE IN A ROUNDABOUT

1. Slow down when approaching a roundabout.
2. Keep to the right of the "splitter island".
3. Choose the correct entry lane. To turn right, get in the right lane. To turn left, get in the left lane. To go straight, get in the left or right lane.
4. Observe the crosswalk and yield to pedestrians.
5. Move to the yield line and wait for a gap in traffic before entering the roundabout. Yield to all traffic to your left (including cyclists), regardless of their position.



Turning right and turning left



Driving straight through a roundabout

6. Do not enter beside someone already in the roundabout because they may be exiting. Drivers in the roundabout always have the right-of-way.
7. Within the roundabout always travel counterclockwise and do not stop; you have the right-of-way over entering traffic.
8. Do not pass other vehicles in the roundabout. Give large vehicles extra space because they may use both lanes.
9. As you approach your desired exit, use your right turn signal and take the exit while maintaining a slow speed. Do not change lanes before exiting.

## TIPS FOR DRIVERS OF LARGE VEHICLES

When getting into the roundabout, straddle the entry lanes. Within the roundabout, use both lanes. Don't try to leave space for another vehicle to pass you.



## TIPS FOR PEDESTRIANS

1. Use the sidewalks and crosswalks around the outside of the roundabout. Do not cut across the middle of the roundabout.
2. Use the "splitter island". This will let you cross one direction of traffic at a time.
3. Watch for gaps in approaching traffic. Choose a safe time to cross.

## TIPS FOR CYCLISTS



For experienced cyclists, ride as if you were driving a car. Vehicles in roundabouts travel slowly, close to the speed you ride your bicycle. When getting into a roundabout, merge into the travel lane before the bike lane or shoulder ends. Within the roundabout, ride in the middle of your lane; don't hug the curb. Watch out for drivers' blind spots.

For less confident cyclists, dismount and walk your bicycle. Follow the tips for pedestrians.



## WHAT ABOUT EMERGENCY VEHICLES?

If you have not yet entered the roundabout, let the emergency vehicle pass you. If you are in the roundabout, continue on and exit as normal, then pull to the right where there is room for the emergency vehicle to pass. Do not stop inside the roundabout.