

Identifying Characteristics of High-Risk Intersections for Pedestrians and Cyclists



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AASHTO RAC – TRB Annual Meeting
July 16, 2013



Introduction

- The travel experience varies by mode (auto, transit, bike, ped)
- Intersections are typically the most dangerous locations for pedestrians and cyclists
- Which intersections are the most dangerous for cyclists and pedestrians?
- How are high-risk intersections different from low-risk intersections?



Background



- Pedestrians and traffic crashes:
 - Nearly 12 percent of all traffic fatalities
 - Almost 60,000 injuries per year
- The built environment plays a major role in safety
- Characteristics that impact safety:
 - Traffic volume
 - Land-use mix
 - Exclusive turning movements
 - Number of lanes
 - Intersection width
 - Signal timings

Method

- Intersection Classification
 - Crash Data
- Inventory of site characteristics
 - Transportation System
 - Built Environment
 - Demographics and Other Data

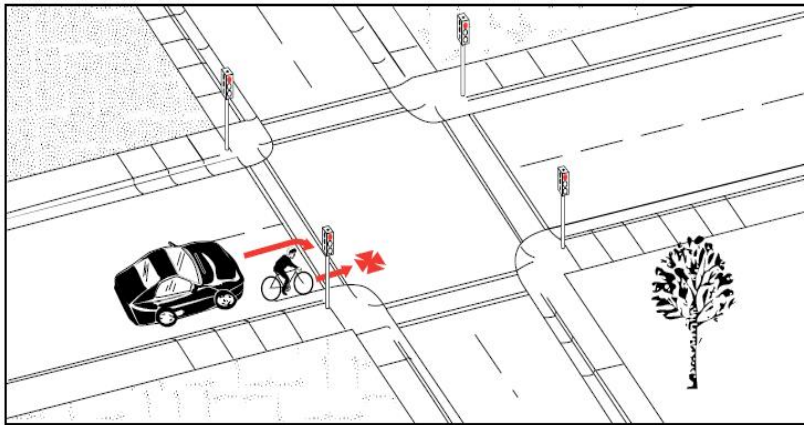


High-Risk Intersection

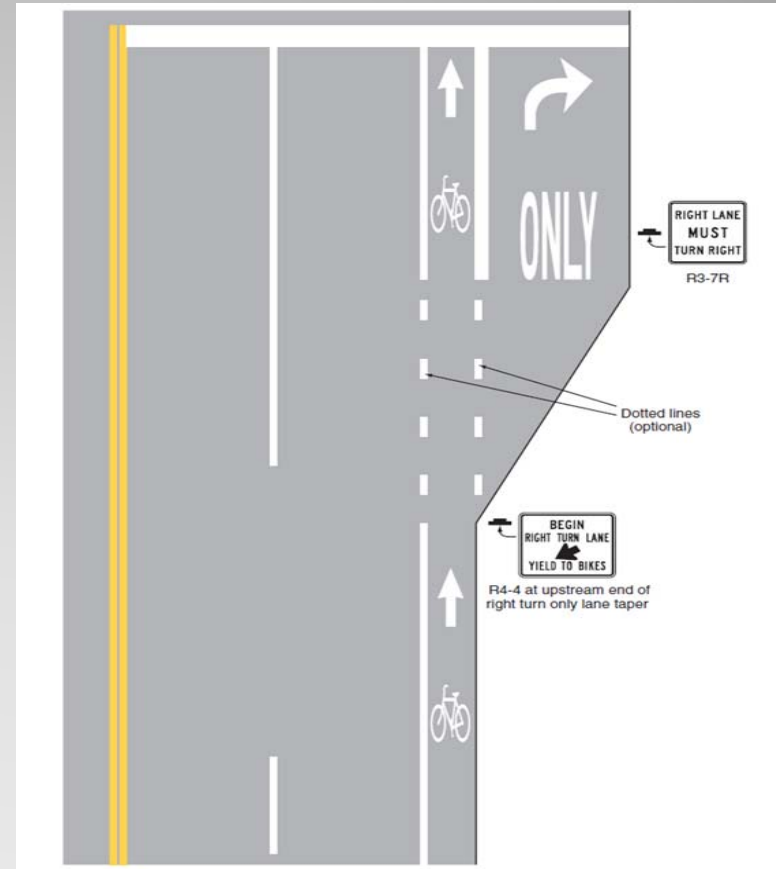
Site Characteristics

| Transportation System Characteristics | Built Environment Characteristics | Other Data |
|---------------------------------------|---|----------------------------------|
| # of Roadway Legs | # Sidewalks | Median income (within ¼ mile) |
| Speed Limit | Sidewalk Widths | % population <18 (within ¼ mile) |
| Level of Service | Curb Radius | % population <65 (within ¼ mile) |
| Number of Lanes | Pedestrian Approaches (#) | Pedestrian volume (per hour) |
| Road Width | Land-Use (Res, Comm, Mixed) | Cyclist volume (per hour) |
| Bike Lanes | Street Trees | |
| Signals (light, stop sign, etc.) | Building Set Back | |
| Signal Timing | Bus stops (within ¼ mile) | |
| Dedicated Left Turn Lane (#) | Non-Residential Driveways (within ¼ mile) | |
| Dedicated Right Turn (#) | Rail Stops (within ¼ mile) | |
| Raised Center Median (#) | Trails (within ¼ mile) | |
| # of Through Lanes | Freeway on/off ramps (within ¼ mile) | |
| Crosswalk (#) | | |
| Pedestrian signals (#) | | |
| Pedestrian Signal Timing | | |

Right Turns



Right Hook



Dedicated Right Turn Lane

Intersection Characteristics

| Characteristic | High-Risk | Low-Risk | All Intersections |
|--|-----------|----------|-------------------|
| Speed Limit | 40 | 35 | 37.6 |
| Number of Lanes | 6.11 | 6.625 | 6.44 |
| Roadway Width (feet) | 85.95 | 99.175 | 92.25 |
| Sidewalk Segments (8 possible) | 7.82 | 7.20 | 7.52 |
| Bike Lanes (4 possible) | 1.36 | 0.80 | 1.10 |
| Pedestrian Volume (per hour) | 35.09 | 30.20 | 32.76 |
| Cyclist Volume (per hour) | 5.64 | 3.90 | 4.81 |
| Bus Stops (within ¼ mile)* | 7.27 | 7.00 | 7.14 |
| Non-Residential Driveways (within ¼ mile) | 39.27 | 41.40 | 40.29 |
| Rail Stops (within ¼ mile)* | 0.09 | 0.30 | 0.19 |
| Trails (within ¼ mile) | 0.27 | 0.20 | 0.24 |



Signal and Crossing Characteristics



| Characteristic | High-Risk | Low-Risk |
|--|-----------|----------|
| Signal Length (seconds) | 40.23 | 50.15 |
| Left Turn Arrows | 90.9% | 90.0% |
| Dedicated Left Turn Lanes (intersection total) | 4.91 | 5.10 |
| Dedicated Right Turn Lanes (intersection total) | 2.45 | 3.90 |
| Through Lanes (per segment) | 2.41 | 2.15 |
| Raised Center Medians | 0.0% | 20.0% |
| Pedestrian Countdowns | 54.5% | 60.0% |
| Countdown Length (seconds) | 9.05 | 13.9 |

Built Environment Characteristics

| Characteristic | High-Risk | Low-Risk |
|--------------------------|-----------------------|-------------------|
| Street Trees | 9.1% | 20.0% |
| Sidewalk Width (feet) | 5.26 | 4.80 |
| Building Setbacks (feet) | 64.38 | 79.90 |
| Land-Use* | 36.4% Com 63.6% MU | 60% Com 40% MU |



What Makes an Intersection Low Risk?



Longer signal lengths

Dedicated right-turn lanes

Narrower sidewalks

Street trees

No road construction

Report and Video

Research Report:

1. Go to:
www.udot.utah.gov/go/research
2. Click "*Reports/Newsletter*"
3. Click "*Program Development*"
4. Click "*Identifying Characteristics of High Risk Intersections for Pedestrians and Cyclists*"

YouTube Video:

1. Go to:
www.udot.utah.gov/go/research
2. Click "*Multimedia*"
3. Click "*Youtube*"
4. Click "*High Risk Intersections for Pedestrians and Cyclists*"