Bicyclists and Pedestrians at Interchanges

ITE Quad Conference

May 2009
Presentation Overview

• Issues for all users at on and off ramps
• Existing Guidance
• Recommendations for off-ramps
• Recommendations for on-ramps
• Next Steps
Shared right/through lane is a difficult configuration for bicyclists.
Drivers utilize space normally available to cyclists to pass stopped traffic en route to the freeway on-ramp.
The dual lane on-ramps are difficult for pedestrians to cross and create weaving problems with bicyclists.
Pedestrian crossings across on-ramps are often difficult for approaching drivers to see.
Two-lane on-ramps make pedestrian crossing difficult due to limited visibility and confusion over cars approaching from second lane.
Provisions for pedestrians are often minimal.
Land uses in many areas are changing to high density, transit-oriented uses, often near rail stations.
Improvement Focus
Existing Design Guidance

Oregon
California
Minnesota
Florida
Wisconsin
Hawaii
Vermont

Source: Oregon Bicycle and Pedestrian Plan
Accommodating Bicyclists and Pedestrians at Interchanges
ITE Pedestrian and Bicycle Council and Traffic Engineering Council Joint Workshop
TRB Annual Meeting
Washington, D.C.
GUIDING PRINCIPLES

1. Provide bicycle and pedestrian facilities.
2. Encourage slower vehicle speeds until past on-ramp pedestrian crosswalk.
3. Locate crosswalk at the location with best visibility and before the point where vehicles begin to accelerate to enter the freeway.
4. Crosswalks should be as short as possible.
5. Where bicyclists would travel between two moving lanes for more than 200 feet, install a buffer zone between the bike lane and right-turn lanes.

DESIGN CONCEPTS

The following are examples, from best to worst, of how to accommodate bicycle and pedestrians at interchanges. These examples can be used for new interchange design or for retrofits.

Provision of a shared through/right-turn lane adjacent to a dedicated right-turn lane is not shown as it is strongly discouraged.

Case #1: Shared Through-RT On-Ramp

Case #2: Short, Single RT Lane On-Ramp

Case #3: Long, Single RT Lane On-Ramp

Case #4: Short Dual RT On-Ramp

Case #5: Long Dual RT On-Ramp

Case #6: Long Dual Trap RT Lane

“Yield here to pedestrians”

GENERAL NOTES

When HOV lanes are present, they should begin on the on-ramp downstream of the crosswalk.

Preferred crosswalk locations are shown assuming level terrain. Site conditions, particularly sight distance, should be considered.

Crosswalk control and markings should be based on the speed, volume, and number of lanes of traffic using the NCHRP 562 Appendix A recommendations.
<table>
<thead>
<tr>
<th>FIELD</th>
<th>CATEGORY</th>
<th>INPUT</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Speed Limit</td>
<td>40</td>
<td>mph</td>
</tr>
<tr>
<td>2</td>
<td>Peak Hour Pedestrian Volume</td>
<td>22</td>
<td>ped/h</td>
</tr>
<tr>
<td>3</td>
<td>Major Road Peak Hour Volume (Total)</td>
<td>2707</td>
<td>veh/h</td>
</tr>
<tr>
<td>4</td>
<td>Major Road Peak Hour Volume Direction 1</td>
<td>1354</td>
<td>veh/h</td>
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<tr>
<td>5</td>
<td>Major Road Peak Hour Volume Direction 2</td>
<td>1353</td>
<td>veh/h</td>
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<tr>
<td>6</td>
<td>Average Pedestrian Walking Speed</td>
<td>3.5</td>
<td>ft/s</td>
</tr>
<tr>
<td>7</td>
<td>15th Percentile Crossing Speed</td>
<td>3</td>
<td>ft/s</td>
</tr>
<tr>
<td>8</td>
<td>Pedestrian start-up time and end clearance time*</td>
<td>3</td>
<td>s</td>
</tr>
<tr>
<td>9</td>
<td>Pedestrian Crossing Distance (curb to curb)</td>
<td>80.16</td>
<td>ft</td>
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<tr>
<td>10</td>
<td>First Half Crossing Distance</td>
<td>39.83</td>
<td>ft</td>
</tr>
<tr>
<td>11</td>
<td>Second Half Crossing Distance</td>
<td>40.33</td>
<td>ft</td>
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<tr>
<td>12</td>
<td>Number of Lanes</td>
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<td>Lanes</td>
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<td>13</td>
<td>Expected Motorist Compliance</td>
<td>Low</td>
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<tr>
<td>14</td>
<td>Is frequent at-grade transit present?</td>
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<tr>
<td>15</td>
<td>Are bicycle lanes present?</td>
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<tr>
<td>16</td>
<td>Is there heavy bicycle traffic?</td>
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<tr>
<td>17</td>
<td>Is there a clear major and minor road?</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Are there sight distance problems?</td>
<td>No</td>
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<tr>
<td>19</td>
<td>Is there heavy truck traffic?</td>
<td>No</td>
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<td>20</td>
<td>Does existing infrastructure limit potential treatments?</td>
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<tr>
<td>21</td>
<td>Is there on-street parking at the location?</td>
<td>No</td>
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</tr>
<tr>
<td>22</td>
<td>Is the location in a downtown area?</td>
<td>No</td>
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<tr>
<td>23</td>
<td>Is a median refuge island present?</td>
<td>Yes</td>
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<tr>
<td>24</td>
<td>Actual Total Pedestrian Island Delay</td>
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<td>s</td>
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<tr>
<td>Output</td>
<td>Value</td>
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<tr>
<td>---------------------------------------------</td>
<td>--------------------------------------------</td>
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<tr>
<td>Signalized Crossing or Unsignalized Crossing?</td>
<td>Unsignalized Crossing</td>
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<tr>
<td>Candidate Pedestrian Treatment Identified</td>
<td>HAWK</td>
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<td></td>
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<td>Candidate for Median Refuge Island?</td>
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<td></td>
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<tr>
<td>Candidate for Road Diet?</td>
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<tr>
<td>Other Treatments for Consideration*</td>
<td>Hawk, signal controlled with flashing red</td>
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</tbody>
</table>

Note: Spreadsheet should supplement engineering judgment and should be used in conjunction with treatment fact sheets per NCHRP Report 562. Credit: Fehr & Peers, April 2008. Version 1.02
Multiple Threat Crash Type
New Device: “Stutter Flash”

31st St. North of 54th Ave. South
St. Petersburg, FL
Median unit “on”
How? Signals
FREE RIGHT OFF-RAMP
LESS THAN 200'

One Inch = Twenty Feet
2 LANE OFF-RAMP
FREE RIGHT + YIELD/MERGE
Preferred - Realign

2 Lane Off-Ramp
Free Right + Yield/Merge

- Rider lane
- Sidewalk

Signalize with advance stop bars
Allow KTOR if sight distance permits

Add lane downstream if required for right-moves

One Inch = Twenty Feet
2 LANE OFF-RAMP/2 FREE RIGHTS
GREATER THAN 200'

MERGE

TRAP RIGHT

2 TRAP RIGHTS

ONE INCH = TWENTY FEET
Alternate

2 LANE OFF-RAMP/2 FREE RIGHTS
GREATER THAN 200'

ONE INCH = TWENTY FEET

HAWK for pedestrians and bikes

TRAP RIGHT

2 TRAP RIGHTS