Designing for Pedestrian Safety

Sidewalk Design

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Learning Outcomes:

At the end of this module, you will be able to:

- Describe the operational and safety benefits of shoulders and sidewalks
- Select the appropriate design requirements for sidewalks
Walking along the road accounts for 10-15% of pedestrian crashes:

- Fewer in urban areas
- More in rural areas
- They’re easily preventable

**Crash Reduction Factor (CRF):**

- Paved shoulders reduce pedestrian crashes 70%
- Sidewalks reduce pedestrian crashes 88% (most sidewalk crashes occur at driveways)

**CRF:** % fewer crashes experienced on a road with a given treatment than on similar road without treatment
Shoulders improve safety for all users

For motorists: room to avoid crashes
Shoulders improve safety for all users

For bicyclists: a place to ride
Shoulders improve safety for all users

CRF = 70%
6’ width preferred

For pedestrians: a place to walk
At a certain point, sidewalks are needed
“Goat trail” indicates sidewalks are needed
The AASHTO "Green Book" states: "Sidewalks are integral parts of city streets"

Sidewalks are not added to streets, they are part of the street
Sidewalks reduce pedestrian crash risk by 88%
Curbs & sidewalks slow traffic more than speed sign

Sidewalks define an urban street
Discussion: Why are sidewalks discontinuous?
Discussion: Why are sidewalks discontinuous?

Because they’re built by developers
A sidewalk on 1 side only is not OK

Discussion: Why are sidewalks on one side not OK?
A sidewalk on 1 side only is not OK

Discussion: Why are sidewalks on one side not OK?

Answer: Pedestrians walk in street, or cross twice
Sample Implementation Strategy

Sample Implementation Strategy to retrofit existing streets with sidewalks
- how to develop a program to fill in missing sidewalks over 20 years
How do you make such a daunting task manageable?

⇒ Seattle example: divide it into bite-size chunks, with overlapping priorities
Urban village
Designing for Pedestrian Safety – Sidewalk Design

Schools
Service providers

BINGO!
Discussion:

What are your requirements for sidewalks:

1. What are the triggers?
2. Who pays for them?
3. Who maintains them?
Sidewalk Corridors – The Zone System

The sidewalk corridor extends from the edge of roadway to the right-of-way and is divided into 4 zones:

- Curb zone
- Furniture zone
- Pedestrian zone
- Frontage zone
Curb zone
Why the curb zone matters:

Mountable curbs are inappropriate on local streets
Why the curb zone matters:

It’s where pedestrians transition from/to the street
Curbs & drainage are the greatest sidewalk cost
This sidewalk cost little to install without the curb
Furniture zone

- Furniture zone
- Curb zone
- Pedestrian zone
- Total width
All the “stuff” goes in the furniture zone

All these things go here!
The furniture zone keeps the sidewalk clear
Sidewalk with furniture zone is pleasant to walk on
Planter strip helps define driveways

- It’s easier for drivers to find driveways
- Drivers are more likely to yield to pedestrians
Pedestrian zone

Total width

Pedestrian zone

Frontage zone

Pedestrian zone

Pedestrian zone

Pedestrian zone
Sidewalk width

- 5-feet width is necessary for two people to walk comfortably side by side or to pass each other
- 6-feet width is preferred
Sidewalk width

A sidewalk should be as wide as needed to serve anticipated pedestrian use (use HCM ped LOS)
Frontage zone
Shy Distance

Shy distance concept applies to pedestrians, who will shy away from a vertical face; extra width is needed.
An interesting façade makes narrow sidewalks feel wider
The type of fence material impacts pedestrian comfort

The sidewalk on the left is wider, but feels constrained because of high chain link fence.
The Zone System – Summary

Residential street
The Zone System – Summary

Commercial street
With Zone System

Street furniture arranged in zones leaves sidewalk clear
Without Zone System

Randomly placed street furniture clutters sidewalk
Without Zone System

No buffer between pedestrians and traffic
ADA requirements for sidewalks

Well-designed sidewalks meet ADA:

- Sidewalks should be clear of obstructions:
  - 3’ min clearance, 4’ proposed
- Sidewalk should have smooth surface
- Sidewalk should be at 2% max cross-slope including at driveways

- The zone system creates a safer and more pleasant place to walk, and makes it easier to meet ADA requirements.

- Note: many slides include older photos that show non-compliant sidewalk features, especially ramps without the truncated domes
Options for ADA training

- Designing Pedestrian Facilities for Accessibility (DPFA) Web Based Course from FHWA
  - To request a course or learn more contact
    - Jodi Petersen at jodi.petersen@dot.gov
    - Peter Eun at peter.eun@dot.gov

- Designing Pedestrian Facilities for Accessibility training course from APBP (in person):
  - To request a course see link below
    - http://www.apbp.org/?Access_Course
Agenda for DPFA Web Based Course

1. Introduction - Live web conference
   a) ADA Statistics
   b) Policies / Legal Background
   c) Walking Environment
2. Pedestrian Access Route – self paced
3. Curb Ramps and Blended Transitions – self paced
4. Detectable Warning Services – self paced
5. Pedestrian Crossings – self paced
6. Accessible Pedestrian Signals – self paced
7. Street Furniture and Parking – self paced
8. Work Zones – self paced
9. Wrap Up - Live web conference
   a) Q & A
   b) Knowledge Test
Utilities & poles should not obstruct sidewalk
Mitigate around obstacles on narrow curbside sidewalk
Driveways

Driveways are the source of most conflicts with motor vehicles on sidewalks.
Driveways built like intersections encourage high-speed turns
Driveways built like driveways encourage slow-speed turns
This driveway was built like an intersection
Driver exits at high speed, not looking at pedestrians
ADA requirements for driveways:

Minimum passage of 3’ (soon to be 4’) at 2% max cross-slope
Easier to maintain level passage with separated sidewalks
Without zone system (curbside sidewalk) hard to meet ADA

Cross-slope exceeds 2%
For narrow curbside sidewalks, wrap sidewalk around apron
Walking Along the Road – Let’s Recap

1. Crash Reduction Factors:
   - **Rural environments:**
     - Paved shoulders reduce ped crashes up to 70%
   - **Urban environments:**
     - Sidewalks reduce ped crashes up to 88%
     - (most sidewalk crashes occur at driveways)
Walking Along the Road – Let’s Recap

2. Sidewalk Design: The zone system

What are the 4 zones?

1. The curb zone
2. The furniture/planter/buffer zone
3. The pedestrian/walking zone
4. The frontage zone
Walking Along the Road – Let’s Recap

3. Sidewalk Design: Key characteristics

- How should the walking zone be designed?
  - Smooth
  - Separated from traffic
  - Clear of obstructions
  - Level cross-slope (max 2%)
  - Wide enough to accommodate expected pedestrian volumes
Walking Along the Road – Learning Outcomes:

You should now be able to:

- Describe the operational and safety benefits of shoulders and sidewalks
- Select the appropriate design requirements for sidewalks
Questions?