Washington State’s Roundabout Program

TRB National Roundabout Conference
May 25, 2005

Brian Walsh, P.E.
Washington State Department of Transportation
An alternative title could have been

“Myth Busters”
Fighting the perception…..

(Simpson Video)
Policy Development

“The Short Story”
Roundabout Task Force
### Chapter 915  Roundabouts

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**915.01 General**

Modern roundabouts are circular intersections at grade. They can be an effective intersection with any of these features are not an approved intersection type.

**Old rotaries and traffic circles** are characterized by a large diameter, often in excess of 300 ft. This large diameter typically results in travel speeds within the circulating roadway that exceed 30 mph. They typically provide little or no horizontal deflection of the paths of through traffic. These large diameters also create weaving areas that increase accidents in the circulating roadway. At times, traffic control was imposed on the circulating traffic, such as yield or stop signs that required circulating traffic to yield to entering traffic. In some cases, each entry was controlled with a traffic signal. Circular intersections with any of these features are not an approved intersection type.

*(1) Locations Recommended for Roundabouts*
Chapter 910

Intersections At Grade

910.01 General
Intersections are a critical part of highway design because of increased conflict potential. Traffic and driver characteristics, bicycle and pedestrian needs, physical features, and economics are considered during the design stage to develop channelization and traffic control to enhance safe and efficient multimodal traffic flow through intersections.

This chapter provides guidance for designing

910.02 References
910.03 Definitions
910.04 Design Considerations
910.05 Design Vehicle
910.06 Right-Turn Corners
910.07 Channelization
910.08 Roundabouts
910.09 U-Turns
910.10 Sight Distance at Intersections
910.11 Traffic Control at Intersections
910.12 Interchange Ramp Terminals
910.13 Procedures
910.14 Documentation

WAC 468-52, “Highway access management—Access control classification system and standards”

Local Agency Guidelines (LAG), M 36-63, WSDOT

Manual on Uniform Traffic Control Devices for Streets and Highways, USDOT, FHWA; including the Washington State Modifications to the MUTCD, M 24-01, WSDOT (MUTCD)

Standard Plans for Road, Bridge, and Municipal Construction (Standard Plans), M 21-01, WSDOT

Roundabouts: An Informational Guide, FHWA-RD-00-067, USDOT, FHWA

Guidelines and Recommendations to Accommodate Older Drivers and Pedestrians, FHWA-RD-01-051, USDOT, FHWA, May 2001

A Policy on Geometric Design of Highways and Streets (Green Book), 2001, AASHTO

Highway Capacity Manual (HCM), Special Report 209, Transportation Research Board, National Research Council

NCHRP 279
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<tr>
<th><strong>Design Element</strong></th>
<th><strong>Mini</strong> (1)</th>
<th><strong>Urban Compact</strong></th>
<th><strong>Urban Single-Lane</strong></th>
<th><strong>Urban Double-Lane</strong></th>
<th><strong>Rural Single-Lane</strong></th>
<th><strong>Rural Double-Lane</strong></th>
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<tbody>
<tr>
<td>Number of Lanes</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
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<tr>
<td>Typical max. ADT</td>
<td>12,000</td>
<td>15,000</td>
<td>20,000</td>
<td>40,000</td>
<td>20,000</td>
<td>40,000</td>
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<tr>
<td>Splitter Island Treatment</td>
<td>Painted, raised if possible</td>
<td>Raised</td>
<td>Raised</td>
<td>Raised extended</td>
<td>Raised extended</td>
<td></td>
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<tr>
<td>Inscribed Circle Diameter</td>
<td>45'-80'</td>
<td>80'-100' (5)</td>
<td>100'-130' (6)</td>
<td>150'-180'</td>
<td>115'-130' (6)</td>
<td>180'-200' (6)</td>
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<tr>
<td>Circulating Roadway Width</td>
<td>14'-19'</td>
<td>14'-19'</td>
<td>14'-19'</td>
<td>20'-32'</td>
<td>14'-19'</td>
<td>20'-32'</td>
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<tr>
<td>Max. Entry Design Speed</td>
<td>15 mph</td>
<td>15 mph</td>
<td>20 mph</td>
<td>25 mph</td>
<td>25 mph</td>
<td>30 mph</td>
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<tr>
<td>Entry Radius</td>
<td>25'-45' (7)</td>
<td>25'-100' (7)</td>
<td>35'-100' (7)</td>
<td>100'-200'</td>
<td>40'-120' (7)</td>
<td>130'-260' (7)</td>
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<tr>
<td>Entry Lane Widths</td>
<td>14'-16'</td>
<td>14'-16'</td>
<td>14'-16'</td>
<td>25'-28'</td>
<td>14'-16'</td>
<td>25'-28'</td>
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</table>

(1) Mini roundabouts are not suitable for use on a
(5) Use 100 ft minimum on state routes.
Flexibility Document

Examples

Exhibit III-1-21 — Essential elements to consider when providing pedestrian facilities at intersections:

- Consider safety by evaluating the separation of potential conflicts in space and/or time.
- Optimize pedestrian visibility.
- Evaluate pedestrian route continuity.
- Consider the mobility, comfort, and convenience of all users.
- Consider appropriate pedestrian features consistent with the design content.
- Identify the time and distance required for a pedestrian to cross at the intersection.
- Reduce vehicular speed at the intersection.
- Accessibility.

Exhibit III-1-22 — Pedestrian Facilities: Approaching and at a Roundabout, Including Sidewalks and Crosswalks.

- Note the pedestrian barrier provided to prevent undesirable pedestrian crossings and the route continuity maintained through the intersection (Location: Port Orchard, WA).

Exhibit III-4.4 — Illustration of the WB-87 (Source: WSDOT)

The WB-87 is the largest truck vehicle on state routes, and it has frequently been used as the largest vehicle to be considered when selecting a design vehicle for intersections. When selecting design vehicles for intersections, independent studies should be made for each leg of the intersection. The frequency results in different design vehicles for different legs of the intersection. Design vehicle decisions for intersections influence elements such as roadway width, street width, roundabout design, and crosswalks. Heavy trucks and the size of vehicles necessary to serve business along the corridor should be considered when selecting a design vehicle for intersections. Alternative routes that might be available for larger vehicles (as well as local pedestrian activity, bicycle usage, traffic volume, the percentage of trucks, and the speed of the facility) should also be considered.

Proper design vehicle considerations result in efficient traffic flows with the typical traffic mix of vehicles and non-motorized traffic. If too small a design vehicle is used, the design parameters of traffic volumes can result when larger vehicles pass through. If too large a design vehicle is used, the pedestrian crossing distances and the number of people are significantly increased.

Exhibit III-4.2 — Illustration of Roundabout Design

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Leading Roundabout Cities

- Kennewick (11)
- Lacey (8)
- University Place (7)
For More Information:

City of Olympia
Department of Public Works
520 Pear St. S.E.
P.O. Box 1967
Olympia, WA 98501
Phone: (360) 753-8768
Fax: (360) 753-8771

City of Lacey
Department of Public Works
420 College St. S.E.
P.O. Box 3400
Lacey, WA 98509-3400
Phone: (360) 491-5600
Fax: (360) 456-7799

Washington State Department of Transportation – Highways and Local Programs Service Center
310 Maple Park Avenue S.E.
P.O. Box 47390
Olympia, WA 98504-7390
Phone: (360) 705-7000
Fax: (360) 705-6822

This video was developed in partnership with the City of Lacey, City of Olympia and the Washington State Department of Transportation.
Excerpt from “Modern Roundabout Driving” Video
Roundabouts

A roundabout is an intersection control device with traffic circulating around an island. Approaching vehicles must yield to the traffic in the circle. Always yield to pedestrians and bicyclists who are legally crossing the road. Inside the circle, always drive around the circle to the right.

How to drive in a roundabout:
1. Slow down as you approach the intersection; roundabouts are designed for speeds of 15-20 mph.
2. Enter the roundabout when there is a gap in traffic. Once inside, do not stop.
3. You may exit at any street or continue around if you miss your exit.
Low Tech Tools
HO Scale Model Trucks
Truck Accommodation
Open House Use
Our first roundabout(s)
West Lake Sammamish Parkway
Operations
Unique Issues
SR 203 during first month – Video footage
"Ideal" Central Island
Conforms with Aesthetics
“Preferred” use of Central Island
A State DOT’s “preferred” way
Innovative way to use the Central Island!
“Plumbing Optional”
Kittitas County
Washington State Law regarding fault in roundabout crashes
Striping
State Route 203
Design Visualization
Outreach
Peds on Central Island?
Washington State Roundabout Status

- 67 “bonafide” roundabouts as of Dec 2004
- A good mix of WSDOT, city and county
- Construction will add 10 – 15 roundabouts in 2005
- More than 50 in design
- How many don’t we know about?
Questions/Comments?