

Position Statement on Accessible Roundabouts

April 16, 2013

Issue

Roundabouts have been found to present significant challenges to people who are blind, deafblind, or partially sighted. Despite this, the number of roundabouts in Canada and elsewhere is expected to increase. This research-based document outlines essential elements in the design of roundabouts aimed at making them accessible for all pedestrians, including those who are blind, deafblind, or partially sighted.

Background

Many cities are considering roundabouts to improve vehicle safety, increase roadway capacity and efficiency, reduce vehicular delay and concomitant emissions, provide traffic-calming effects, and mark community gateways. As a result, roundabouts are replacing many traditional intersections in cities across Canada.

This rapid installation of roundabouts has led to major concerns regarding the accessibility of these free-flowing intersections to all pedestrians, with a particular concern for the safety and independent

travel of people who are blind, deafblind, or partially sighted. Research has shown that roundabouts can present significant challenges to the safe and independent travel of people with vision loss.¹

Pedestrians who are blind, deafblind, or partially sighted rely primarily on auditory, visual markings, and/or tactile information to make judgments about when it is appropriate to begin crossing a street. The continuous flow of traffic at roundabouts removes many of the audible cues pedestrians who are blind, deafblind, or partially sighted use to navigate street crossings. Visual barriers in the centre island, which may be desirable for vehicular traffic, create an auditory barrier for pedestrians with vision loss.

In the United Nations Convention on the Rights of Persons with Disabilities (CRPD), which the Canadian Government (with the support of all provinces and territories) ratified in March 2010, Article 9 states, in part, that “States Parties shall take appropriate measures to ensure to persons with disabilities access, on an equal basis with others, to the physical environment, to transportation, to information and communications, including information and communications technologies and systems, and to other facilities and services open or provided to the public, both in urban and in rural areas.”² Equal access to the physical environment requires ensuring that people with disabilities can make use of the same streets and sidewalks in their communities as everyone else.

¹ See, for example, Schroeder et al. (2011) “Crossing Solutions at Roundabouts and Channelized Turn Lanes for Pedestrians with Vision Disabilities.” Available at http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_674.pdf

² See the United Nations Convention on the Rights of Persons with Disabilities. Available at <http://www.un.org/disabilities/convention/conventionfull.shtml>

The organizations listed below would prefer that roundabouts not be installed unless deemed absolutely necessary. However, if a roundabout is installed in a residential and/or urban area equipped with sidewalks, the undersigned organizations recommend that the roundabout include the following design elements.

Recommendations

General Recommendations

1. Public education must be done on how to safely and effectively use roundabouts for both drivers and pedestrians.
2. Water fountains and other features that produce background noise must not be placed in close proximity to the roundabout, as such features can mask the ambient sound of vehicular traffic.
3. Visual barriers higher than 30 cm should not be permitted in the middle island, as such barriers make it harder for drivers and pedestrians to see one another and create an auditory barrier for pedestrians.
4. Clear and consistent wayfinding aids that provide both visual and tactile cues about where to enter and safely cross the roundabout must be utilized. Specific wayfinding recommendations are offered below.
5. City snow removal must include all cuts from the side walk to the designated pedestrian crossing to ensure tactile landmarks can be

located during all seasons.

6. For one and two lane roundabouts, a marked crosswalk equipped with an accessible pedestrian signal (APS) with acoustic locater tone and a Vibro-tactile component must be installed on each leg of the roundabout approach where a pedestrian will be able to cross the roundabout. APS output volumes must be consistent with the volume settings suggested in the Transportation Association of Canada Guidelines for the Understanding, Use, and Implementation of Accessible Pedestrian Signals so as to avoid volume spillover and confusion by pedestrians wanting to cross other legs of the roundabout.³ There must be one set of signals per entry and exit. We recommend the standard red/yellow/green signals be used. Such signals would rest on flashing green. In response to a pedestrian activation, they would cycle to amber, and then red for the time allocated to allow for pedestrian crossing.
7. Consideration should be given to building pedestrian overpasses in cases of roundabouts with three lanes or more travelling in the same direction. If pedestrian overpasses are not installed, then accessible pedestrian activated signals are to be installed. Activating the signal should allow sufficient time for pedestrians to reach the splitter island where another APS can be located to activate the signal for the next half of the crossing.
8. All bus stops, suburban mail boxes and garbage pails must not be located any closer than 50 metres to a roundabout, as the bus visually and aurally, obscures the pedestrian crossing.
9. All marked crosswalks on the approaches to roundabouts must be within 50 metres to the vehicular entrance of the roundabout.

³ The TAC Guidelines may be purchased at <https://vws3.primus.ca/dev.tac-atc.ca/english/bookstore/products.cfm?catid=12&subcatid=21&subcat=0>

Tactile warning surfaces must be used in all places to signify transitions from sidewalk to road where pedestrians are to cross.

Please go to www.itre.ncsu.edu/NCHRP378/ for visualizations of some of the above mentioned treatments.

As noted in Recommendation 4 above, wayfinding elements are crucial for enabling the safe and independent negotiation of roundabouts by pedestrians who are blind, deafblind, or partially sighted. Wayfinding is the consistent usage of signs, clearly marked pathways, tactile walking surface indicators (TWSIs), universally understood graphics, and audible sounds used to convey location and a natural flow of direction for travelers towards reaching a destination. The following wayfinding elements and techniques must be adopted when designing a roundabout.

WayFinding Recommendations

1. As this is a mid block crossing, safety yellow guidance TWSIs (3 – 5 parallel flat-topped elongated bars that extend in the direction of travel, each approximately 2.5 – 5.5 cm wide, having a height of 5mm +/- 1mm) must span the sidewalk in order to indicate the crosswalk entrance.
2. Curb cuts or let-downs on both the departure and destination curbs of the crosswalk must include high color contrasting (defined by two elements having a minimum 70% contrast or conspicuity rating between one element and another) 600mm wide tactile walking surface indicators (measuring back from the curb's edge) that span the horizontal plain of the curb cut. This also applies to the splitter islands when the crosswalk goes over it.

3. Sidewalks must include landscaping at street edge to preclude prohibited crossings to centre island.
4. Areas where pedestrians may cross must have standardized, well-defined and color contrasting crosswalks, with high color contrasted, cane detectable guide strips (3 – 5 raised or indented parallel lines, with the concave and convex, each approximately 2 cm wide, having a minimum depth variance of 1 cm) to demark a straight line of travel for pedestrians who are blind, deafblind, or partially sighted.
5. Crosswalks must be perpendicular to all curbs.
6. Splitter islands must not extend into the crosswalk so as to avoid pedestrians who are blind, deafblind, or partially sighted interpreting the splitter island as the destination curb. If they do extend into the crosswalk they must have tactile warning surfaces installed to notify pedestrians of transitions from road to sidewalk.
7. Pedestrian WALK phases must allow sufficient time for a pedestrian to execute a complete crossing from the departure curb to the destination curb, particularly where the roadway is wider due to a splitter island.
8. All pedestrian signage must be consistent in format, provide both tactile and uncontracted braille lettering, as per Canadian Standards Association (CSA) standards, and have high contrast between foreground and background colors. Contrast is to be measured using light reflectance values in all lighting conditions, specifically during day light hours, night time, dusk and dawn. Testing must also occur when the sun is shining and during cloudy conditions.
9. All graphics or symbols used for signage must be universally recognizable and/or in accordance with accepted standards.
10. Roundabouts with pedestrian crossings require lighting in all

crosswalk locations to assist in visibility of pedestrians.

Supporting Organizations:

[Alliance for Equality of Blind Canadians](#)

Canadian National Society for the Deaf-Blind
Views for The Visually Impaired

[Vision Impaired Resource Network \(VIRN\)](#)

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