Designing Pedestrian Facilities for Accessibility

Module 6

PROWAG: R306 Accessible Pedestrian Signals

Washington Division

Federal Highway Administration

Federal Highway Administration RESOURCE CENTER

Design Issues for Pedestrians with low vision and who are blind

- US Access Board Video (click link below)
  - Who are blind 12 min
  - Copy the following address into browser if you encounter any problems
  - http://fhwa.na3.acrobat.com/abblind
  - Remember to turn on your speakers
  - Also it may take a minute or two to load

R306.2 Pedestrian Signals

- Each crosswalk with pedestrian signal indication shall have an accessible pedestrian signal which includes audible and vibrotactile indications of the WALK interval.
- Where a pedestrian pushbutton is provided, it shall be integrated into the accessible pedestrian signal and shall comply with R306.2.

Applicable Regulations

- Title II, 35.130 prohibits discrimination
- Title II, 35.151 New Construction and Alterations
  - New facilities must be accessible to and usable by persons with disabilities
  - Altered facilities must be accessible to and usable by persons with disabilities to the maximum extent feasible
- Title II, 35.160, Subpart E Communications:
  - Communications with public with disabilities must be as effective as with others

Effective Communication

Accessible Pedestrian Signals (APS)

- Provide pedestrian signal information in usable formats, both audible and vibrotactile
  - Benefit all pedestrians by providing redundant information
- Increase the efficiency of pedestrian timing (research shows reduction in vehicle delay)

Pushbutton-Integrated APS

- Specified by PROWAG and proposed 2009 MUTCD
- No longer recommended
  - Pedhead-mounted (cuckoo/chirps)
  - Vibrotactile-only
  - Receiver-based

Pushbutton-Integrated APS

- Key features
  - Speakers at the pushbutton
  - Pushbutton locator tone
  - Tactile arrow
  - Audible and vibrotactile walk indications
  - Automatic volume adjustment

Speakers at the pushbutton

Pushbutton Locator Tone

- Repeating sound that informs approaching pedestrians that there is a pushbutton and enables pedestrians to locate the pushbutton
- PROWAG & MUTCD specify locator tone must have a repetition rate of one tone per second.
- Volume set to be heard within 6 to 12 feet, or at building line, whichever is less
- Different sounds acceptable
- PROWAG requires that all new pushbuttons have integrated locator tones

Tactile/Vibrotactile Arrow

- Aligned with the direction of travel on crosswalk
- May be on pushbutton, or on part of device, or on sign above pushbutton

(PROWAG 306.4.1; MUTCD 4E.09)

Tactile Arrow Examples

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WALK Indications

- PROWAG requires audible and vibrotactile WALK indications
  - Audible WALK indication: tone or speech
  - Vibrotactile WALK indication: arrow (or other surface on pushbutton unit) vibrates during WALK
    - Provides signal information to persons with hearing impairment
    - Must be located close to crosswalk

Audible WALK Indication – Tone or Speech

- Depends on location of the APS pushbuttons
  - If separated by more than 10 feet, use tone
  - When two pushbuttons are closer than 10 feet to each other, speech message works best

Rapid Tick WALK Indication

- Pushbutton locator tone, followed by rapid tick WALK indication
  - Hear the locator tone during flashing and steady don't walk
  - Walk indication during WALK

Speech WALK Indication

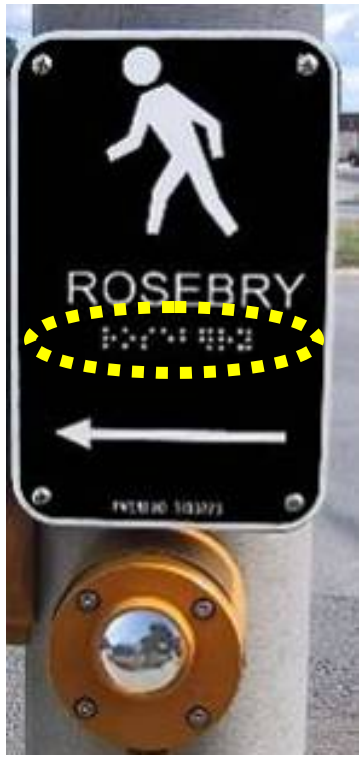
- Pushbutton locator tone, followed by speech WALK indication
  - Hear the locator tone during flashing & steady don't walk
  - Walk indication during WALK
- Must be accompanied by:
  - Tactile arrow
  - Pushbutton information message

Automatic Volume Adjustment

- APS adjusts in response to ambient sound in environment
  - Quiet when traffic is quiet
  - Louder when traffic is louder
- Increased volume can be provided by some devices "on request"
  - Requested by pushing pushbutton for over 1 second
  - Called "audible beaconing" in proposed 2009 MUTCD

Additional APS Features

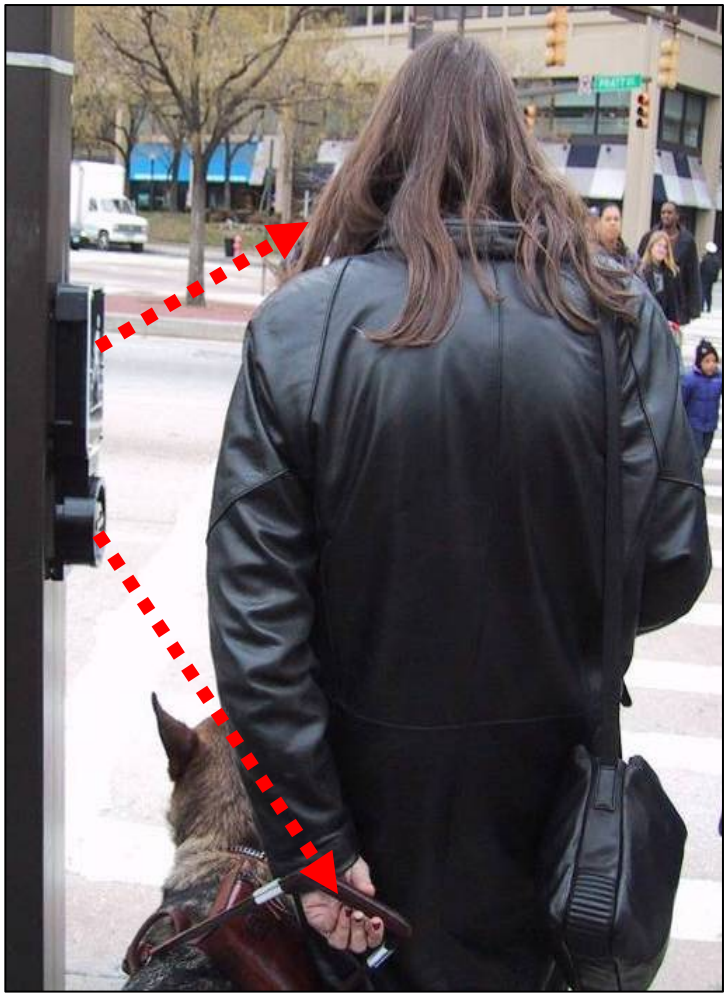
- Information Message
  - Provides street names & other intersection information
  - Plays when pushbutton is pressed for 1 second or more during steady or flashing DON'T WALK
- Braille street name (on faceplate)
  - Clarify which street crossing pushbutton controls



Pushbutton Information Message & Speech WALK Message

APS Location is Critical

- Provides information to user at departure point
  - Audible (can be quieter)
  - Vibrotactile within reach
- Imposes less cognitive load on pedestrians

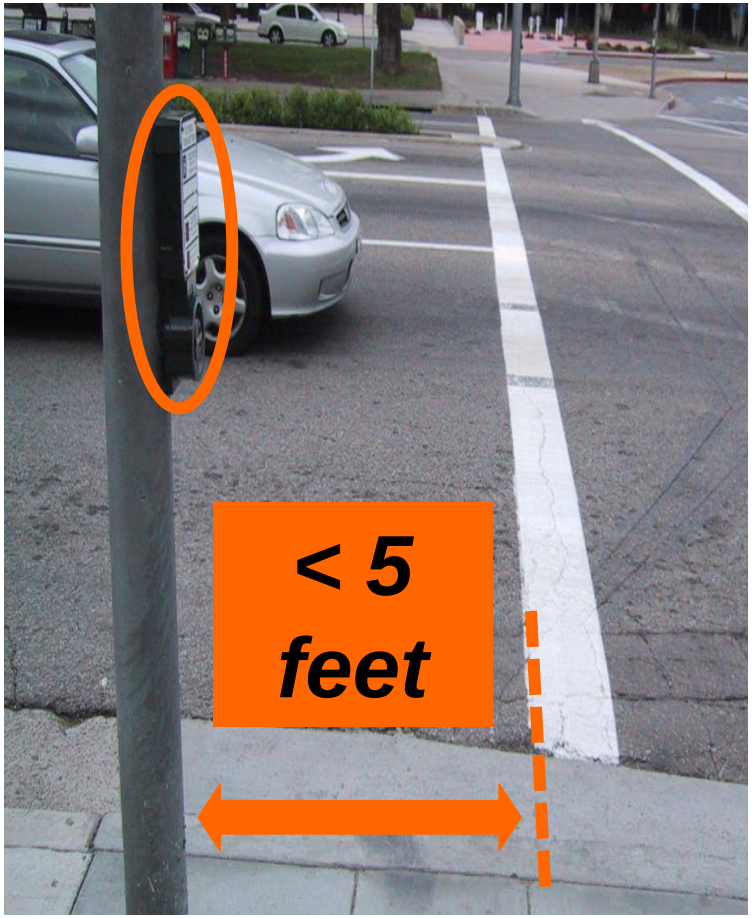


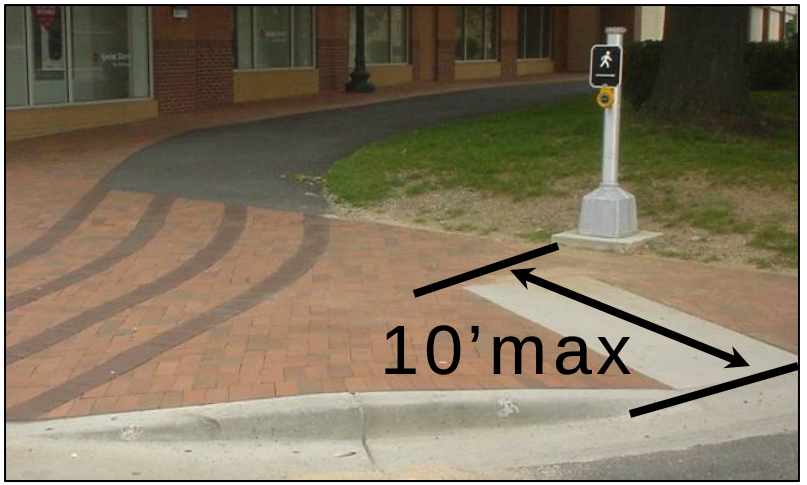
Pushbutton Location – Proposed 2009 MUTCD

- Pedestrian pushbuttons shall be located to meet all of the following criteria:
  - Unobstructed & adjacent to level all-weather surface
  - Accessible wheelchair route from pushbutton to curb ramp
  - Between edge of crosswalk line & side of curb ramp (no more than 5 feet)
  - Between 1.5 and 6 feet from edge of curb, shoulder, pavement
  - Face of pushbutton parallel to crosswalk to be used
  - Maximum mounting height of 4 feet

APS Location Example

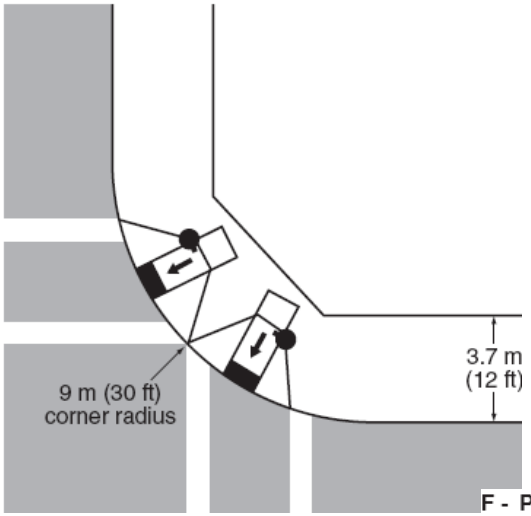
APS Location Examples



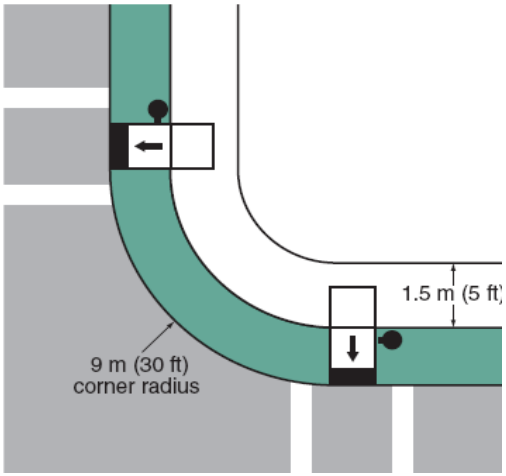


Pushbutton Location Examples – 2009 MUTCD

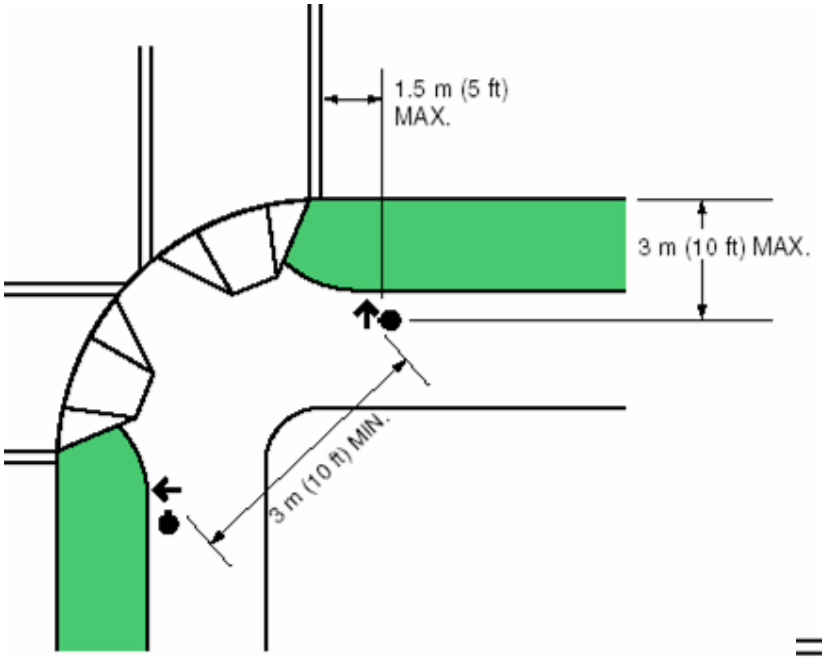
E - Perpendicular ramps with crosswalks close together



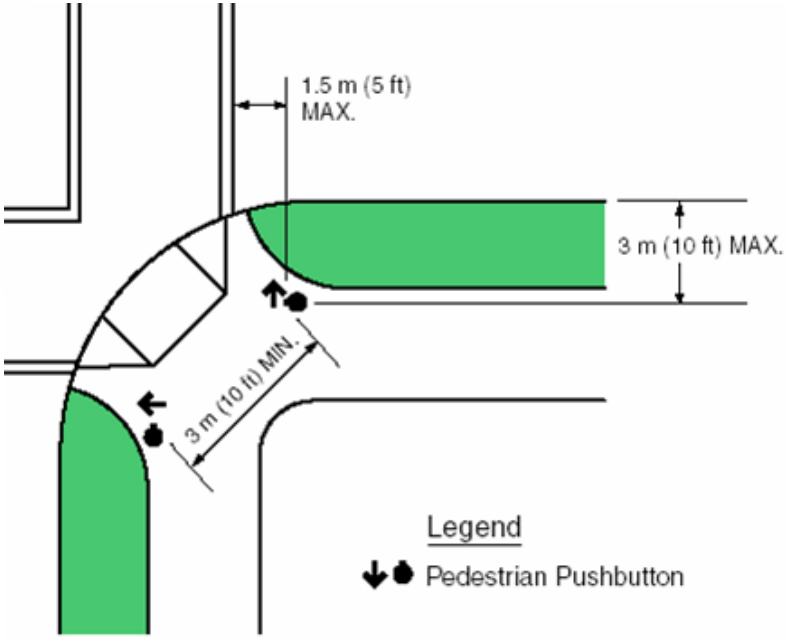
F - Perpendicular ramps with sidewalk set back from road with crosswalks far apart



Pushbutton Location Examples – 2009 MUTCD

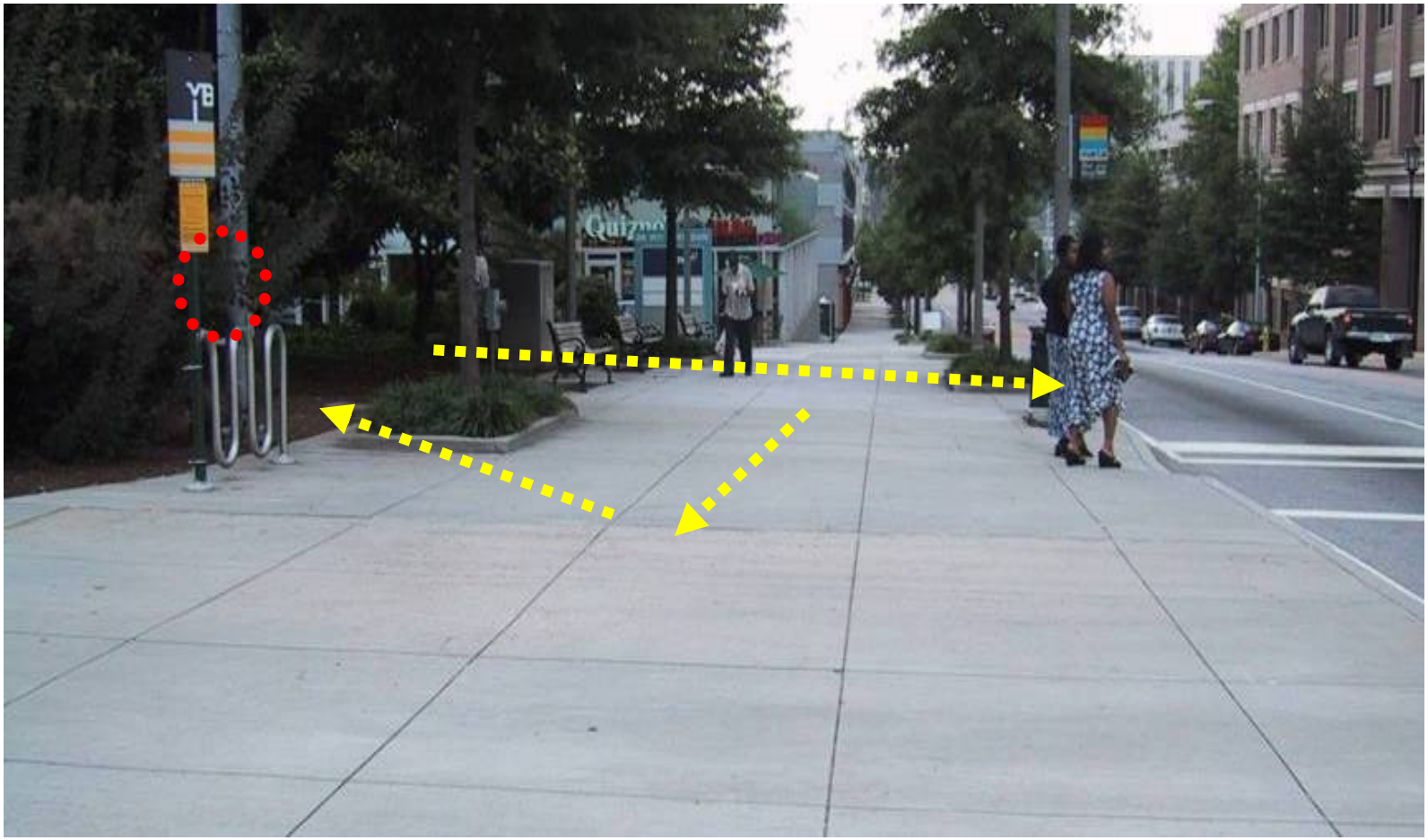


Two Curb-Cut Ramps



One Curb-Cut Ramp

Find the pushbutton



APS Pushbutton Location – Mounting Height

- Vertical reach
  - MUTCD: 42 inches
  - ADAAG/PROWAG: 48 inches maximum
- Horizontal reach
  - PROWAG: 10 inches maximum

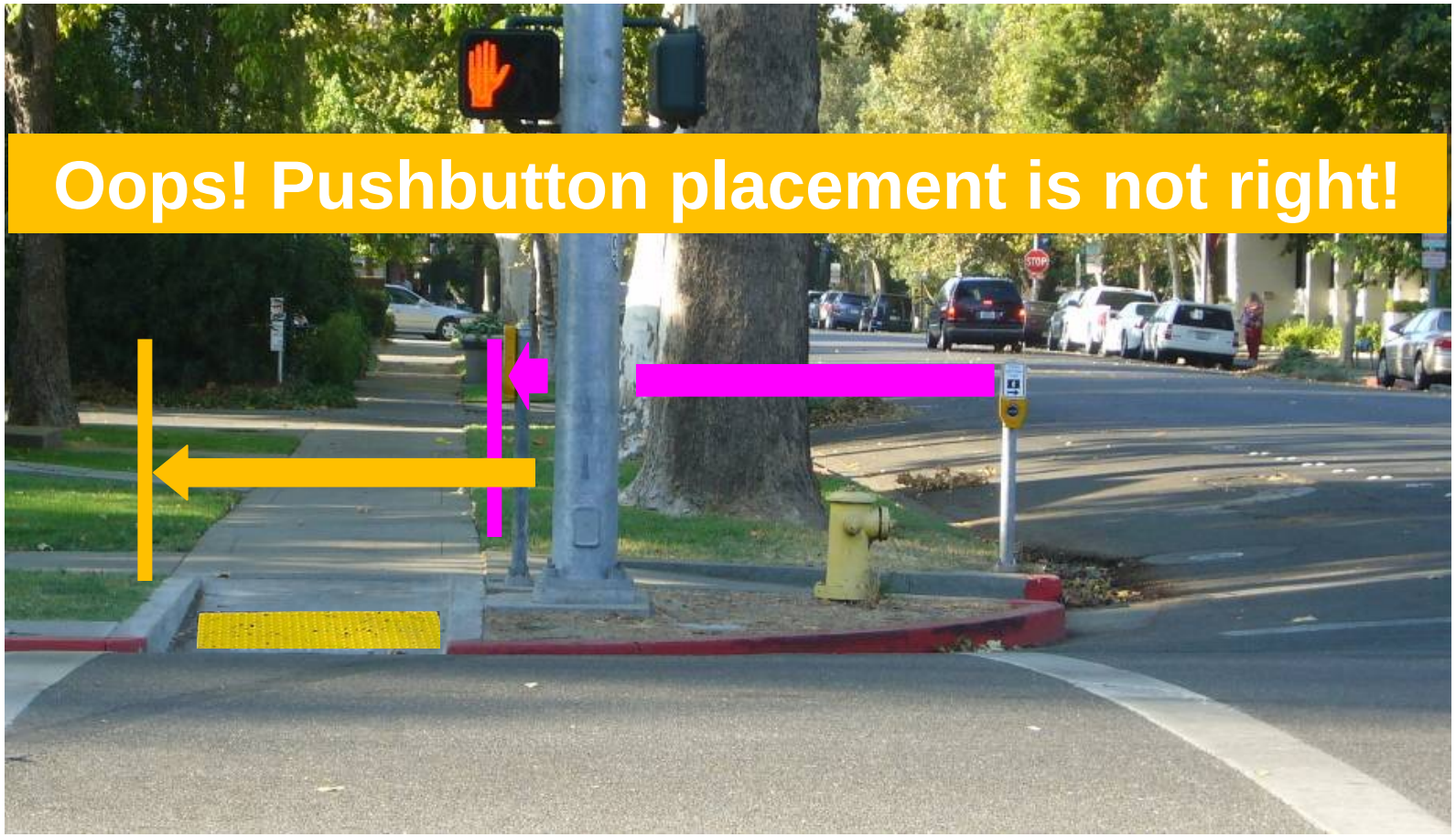
Pushbutton Size & Operation

- Recessed pushbutton with small diameter does not meet the “closed fist” test for controls and operating mechanisms

- 2-inch diameter minimum
- Visual contrast with housing or mounting
- Operable with one hand without grasping, pinching, or twisting wrist
- Actuation force: no more than 5 pounds

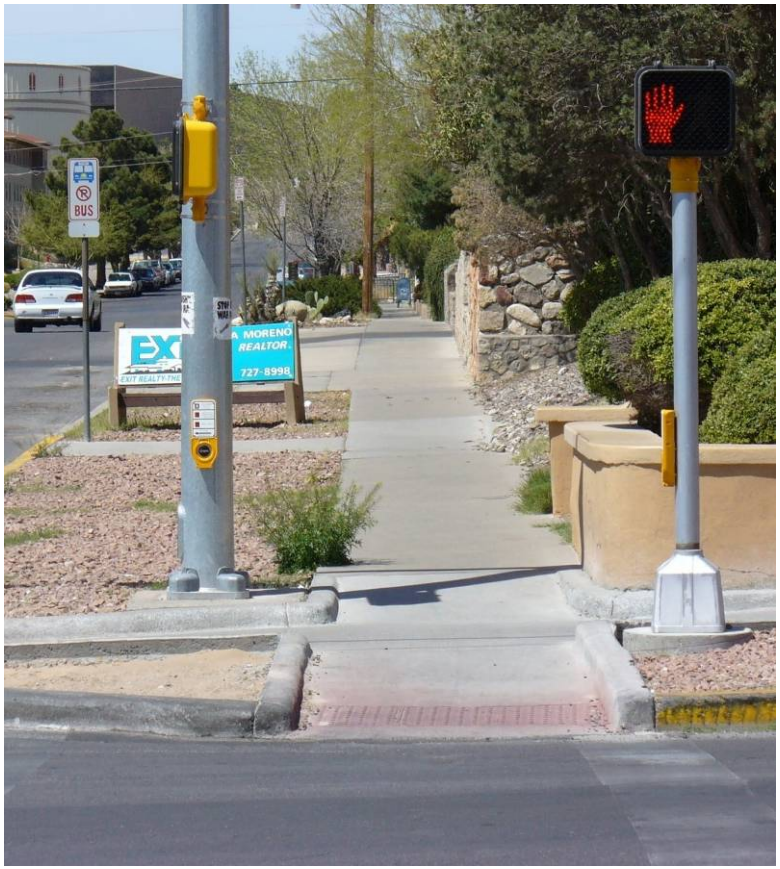
Visual Signal Head Placement

Visual Signal Head Placement



Good Pushbutton & Pedestrian Signal Head Placement

- Good:
  - Pushbutton separation
  - Mounting height
  - Horizontal reach (right)
  - Visual display location
- Pretty Good:
  - Horizontal reach (left)



APS Installation

- PROWAG (new construction/reconstruction)
  - When pedestrian signals are newly installed
- MUTCD 2009
  - Engineering study considers needs of pedestrians with visual disabilities
- FHWA Guidance
  - Jurisdictions must have a reasonable & consistent policy to provide accessibility
  - Policy should include:
    - APS as individual accommodation upon request
    - APS in existing locations (transition plan)
    - APS in new construction/alterations

Reasonable & Consistent Policy

- Complaint against the Maryland State Highway Administration
  - Alleged that blind pedestrians were not able to access pedestrian signal information and APS were not installed in response to requests
  - FHWA found ADA violation regarding APS and in response, Maryland SHA agreed to develop APS policy

Maryland State Highway Administration APS Policy

- New construction/alterations
  - APS to be installed at all signals with pedestrian indications
  - Signals without pedestrian indications will be designed for future installation of APS
- Existing signals with pedestrian indications where no work is planned
  - Consider and address individuals requests for APS
  - Install APS on priority ranking basis (transition plan)
  - APS committee to establish ranking

Crossing Distance

- Minimize crossing distance
- Factors affecting crossing distance:
  - Number of lanes
  - Lane width
  - Curb radii
  - Medians/islands
  - Curb extensions
  - Parking lanes
  - Bike lanes
  - Transit lanes

Pedestrian Crossing Time
2009 MUTCD Proposal

- Current pedestrian clearance Interval:
  - Where pedestrians who walk slower than normal or pedestrians who use wheelchairs routinely use a crosswalk, a walking speed of less than 4 feet/sec should be considered.
- Proposed 2009 MUTCD:
  - changes the current 4 seconds minimum steady walk to 7 seconds
  - changes the 4 ft/sec walking speed to 3.5 ft/sec.
  - Need to do a comparison calculation from top of ramp of 6 feet length. Need to use 3.0 ft/sec

Sample Calculation of 60’ Curb to Curb Crosswalk

- Ped clearance phase calculated at 3.5’/sec curb-to-curb.
  - 60’ crosswalk requires 17 sec
  - 7 + 17 = 24 sec total
- Time from push button (or 6’ feet back from top of ramp to curb at the other side to equal 3’/sec including steady walk phase
  - 60’ crosswalk + 6’ ramp = 66’
  - 66’ requires 22 sec

24 sec > 22 sec; passes test.

Calculations Based on 2009 MUTCD Proposed Changes

End of Module 6

Congratulations you have completed module 6 of the Designing Pedestrian Facilities for Accessibility course.

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