STEP
Safe Transportation for Every Pedestrian
Speaker

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FHWA EVERY DAY COUNTS 4 / STEP
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Pedestrian Safety Trends

Data Source: FARS
Nationally Why STEP?

• Over 66% of pedestrian fatalities occur at non-intersection locations

• Roughly 16% of pedestrian fatalities occur at uncontrolled intersections
What is the **STEP** innovation?
Enhanced Crossings @ Uncontrolled Locations
STEP Vision

Vision: Help agencies provide the safest possible pedestrian crossings to reduce fatalities and connect their communities.

Mission: Encourage and assist practitioners in providing safer crossings for all pedestrians through the implementation of appropriate safety treatments at uncontrolled crossing locations.
**Goal:** Empowering People to Improve Their Lives

**STEP 1:** Does our agency want to get pedestrians safely across the road?

**STEP 2:** What type of roadways are people trying to cross?

**STEP 3:** Which countermeasure(s) should be selected?
STEP 1: Primary Question

Does your agency want to get pedestrians safely across the road?

- Does your agency have a policy?
- Does your agency have a process?
How to determine where to mark a crosswalk?

Consider origins and destinations

In this case, apartments across from bus stop & stores
STEP 2: What Type of Roadways are People trying to Cross?

- Number lanes
- Average Daily Traffic
- Speed limits/Actual speeds
- Median or Pedestrian Refuge Island in place
Marked vs. Unmarked Crosswalks at Uncontrolled Locations

Marked vs. Unmarked Analysis

Speeds < or = to 40 mph

• Two-lane roads: No significant difference in crash rate

• Multilane roads (3 or more lanes)
  o Under 12,000 ADT: no significant difference in crash rate
  o Over 12,000 ADT w/ no median: crashes marked > crashes unmarked
  o Over 15,000 ADT & w/ median: crashes marked > crashes unmarked

https://www.fhwa.dot.gov/publications/research/safety/04100/
STEP 3: What Countermeasures Should be Selected?

Developed by
1. Surveying State DOT’s, Local Transportation Agencies
2. Identifying & synthesizing effective practices and policies
3. Comprehensive literature review of safety evidence for more than 25 pedestrian crossing treatments

http://www.trb.org/Publications/Blurbs/175419.aspx
The Fabulous Five

- Crosswalk Visibility Enhancements
- Pedestrian Refuge Islands
- Raised Crosswalks
- Pedestrian Hybrid Beacon (PHB)
- Road Diets
Crosswalk Visibility Enhancements
High Visibility Crosswalk

What Pedestrians See

What Drivers See

Photo Source all 4: Michael Ronkin
• Advance yield line (shark’s teeth) & sign
• Consider double white lines for no passing
Crosswalk Visibility Study

Figure 19. Graphic. Dimensions used for installed bar pair markings.

Figure 20. Graphic. Dimensions used for installed continental markings.

Figure 21. Graphic. Dimensions used for installed transverse markings.

Photo and images from Crosswalk Visibility Study
Supplement textured crosswalks with white lines to increase visibility
In-street pedestrian crossing signs

Yield or Stop depends on state law

2009 MUTCD Section 2B.12 and Figure 2B-2
Crosswalk Visibility Enhancements
Pedestrian Crossing signs

2009 MUTCD Sec. 2C.50 & Fig. 2C-11
Crosswalk Visibility Enhancements
Crosswalk Lighting

- CRF 42% to 59%
  - Lighting at intersections
  - 4 star rating
  - Vehicle/ped crashes

Photo source: Youtube screen capture SWARCO
Lighting Over Crosswalks

Fig 11. Traditional midblock crosswalk lighting layout

Fig 12. New design for midblock crosswalk lighting layout

Recommended lighting level: 20 lux at 5’ above pavement
Raised Crosswalks

Photo Source: SRTS Guide

Photo Source: Seattle.gov Crosswalks
Raised Crosswalks
NCHRP Synthesis 498 (December 2016)

Key Measured Effects
• Lower speeds
• Improved motorist yielding at some locations
• 30% CRF for all crashes
• 36% CRF for all fatal injury crashes
Considerations

• May not be appropriate if street is a bus route or emergency route
  • Emergency services consulted
  • Snow Plowing public works consulted
• 1 may be necessary & serve primary need Several may be disruptive, so other measures should be considered
• Visually impaired pedestrians need truncated domes
• Drainage
• May be inappropriate for crossings on curves or steep roadway grades
Pedestrian Refuge Islands
Raised median - Breaks complex crossing into two simpler crossings

CRF: V/P 39% unmarked crosswalks (uncontrolled)

CRF: V/P 46% marked crosswalks (uncontrolled)
Pedestrian Hybrid Beacons (PHB)

CRF: Vehicle/Pedestrian 69%
Early PHB Research

- 102 control sites / 21 PHB sites (~3 yrs before/after)
- 69% CRF involving pedestrians
  - Statistically significant at a 95% confidence level
- 15% reduction in severe crashes that result in injury
  - This was not statistically significant at a 95% confidence level, probably because of the low number of these types of crashes
- A 29% reduction in total crashes
  - Statistically significant at a 95% confidence level
Research of PHB

• 20 PHB sites open-road study
• Driver yielding to pedestrians avg 96%
• Overall, 91% pedestrians pushed pushbutton to activate the PHB in the crosswalk
• A greater percentage number of pedestrians activated the device when on 45 mph posted speed limit roads as compared to roads with posted speed limits of 40 mph or less

Excerpts from 2009 MUTCD Chapter 4F For Pedestrian Hybrid Beacons

The CROSSWALK STOP ON RED sign shall be used
There are Guidelines (similar to signal warrants) for Pedestrian Hybrid Beacons – variables include:

- Pedestrian volume
- Traffic speeds
- Traffic volumes
- Crosswalk length

MUTCD Sections 4F.1 and 4F.2
Road Diet / Roadway Reconfiguration

- Reduce crossing distance
- Eliminate /reduce “multiple threat” crash types
- Install crossing island to cross in 2 simple steps

Photo Source: Complete Streets
• Reduce top end travel speeds
• Buffer sidewalk from travel lanes (parking or bike lane)
• Reclaim street space for “higher and better use” than moving peak hour traffic
Road Diets

Considerations

- Safety
- Operations
  - Peak Hour
- Design
  - Signalized Intersection Adjustments
- Resurfacing
- Context Sensitive Solutions/Complete Streets
Road Diet Evaluation

✓ Minimal Impacts on Side Streets
✓ Reduce Speeding
✓ Increase Bicyclist Volumes
✓ Increase Pedestrian Volumes
✓ Reduce Crashes
✓ Increase On-Street Parking Use Rates
✓ Increase Pedestrian Satisfaction
✓ Increase Parking Satisfaction
This 5-lane Main Street was converted to...
Name 4 things that changed

Fewer travel lanes; added bike lanes; parallel to back-in diagonal parking on one side; new pavement
State Policies and Implementation
Oregon

• *All Roads Transportation Safety (ARTS)* pedestrian and bicycle funding program (initiated in 2017)

• *Pedestrian and Bicycle Implementation Plan* (February 2014) – emphasis on corridor projects

• Focus on Raised Median Islands
Oregon

ARTS program:

• based on benefit cost analysis

• uses a risk factor matrix process to identify spot and systemic treatments
Florida

- Florida DOT Median Handbook

- Integration into other guidance
  - Florida DOT Plan Preparation Manual
  - Florida DOT Design Standards

- Focus on raised medians
Florida

Florida DOT Median Handbook
• Evidence-based
• Integrated into other design guidance
• Considers benefits to traffic operations, pedestrian safety, vehicular safety and traffic flow/operations
North Carolina

Pedestrian Crossing Guidance Decision Support Tool
North Carolina

Focus on mid-block unsignalized crosswalks

Classroom training and implementation support
Arizona

• *Pedestrian Hybrid Beacons (PHB/ HAWKS) Installations and Operation*

• Tucson had over 114 PHB’s installed as of June 2012.
Arizona

Implementation has been complimented by outreach and promotion

Instructional Video
https://www.azdot.gov/media/blog/posts/2015/04/23/understanding-the-pedestrian-hybrid-beacon
Key Elements for Pedestrian Countermeasure Policies

• Evidence/Data Driven

• Documented Procedures

• Outreach and training

• Integration into broader transportation programs and design guidance
Next Steps

- Develop a “Model Policy” for implementation
- Webinars and Outreach
- Pedestrian Safety Action Plans
- Road Safety Audits
- Marketing Materials
- Track State Implementation
- Additional technical assistance