Pedestrians and Bicyclists at Roundabouts

TRB National Roundabout Conference
Introduction to Roundabouts Workshop
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Special thanks for slide contributions:
Michael Ronkin and John Ciccarelli
Pedestrians at roundabouts

Two-step crossing – Slow Speed
What does it take to make roundabouts work for pedestrians?

- Slow speeds – adequate deflection
- Single lane preferred
- Well-defined crossings
- Splitter islands
- No ped access to central island
Roundabouts Components for Pedestrian Safety

- Slow speed entry
- Splitter island
- Truck apron
- Lots of deflection for slow speeds throughout
- Slow speed exit?
- Crosswalk 1 (plus) car length back
- Separated sidewalk to direct peds to crosswalks
Key elements for pedestrians:
Deflection on entry to slow drivers
Key elements for pedestrians:
Deflection on entry to slow drivers
Key elements for pedestrians:
Well-defined crossings and splitter islands
Key elements for pedestrians:
Well-defined crossings and splitter islands
Key elements for pedestrians

Crosswalk Placement:
1 (plus) car length back from edge line

Source: FHWA Roundabout Guide
Crosswalk Placement – 20’ back from edge line – provides gap between queued vehicles
20' allows at least one exiting vehicle to yield to peds without blocking circulating traffic
Crosswalk set too far back
Crosswalk left off of this leg – people cross anyway
Key elements for pedestrians: Deflection at exit to slow drivers? (may conflict with other goals)
Key elements for pedestrians: Single lane is best
Multi-lane = less deflection, higher speed, “cheaters”
Multi-lane = less deflection, higher speed
Multiple threat at roundabout crossing
Elements for pedestrian:
No pedestrian access to central island
Landscaping discourages access to central island
People will still take the shortest route early on Sunday morning
People will still take the shortest route early on Sunday morning
Problem areas for travelers who are blind

• Locating the crosswalk
  – Preventing crossing into the circulatory roadway
• Aligning to cross
• Detecting a gap in traffic
Signalized pedestrian crossing

Passive detection or other methods could be used to limit vehicle delay
Signalized pedestrian crossing at multi-lane roundabout
Roundabouts: Designing to accommodate Bicyclists
# Single lane vs. Multilane

<table>
<thead>
<tr>
<th></th>
<th>Single lane</th>
<th>Multilane</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Circulating speed</strong></td>
<td>Can be designed to be bike-compatible (12-20 mph)</td>
<td>Typically faster than bike speeds (20-30 mph)</td>
</tr>
<tr>
<td><strong>Cyclist travel</strong></td>
<td>In line with cars</td>
<td>May be passed</td>
</tr>
<tr>
<td></td>
<td>No lane changes (ring is through-right option)</td>
<td>Must change lanes if making left turns</td>
</tr>
</tbody>
</table>
Single lane:
Bike-compatible speeds
Multilane: Higher speeds, need to choose a lane
Pavement Markings

a) Drop bike lane on entry with dashes, before crosswalk or bike-bypass ramp (indicates that merging is expected)

b) Resume bike lane on exit, after crosswalk or bike-bypass ramp

c) No bike lane on the circulatory roadway (would put through cyclist to right of exiting traffic)
Entering single lane roundabout: “single up”
Drop bike lane on entry, before crosswalk
(indicates that merging is expected)
Circulating: “Take the lane” in single lane
No bike lane on the circulatory roadway
Resume bike lane on exit, after crosswalk
What if a cyclist doesn’t want to enter the roundabout? Provide a ramp at busy roundabouts.
Using the splitter island like a pedestrian
Ramp back to the bike lane

No detectable warning!
Bike ramps at roundabouts so bicyclists can opt to use sidewalk
What is a roundabout?

A modern roundabout is a type of intersection that has safety, operational and aesthetic benefits for many different road users.

Roundabouts are characterized by:
- A fairly large central island
- A circular roadway on which all vehicles travel counterclockwise
- Drivers entering the roundabout yield to traffic already in the circular roadway
- Design elements that cause drivers to use the roundabout at slow speeds, including splitter islands at all approaches

What are the general principles behind using a roundabout?

Think of roundabouts as a series of "T" intersections, where entering vehicles yield to one-way traffic coming from the left. A driver approaching a roundabout must slow down or stop for vehicles stopped ahead, yield to pedestrians in the crosswalk, and yield to traffic already in the roundabout. Then it's a simple matter of a right turn onto a one-way street. Once in the roundabout, the driver proceeds around the central island, then takes the necessary right hand exit.

What are the advantages of roundabouts?

A well-designed roundabout can improve safety, operations and aesthetics of an intersection:
- **Greater safety** is achieved primarily by slower speeds and elimination of left turns
- **Operation** is improved by smooth flowing traffic (with less stop and go than a signalized intersection)
- **Aesthetics** are enhanced by landscaping and less pavement

Are there any disadvantages? What about costs?

Drivers must pay attention; pedestrians don’t have a signal to help them cross and bicyclists must merge with motor vehicles to enter the roundabout.

Construction costs are generally comparable to a traffic signal. Additional landscaping requires a long-term maintenance commitment, but normally costs less in the long run than signal maintenance.
Oregon DOT user guide (all modes)

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**Step-by-Step Instructions For Drivers & Bicyclists**

**Note to Bicyclists:** If you’re riding a bicycle, ride as if you were driving a car. Roundabouts are designed so motorists will drive at about 15-25 MPH, close to your bicycling speed. Be assertive, so cars see you and respect your right to be on the road.

The first cue that you are approaching a roundabout is the following sign, telling you here is a roundabout ahead:

![Roundabout Sign]

You should start slowing down. Next you will see a directional sign that shows where the exits are located on the roundabout:

![Directional Sign]

Now the roundabout will be clearly visible. Slow down to 10-15 MPH as you approach. Stay in your lane, to the right of the splitter island.

Be sure to look for bicyclists merging into the ravel lane, or pedestrians wanting to cross. Be considerate, and let the bicyclists merge. If you see a person in or about to enter the crosswalk, let them cross. It’s the LAW.

**Note to Bicyclists:** If you are riding on the shoulder or bike lane, merge into the travel lane before the shoulder ends. Prepare for this move early, look over your shoulder, and signal your intent to move into traffic. Don’t be intimidated, assert your position upon entering the roundabout.

If you do not want to ride your bicycle in the roundabout, you may enter the sidewalk using the ramps, and proceed as a pedestrian. Refer to the step-by-step instructions for pedestrians for more details.

Then move slowly to the yield line, looking left. A “Yield” sign will tell you to yield to traffic in the roundabout:

![Yield Sign]

You may have to stop to yield to cars on your left. If the road is clear, simply enter the roundabout, turning right. You don’t have to stop, just enter.

Proceed around the roundabout slowly. Don’t pass bicyclists ahead of you within the roundabout, as your speeds should be nearly equal. Continue until you get to your exit. Do not stop in the roundabout.

**Note to Bicyclists:** Once in the roundabout, don’t hug the curb. Ride close to the middle of the lane to prevent cars from passing and cutting you off. Watch for cars waiting to enter the roundabout, as they may not see you.

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**Step-by-Step Instructions For Pedestrians**

You can walk safely through a roundabout following these simple steps:

Proceed around the roundabout on the sidewalk and in the designated crosswalks. Never walk in the roundabout or to the central island.

Cross one lane at a time to the splitter island. It’s there to provide you a refuge between lanes.

When crossing an entry lane, watch for coming at you down the entry lane. Yield the right of way when you’re in the crosswalk, but be careful—make sure drivers can see you and stop for you.

When crossing an exit lane, watch for cars leaving the roundabout. Some vehicles will use their right-turn signal some won’t. You have the right of way but proceed carefully.

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**Directional Signs** will tell you where to exit:

- **Colorado Ave.**

Exit carefully, using your right turn sign. Watch for pedestrians in or approaching the crosswalk and stop for them.

That’s it, you’re done! Go on to your destination and enjoy the rest of your trip.

If you have questions, contact the ODOT Preliminary Design Unit at (503) 966-356.
## Crash Statistics - The Netherlands

Crash reductions by mode at intersections converted to roundabouts

<table>
<thead>
<tr>
<th>Mode</th>
<th>All Crashes</th>
<th>Injury Crashes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passenger car</td>
<td>63%</td>
<td>95%</td>
</tr>
<tr>
<td>Moped</td>
<td>34%</td>
<td>63%</td>
</tr>
<tr>
<td>Bicycle</td>
<td>8%</td>
<td>30%</td>
</tr>
<tr>
<td>Pedestrian</td>
<td>73%</td>
<td>89%</td>
</tr>
<tr>
<td>Total</td>
<td>51%</td>
<td>72%</td>
</tr>
</tbody>
</table>

Source: FHWA Roundabout Guide
## Pedestrian Crash Statistics

**Great Britain**

<table>
<thead>
<tr>
<th>Intersection Type</th>
<th>Pedestrian Crashes per Million Trips</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mini-roundabout</td>
<td>0.31</td>
</tr>
<tr>
<td>Conventional roundabout</td>
<td>0.45</td>
</tr>
<tr>
<td>Flared roundabout</td>
<td>0.33</td>
</tr>
<tr>
<td>Signals</td>
<td>0.67</td>
</tr>
</tbody>
</table>

Source: FHWA Roundabout Guide
## Bicycle Crash Statistics
### Great Britain

<table>
<thead>
<tr>
<th>Intersection Type</th>
<th>Bicyclists</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mini-roundabout</td>
<td>3.11</td>
</tr>
<tr>
<td>Conventional roundabout</td>
<td>2.91</td>
</tr>
<tr>
<td>Flared roundabout</td>
<td>7.85</td>
</tr>
<tr>
<td>Signals</td>
<td>1.75</td>
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</tbody>
</table>

Source: FHWA Roundabout Guide
### Crash Statistics - France

- **Source:** FHWA Roundabout Guide

<table>
<thead>
<tr>
<th></th>
<th>Signalized Crossroads</th>
<th>Roundabouts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of crossroads</td>
<td>1,238</td>
<td>179</td>
</tr>
<tr>
<td>Number of personal injuries</td>
<td>794</td>
<td>59</td>
</tr>
<tr>
<td>Number of crashes involving 2-wheel vehicles</td>
<td>278</td>
<td>28</td>
</tr>
<tr>
<td>Personal injury crashes/year/crossroad</td>
<td>0.64</td>
<td>0.33</td>
</tr>
<tr>
<td>2-wheel vehicle crashes/year/crossroad</td>
<td>0.23</td>
<td>0.13</td>
</tr>
<tr>
<td>Crashes to 2-wheel vehicles per 100 crashes</td>
<td>35.0</td>
<td>40.7</td>
</tr>
<tr>
<td>Serious crashes/year/crossroad</td>
<td>0.14</td>
<td>0.089</td>
</tr>
<tr>
<td>Serious crashes to 2-wheel vehicles/year/crossroad</td>
<td>0.06</td>
<td>0.045</td>
</tr>
<tr>
<td>Serious crashes/100 crashes</td>
<td>21.9</td>
<td>27.1</td>
</tr>
<tr>
<td>Serious crashes to 2-wheel vehicles/100 crashes to a 2-wheel vehicle</td>
<td>27.0</td>
<td>33.3</td>
</tr>
</tbody>
</table>
More information on these issues:

• **Session 5A – 8 AM Tuesday – Roundabout Experience & Practice – Bicycles at Roundabouts**

• **Session 7A – 1 PM Tuesday - Pedestrians**
Questions?

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