Refined Pedestrian Crossing Toolbox

Treatments on Wide, High-Speed Urban Roadways

Developed as Part of the Springfield Main Street (OR 126) Safety Study

Project Team

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Problem Statement

• Main Street in Springfield, Oregon
  – Focal point of safety concerns for many years
  – Particular public concern for pedestrians
  – 9 pedestrian fatalities in past 10 years (40th Street to 57th Street)

• Solution: Corridor Safety Study
  – Determine short-term and long-term improvements
  – Emphasis on pedestrian crossing improvements at unsignalized locations

Main Street Study Corridor

Overall Corridor
• 47,000 to 66,000 ADT
• Five-Lane Cross Section with Bike Lanes and Sidewalks
• Major Transit Corridor

Aerial of Study Corridor

Crossing Accommodations and Pedestrian Fatalities

New Rectangular Rapid Flashing Beacon (RRFB) Crossing Recently Installed

Traffic Signal with Pedestrian Crosswalk
Raised Center Island (Not ADA Accessible)
Pedestrian Fatality
Residential (East of 60th Street)

Retail Center (58th Street)

Mixed Use (53rd Street)

Small Commercial (41st Street)

Service Commercial (40th Street)

Mixed Use (35th Street)
Do Pedestrians Really Try to Cross Main Street?

You can often find gaps if you wait long enough.

Especially when the signals cause platoons.

The traffic separator islands are often used for staging.

Sometimes very leisurely.

The center two-way left-turn lane is also used for staging.
This often results in conflicts with left-turning vehicles.

To catch a bus, pedestrians will take more risks.

And hope that bus drivers are accommodating.

Cyclists also don’t want to be left out of the action.

And kids are also adventurous, especially with friends.

Poor lighting at night is another major issue. This is when all of the pedestrian fatalities occurred.
Rectangular Rapid Flashing Beacon

**Pedestrian Toolbox Development**

1. Identify all potential crossing treatments
2. Determine which treatments are not applicable to study corridor
3. Evaluate remaining treatments
   - Pros/Cons
   - Applicability Criteria
   - Cost Estimates

**Potential Crossing Treatments**

- Median Refuge Islands
  - Street Lighting
    - Supplementary Lights on Utility Poles
    - New Cobra Head Lighting
  - Active Traffic Control
    - Rectangular Rapid Flashing Beacon (RRFB)
    - Overhead Flashers
    - Pedestrian Hybrid Beacon - High intensity Activated Crosswalk (HAWK)
    - Pedestrian Traffic Signal

**Street Lighting**

- Pros
  - Improved pedestrian and vehicle visibility at night
  - Clear lighting issue (all pedestrian fatalities occurred at night)
- Cons
  - May contribute to over lighting
  - Maintenance costs
- Other Considerations
  - Locate new lights to increase lighting uniformity (avoid alternating light/dark)
  - Estimated Cost = $1,000 per light for utility pole mounted; $15,000 per pole for standalone ODOT steel cobra head

**Rectangular Rapid Flashing Beacons (RRFB)**

- Pros
  - LED flashing devices highly visible to motorists
  - High motorist compliance
  - Cost effective
  - Solar power capable
  - Appropriate for low or medium pedestrian crossing volumes
- Cons
  - Does not provide a “red” condition
  - Can start dimming at end of effective life
- Other Considerations
  - Estimated Cost = $8,000 per sign assembly
  - No median = 2 assemblies
  - Median = 4 assemblies (plus median cost)

**Median Refuge Islands**

- Pros
  - Protected area for pedestrians
  - Accommodates two-stage crossings
  - Contributes to traffic calming
- Cons
  - Added obstruction
  - Conflicts with left-turn movements
  - Limits driveway access
- Other Considerations
  - Diagonal refuge orients pedestrians to face on-coming traffic
  - Estimated Cost = $30,000

**Crossing Treatments Not Applicable**

- Curb Extensions
  - Right-of-way constraints
  - Bike lane conflicts
- Traffic Calming Measures (i.e. speed humps, narrow lanes)
  - Not consistent with ‘arterial’ and ‘truck route’ classifications
  - Emergency service conflicts
- In-Roadway Lighting
  - Highly susceptible to roadway damage (especially from snow plows)
  - Cost intensive for installation and maintenance
  - Not approved by ODOT
- Grade-Separated Pedestrian Crossing (i.e., Pedestrian Bridge or Tunnel)
  - Cost prohibitive
  - Right-of-way constraints
  - Not always used

**Project Process**

Overhead Flashing Beacons

- Pros
  - Increases driver awareness
  - Appropriate for low or medium pedestrian crossing volumes
- Cons
  - Does not provide a "red" condition to stop motorists
  - Higher installation cost
- Other Considerations
  - Estimated Cost = $80,000

Pedestrian Hybrid Beacon - High Intensity Activated Crosswalk (HAWK)

- Pros
  - Improves visibility of pedestrians
  - Includes "red" condition to stop motorists
  - Indicates when conditions are changing
- Cons
  - Only appropriate for moderate to high pedestrian demand
  - Difficult to implement on roadways with high access density
  - High installation and maintenance costs
  - Greater delays to vehicles due to red phase
- Other Considerations
  - MUTCD provides applicability requirements
  - Estimated Cost = $150,000

Pedestrian Traffic Signal

- Pros
  - Improves visibility of pedestrians
  - Includes "red" condition to stop motorists
  - Uses standard signal configuration
- Cons
  - High installation and maintenance costs
  - Greater delays to vehicles due to red phase
  - Must meet MUTCD warrants for very heavy pedestrian use
- Other Considerations
  - Estimated Cost = $150,000

Pedestrian Toolbox Use in Selection of Recommended Concepts

1. Toolbox treatments considered for prioritized locations
2. Specific concepts developed
3. Maintained overall corridor consistency on corridor

Preferred Treatment

- Rectangular Rapid Flashing Beacons (RRFB)
  - MUTCD Interim Approval
  - ODOT Support
  - High Driver Compliance
  - Flashers Visible at Night
  - Cost-Effective
  - Lower Vehicle Delay
  - For Low to Medium Pedestrian Crossing Levels
  - Corridor Consistency (Appropriate Option for All Priority Locations)

Supplemental Treatments

- Advanced Stop Bar
- Median Pedestrian Refuge (Diagonal Cut)
- Supplemental Overhead RRFBs (at 2 Locations)
- Street Lighting
- Transit Stop Relocation (Far-Side)
- Driveway Closures Near Crosswalks
1. 41st Street

2. 51st Street *ODOT Planned Improvement*

3. ODOT Installation of 51st Street RRFB

4. 57th Street

5. 34th-35th Streets
6 40th Street

7 Chapman Lane

8 48th-49th Streets

9 38th Street

Relocated Transit Stop
McKenzie Power Equipment
New Street Light

40th Street

Relocated Transit Stop
Lee's Village
New Street Light

Chapman Lane

Relocated Transit Stop
Time Out Tavern
Apartments

Relocated Transit Stop
Umpqua Bank

48th-49th Streets

Relocated Transit Stop
Woodside Assisted Living Community

38th Street

Existing Luminaire

Proposed Luminaire