Designing for Pedestrian Safety

Introduction to Pedestrian Safety Design and Planning Principles

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Designing for Pedestrian Safety Workshop Outcomes

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

- Describe the influence of planning factors: land use, street connectivity, access management, site design, and level of service.
- Describe how pedestrians should be considered and provided for during the planning, design, work zone, maintenance, and operations phases.
- Describe how human behavior affects the interaction between pedestrians and drivers.
- Identify good practices and effective solutions to enhance pedestrian safety and accessibility.
Overview of Pedestrian Safety Problem

- Annually almost 5,000 pedestrians are killed in traffic crashes, representing about 12% of all traffic deaths.
- Nearly 70,000 pedestrians are injured each year.
- Most crashes occur when the pedestrian crosses a road.
- Most fatalities and serious injuries occur on roads designed with little attention for pedestrian safety.
- Pedestrians are rarely killed in walkable environments.
Pedestrian Fatalities by Year
Pedestrian Injuries by Year
Why is it important to accommodate pedestrian safety and accessibility?

Because we are all pedestrians
Why?

Because many people do not drive
Why?

Because other modes depend on walking
Why?

Because it’s good for business – people walk into stores
Why?

Because pedestrians use and belong on streets and highways
Why?

Because walking is healthy exercise
Why?

Because it will make roads safer for all road users
AASHTO: “Because of the demands of vehicular traffic in congested areas, it is often extremely difficult to make adequate provisions for pedestrians. Yet this must be done, because pedestrians are the lifeblood of our urban areas...” (1994 edition, page 97)
Why?

US Congressional Legislation/Policy of US DOT

TEA-21 (1999):

⇒ “The non-motorized modes are an integral part of the mission of FHWA and a critical element of the local, regional, and national transportation system.”

⇒ “… mainstream bicycle and pedestrian projects into planning, design, and operation…”

⇒ “… bicycling and walking facilities will be incorporated into all transportation projects unless ‘exceptional circumstances’ exist.”

Because it’s the LAW !!!
Resources

- PBIC: www.walkinginfo.org
- FHWA: safety.fhwa.dot.gov
- NHTSA: nhtsa.dot.gov
- ITE: www.ite.org
- AASHTO/NCHRP: safety.transportation.org
Planning elements that affect pedestrian safety:

- Land Use
- Street Connectivity
- Access Management
- Site Design
- Level of Service
Land Use
Why do we have cities?

To minimize travel & maximize exchange (to be closer together)
How have we built our urban roadway system?

To facilitate travel over longer distances
Reducing travel demand is best achieved changing Land Use policies that bring destinations closer together

The problem:

- Commercial activities concentrated in auto-dominated corridors.
- Segregated land uses
- Result: long travel distances, not conducive to walking
Reducing travel demand is best achieved changing Land Use policies that bring destinations closer together

Potential solutions?

- Allow small-scale retail in neighborhoods
- Create neighborhood parks
- Site school closer to residences & parks
Neo-traditional development: destinations are close to residential areas
Connectivity creates a pedestrian-friendly street system by:

- Reducing walking distances;
- Offering more route choices, more quiet local streets;
- Dispersing traffic – reducing reliance on arterials for all trips
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Can you increase connectivity with paths, greenways?

Reduces walking distances:
⇒ YES

Offers more route choices:
⇒ YES

Reduces motor vehicle traffic:
⇒ YES

Disperses motor traffic:
⇒ NO
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Lack of connectivity => overly wide streets
Lack of connectivity => few but large intersections
Land Use & Connectivity

- Schools next to parks.
- Dedicate R.O.W. to link cul-de-sacs with linear parks
Access Management

Every driveway is a potential conflict
Drivers and pedestrians must make choices:

Walk in front or in back? Pull forward or back up?
Access Management => fewer conflicts at driveways

Two techniques:

(1) median (no left turns) and (2) consolidate driveways
Driveways can be closed for safety
Severing public streets not a desirable access management technique

This limits people’s ability to walk or bicycle
Connecting severed streets reestablishes walking routes
Severed street can be reconnected for pedestrians
Site Design
Bringing Buildings closer to the Street

Makes access for pedestrians safer and easier

Creates a street where drivers know to expect pedestrians
Parking between sidewalk and building is not pedestrian-friendly
Building at back of walk: pedestrian-oriented design
Fast food typically favors drive-thru over walk-ins

Pedestrians must cross drive-thru lane
Alternative design: Direct pedestrian access is provided with no vehicular conflicts
Parking and drive through are still provided
Even a gas station / convenience store can be built with pedestrian friendly design at back of walk.
Pedway retrofitted from sidewalk to building through parking
Same principles apply to large-scale developments:

- Direct, safe & convenient access is provided
These goals are achieved by local ordinances, which must be enforced.

They are beyond the scope of road designers, yet contribute greatly to the safety, comfort and aesthetics of the walking experience.

Do your local ordinances support pedestrian-oriented planning and design?
Rethinking The Role of Urban Streets
A “complete street” accommodates many uses and provides for all purposes of a street:

- Mobility (all modes)
- Access to destinations
- Thriving businesses
- Beauty
Transforming a street
Narrow lanes; add bike lanes, median, trees, texture
Bring in buildings that face the street
More buildings: Infill
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The street now has life and is safer for pedestrians
The impact of Level of Service (LOS) standards on street design and pedestrian safety
HCM says LOS = A; little traffic, no impediments
Result: very wide roads that reduce pedestrian safety
HCM says ped LOS = A; few people walking

A new ped LOS is needed to reflect quality of walking experience
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HCM says ped LOS = F; too many peds!

A new ped LOS is needed to reflect quality of walking experience
Why are pedestrians at high risk on this street?

Multi-lane roadway, high speeds
Why are pedestrians at Low risk on this street?

Narrow roadway, low speeds, busy
What is the core safety issue?

Pedestrians and drivers must use the streets together

What does the driver see that says “slow down, watch for pedestrians”?

⇒ On-street parking
⇒ Narrow cross-section
⇒ Buildings close to street
⇒ Sidewalks
⇒ Crosswalk
⇒ People!
Reinventing the roadway:

Transform a 5-lane commercial strip to ...
Reinventing the roadway:

...a safer road for everyone

Discussion Questions: What changed? What didn’t change?
Let’s Recap

▷ Why is it important to accommodate pedestrian safety and accessibility?

▷ How does the street environment influence drivers’ and pedestrians’ expectations and interactions?

▷ Where is the information?

▷ What planning factors influence pedestrian safety and accessibility?
Questions?