

Steps to Improve Pedestrian Safety

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Based on the FHWA

Designing for Pedestrian Safety Course

Engineering – Education – Enforcement

- Working together – 3 E's approach
- Comprehensive – Communicative – Cooperative
- Synergy: Each makes the other more effective

“Right design invites right use”



Pedestrian Safety

Engineering Strategies

Crossing Crashes

Part 1: General Principles



General Principles

1. Pedestrians want and need to cross streets safely
2. Drivers need to understand pedestrians' intent
3. Keep crossings short
4. Speed Matters
5. Pedestrians will cross where it's convenient

Effective design makes use of these principles

Principle # 1



Pedestrians want and need to cross the street safely

Orange CA

Principle # 2



Drivers need to understand pedestrians' intent

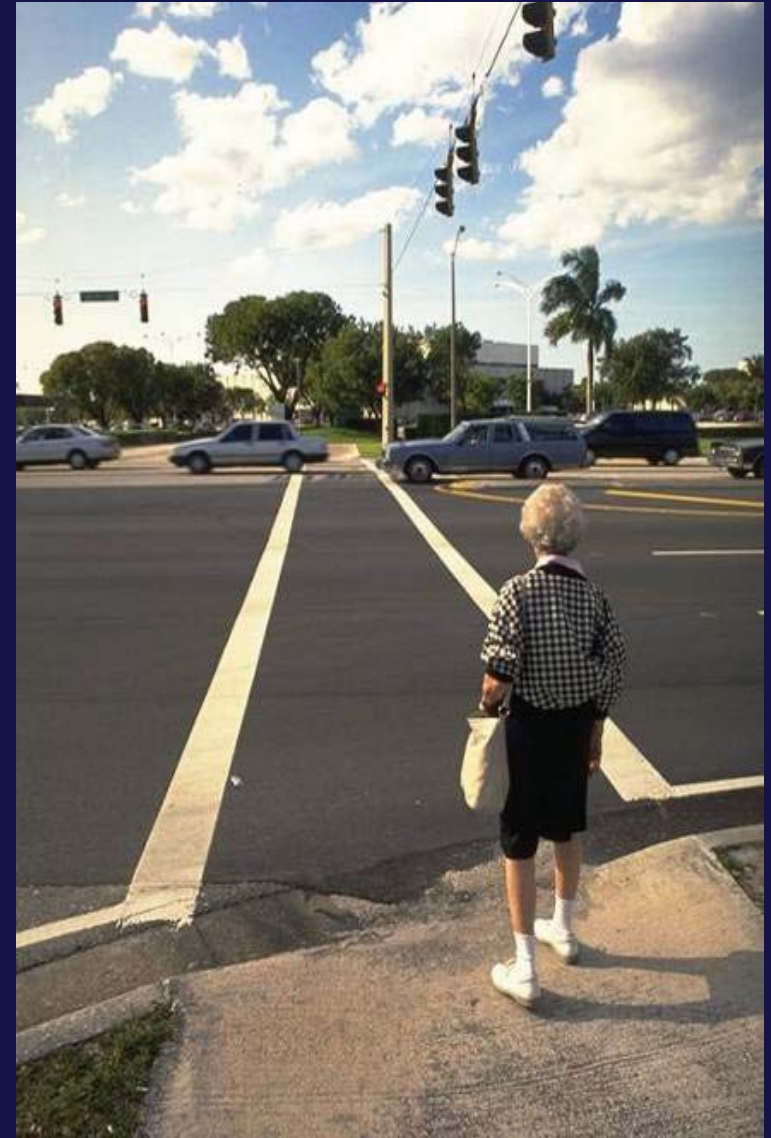
Depoe Bay OR

Principle # 3

Keep Crossings Short

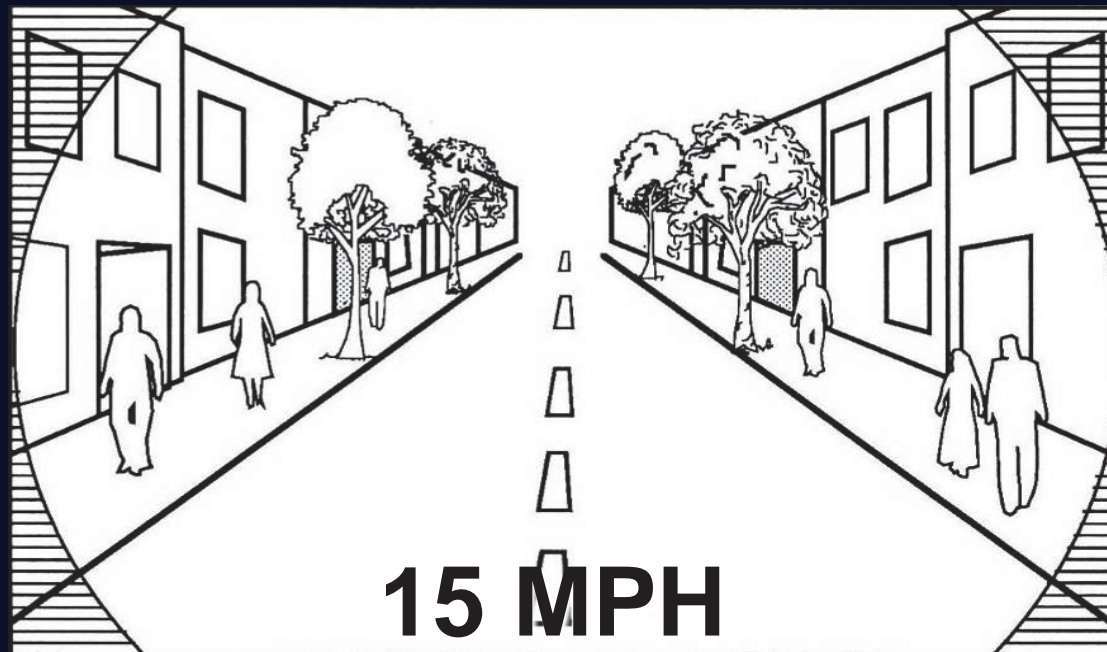
Impacts of long crossing distance:

- Increases exposure time
- Increases vehicle-pedestrian conflict
- Increases vehicle delay
- Decreases ability of slower pedestrians to cross

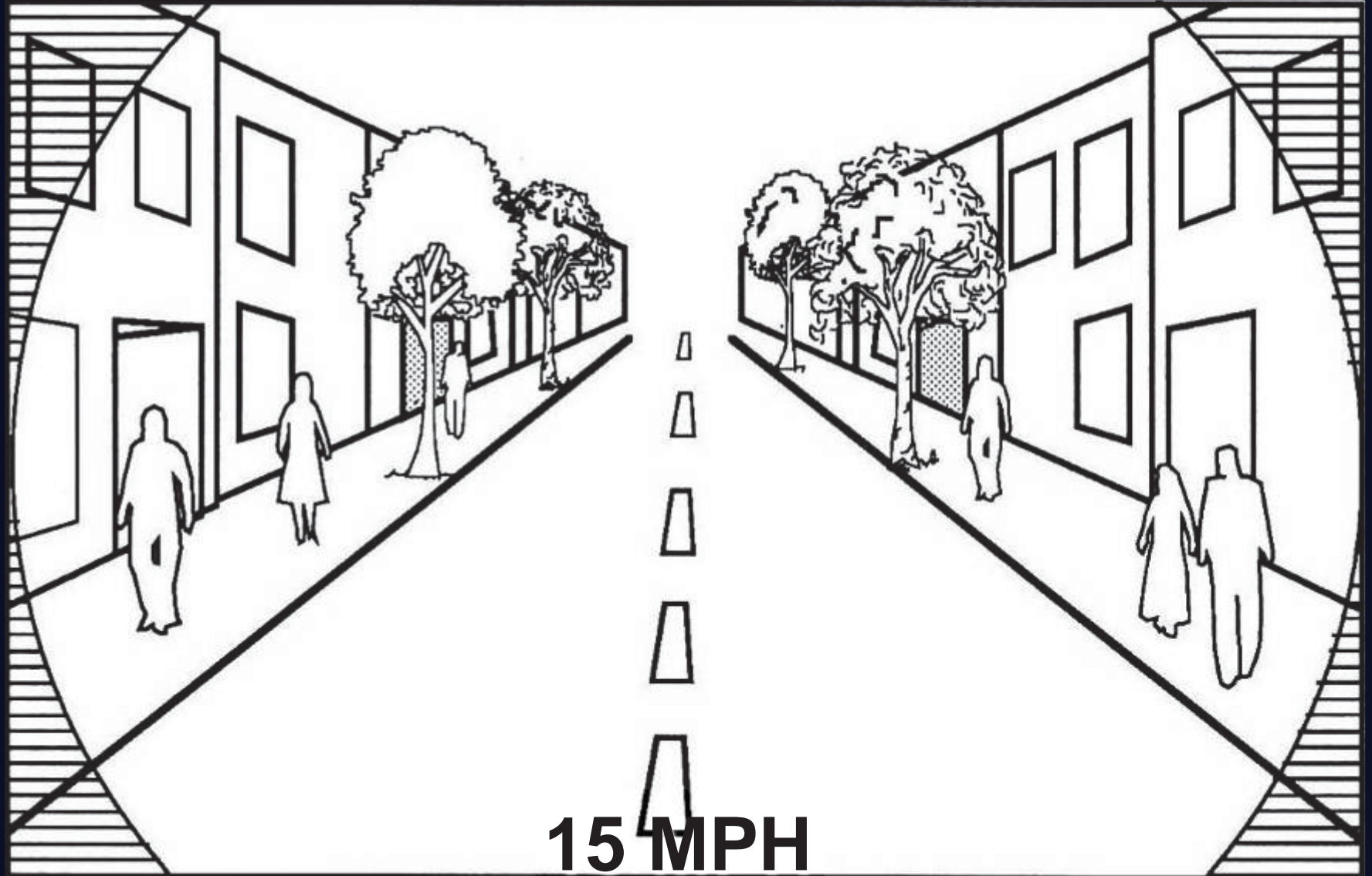


Principle #4: Speed Matters

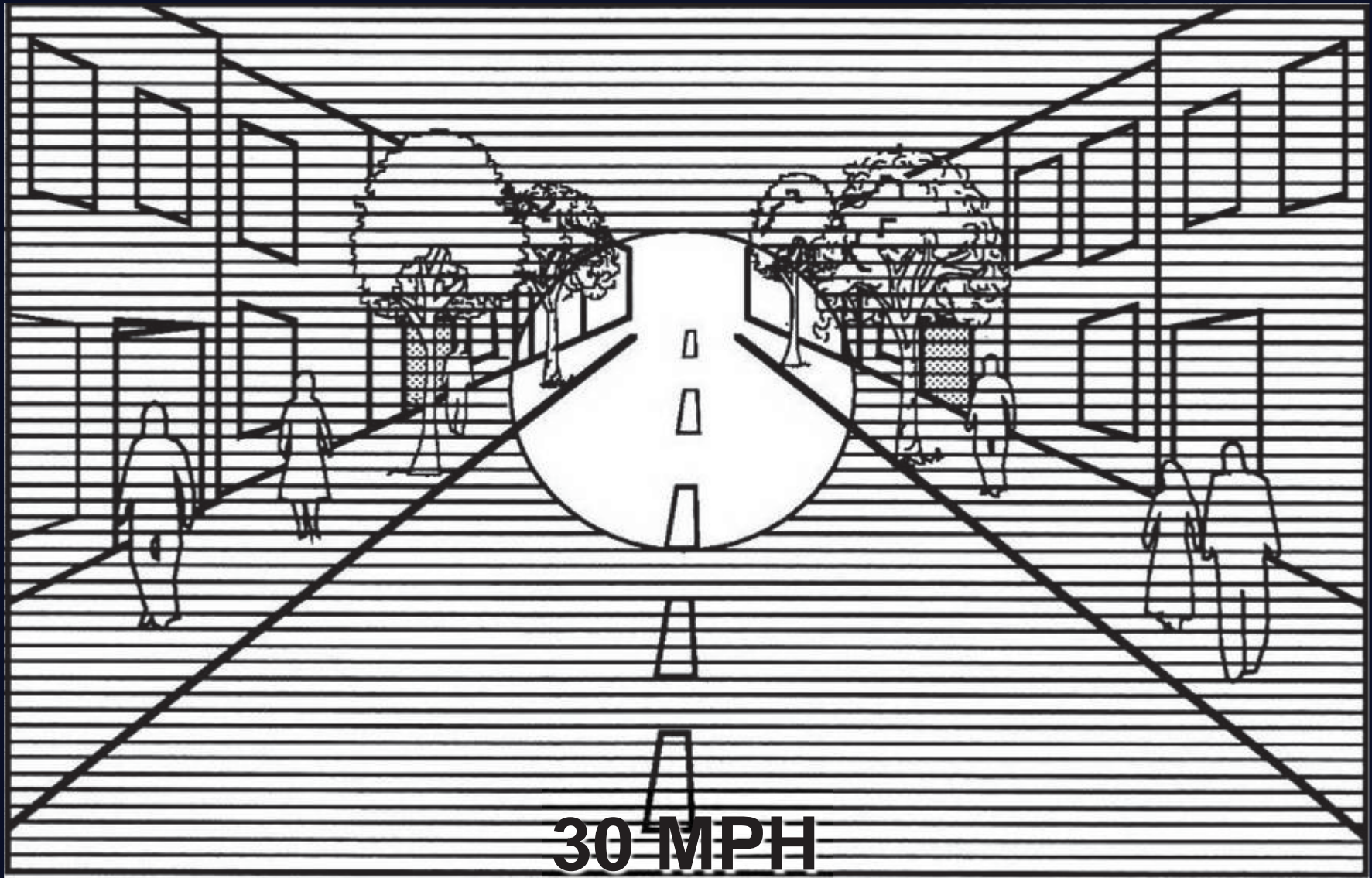
- Drivers' field of vision and ability to see pedestrians
- Drivers' ability to react and avoid a crash
- Crash Severity



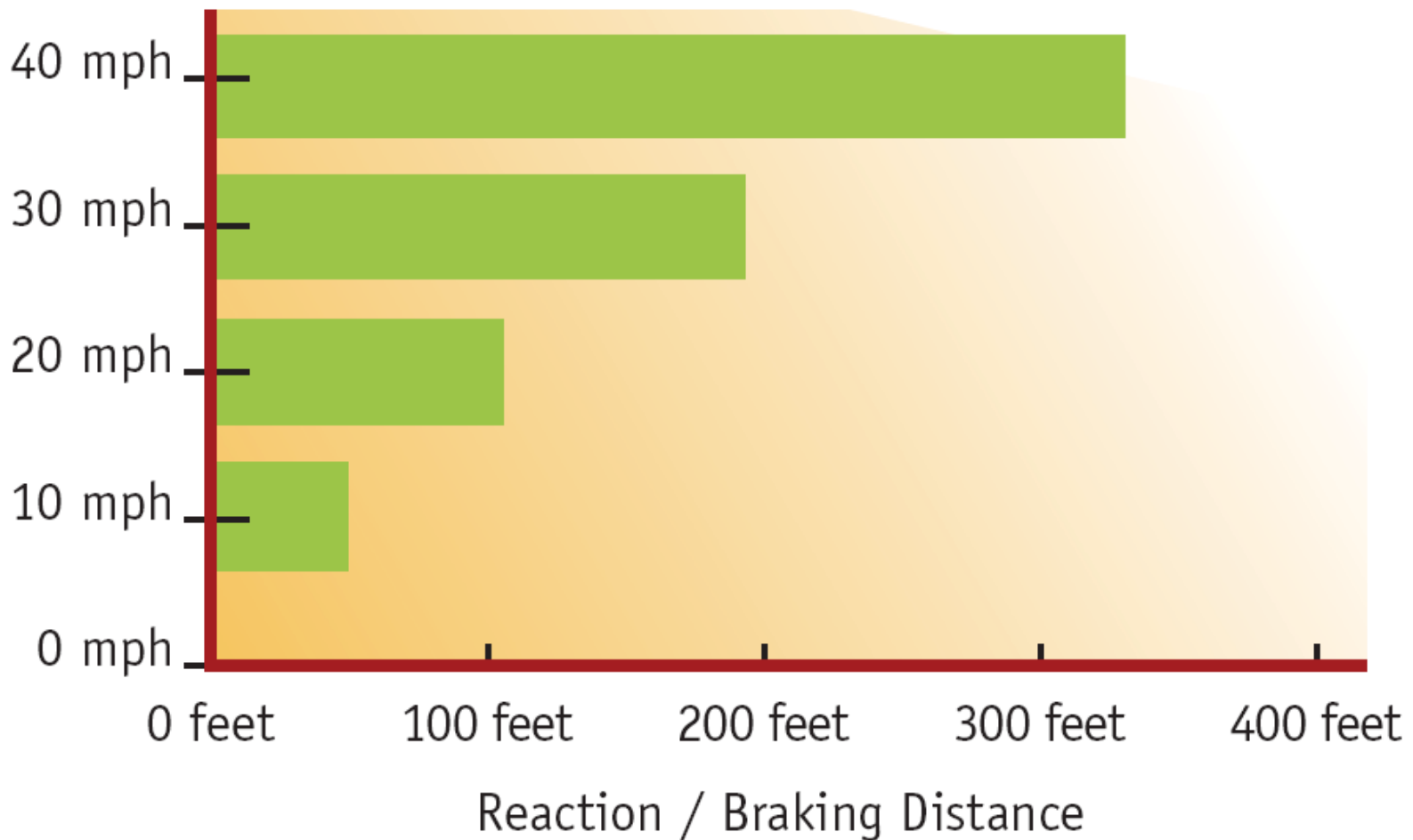
As speed increases, driver focuses less on surroundings



As speed increases, driver focuses less on surroundings

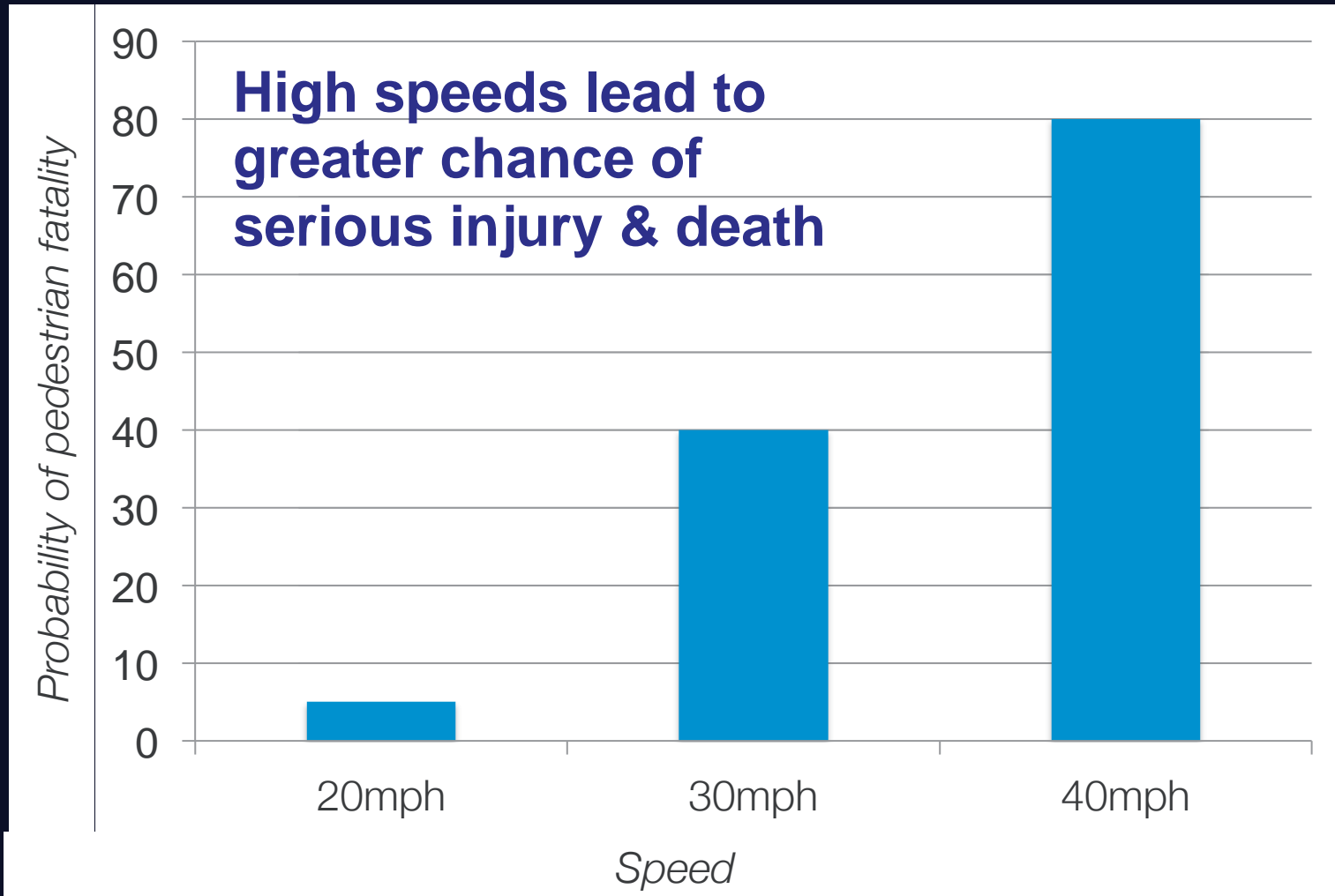


Speed Affects Crash Avoidance



High speeds equate to longer reaction and stopping distance

Speed Affects Crash Severity



W.A. Leaf and D.F. Preusser, "Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups," US Department of Transportation, National Highway Traffic Safety Administration (1999).



Traffic-calming methods
such as curb extensions help slow traffic

Joseph OR

Principle # 5

Pedestrians will cross where it's most convenient



Salem OR

Crossing Crashes

Part 2: Countermeasures



Federal Study on Crosswalks

- Under 45mph roads:
- OK to mark crosswalks on 2-lane roadways
- On roadways with more than 2 lanes, marked crosswalks alone are not recommended with:
 - Average Daily Traffic (ADT) > 12,000 without median
 - Average Daily Traffic (ADT) > 15,000 with median
 - Posted speeds greater than 40 mph
- Use raised medians to reduce risk (reduce crashes by 40%)
- Signals or other treatments should be considered where many young and/or elderly pedestrians

“Pedestrians have a right to cross roads safely, and, therefore, planners and engineers have a professional responsibility to plan, design, and install safe crossing facilities.”

Increase Effectiveness Of Crosswalks With:

- Proper location
- High Visibility Markings
- Illumination
- Signing
- Advance Stop Bars
- Median Islands
- Curb Extensions
- Signals

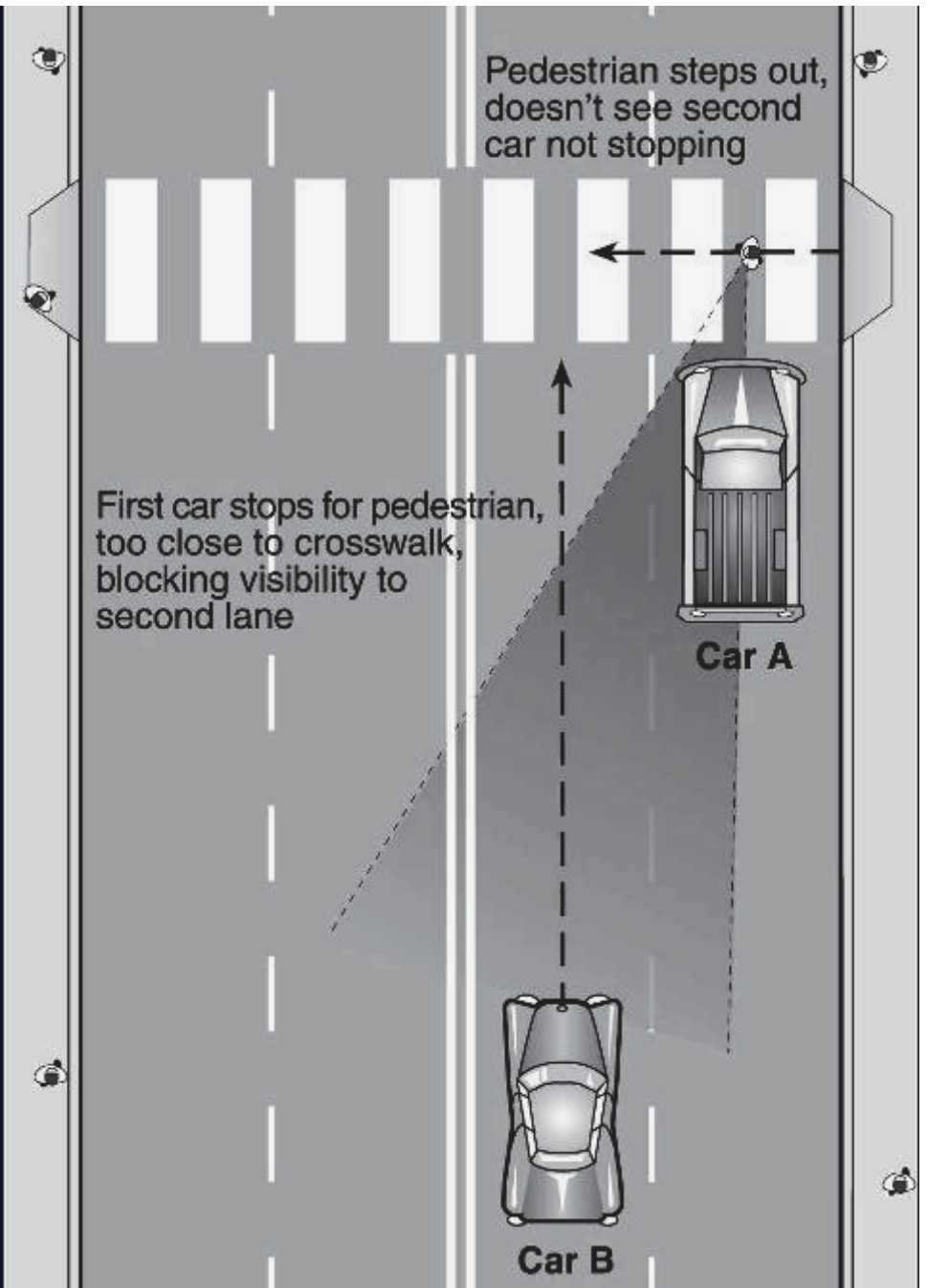


Multiple Threat Crash Problem

Explanation for why
crashes increased at
marked crosswalks

1st car stops to let
pedestrian cross, blocking
sight lines

2nd car doesn't stop, hits
pedestrian

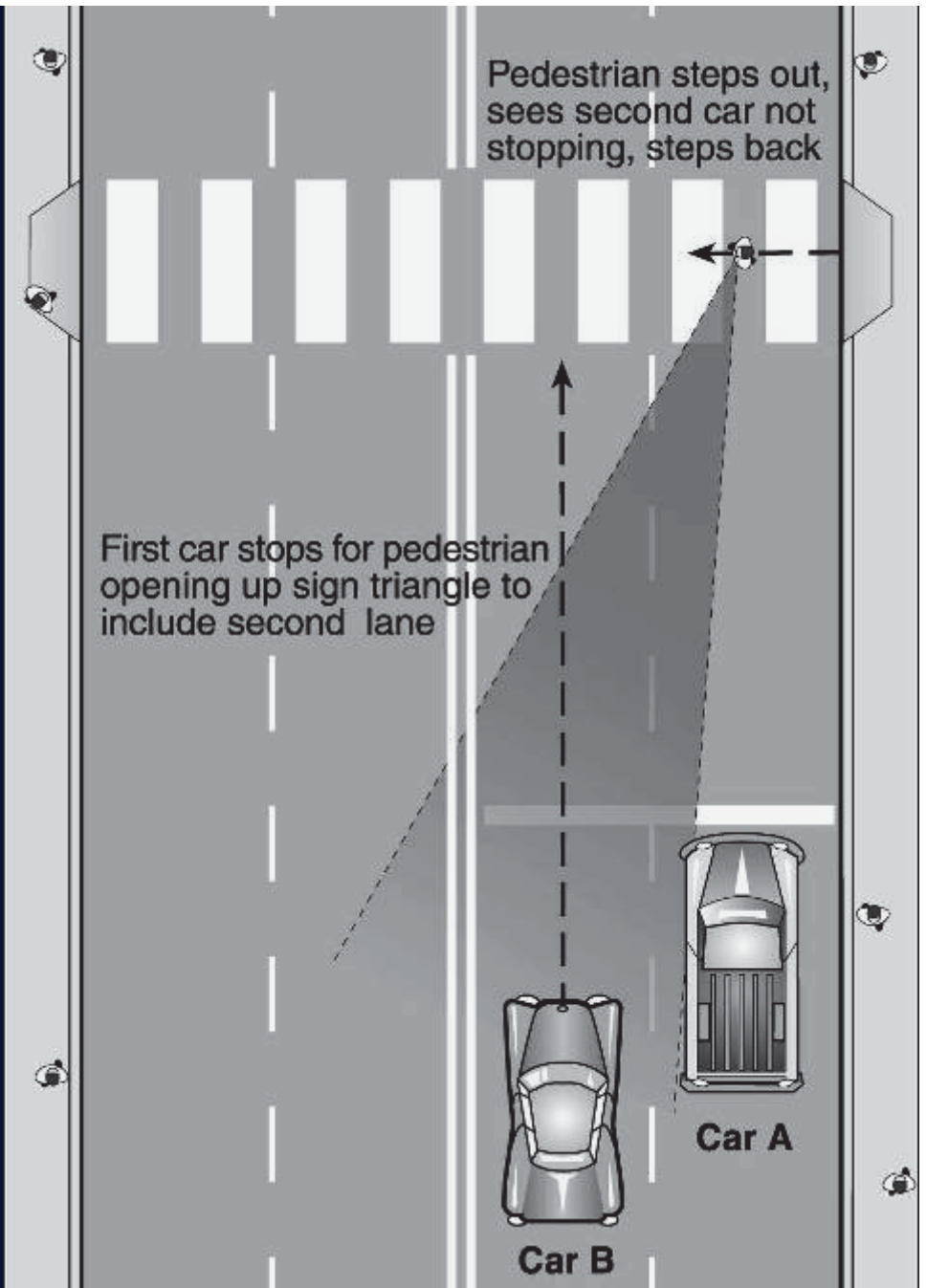


Multiple Threat Crash Solution

Advance stop/yield line

1st car stops further back,
opening up sight lines

2nd car can be seen by
pedestrian





Advance yield line (shark's teeth) and sign

2009 MUTCD Section 3B.16 and Figure 3B-17

Supplement Yield Line (Shark's Teeth) with Appropriate Sign



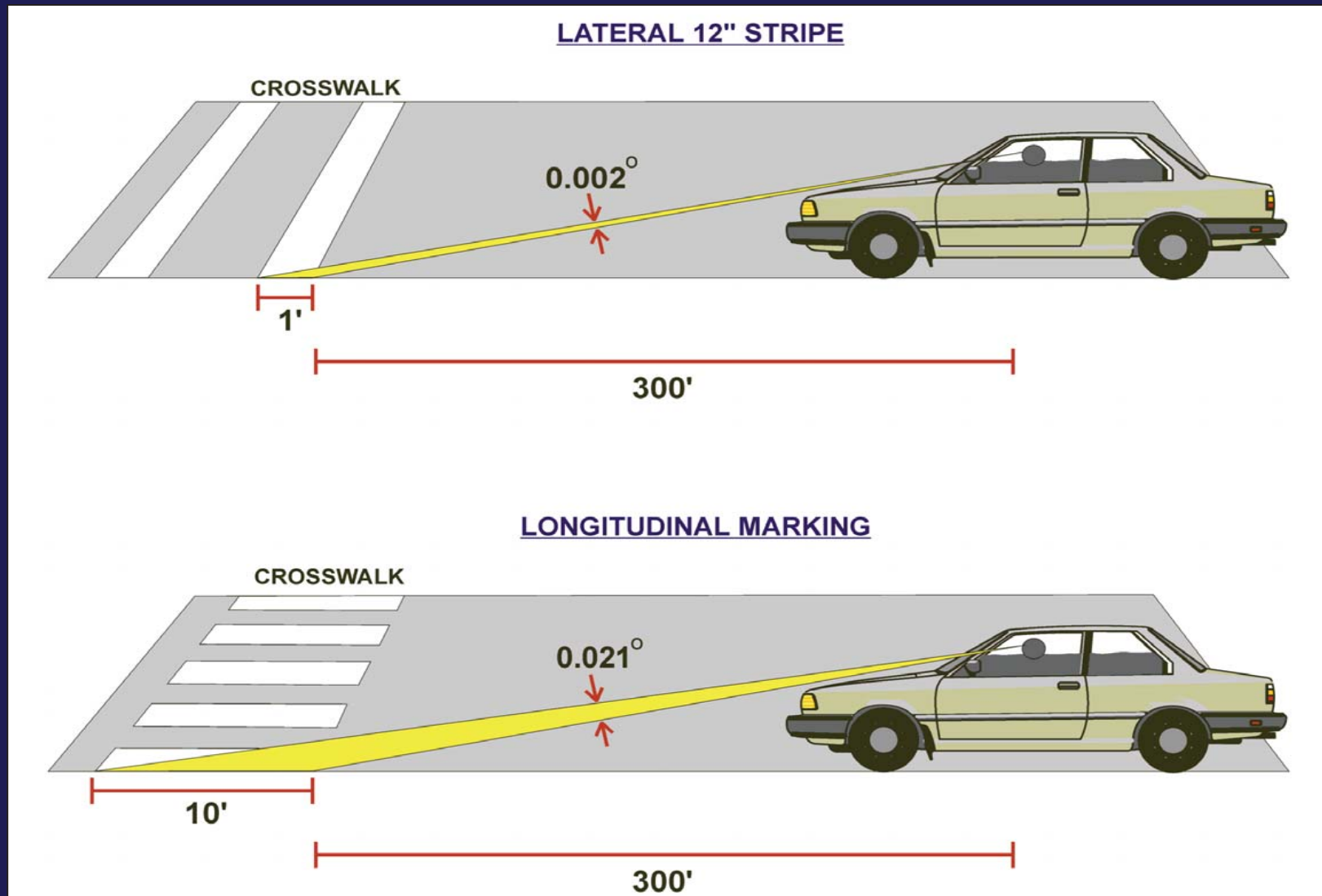
R1-5



R1-5a

Signs in the 2003 MUTCD
(Use where local law says
yield to pedestrians)

Use High Visibility Crosswalks



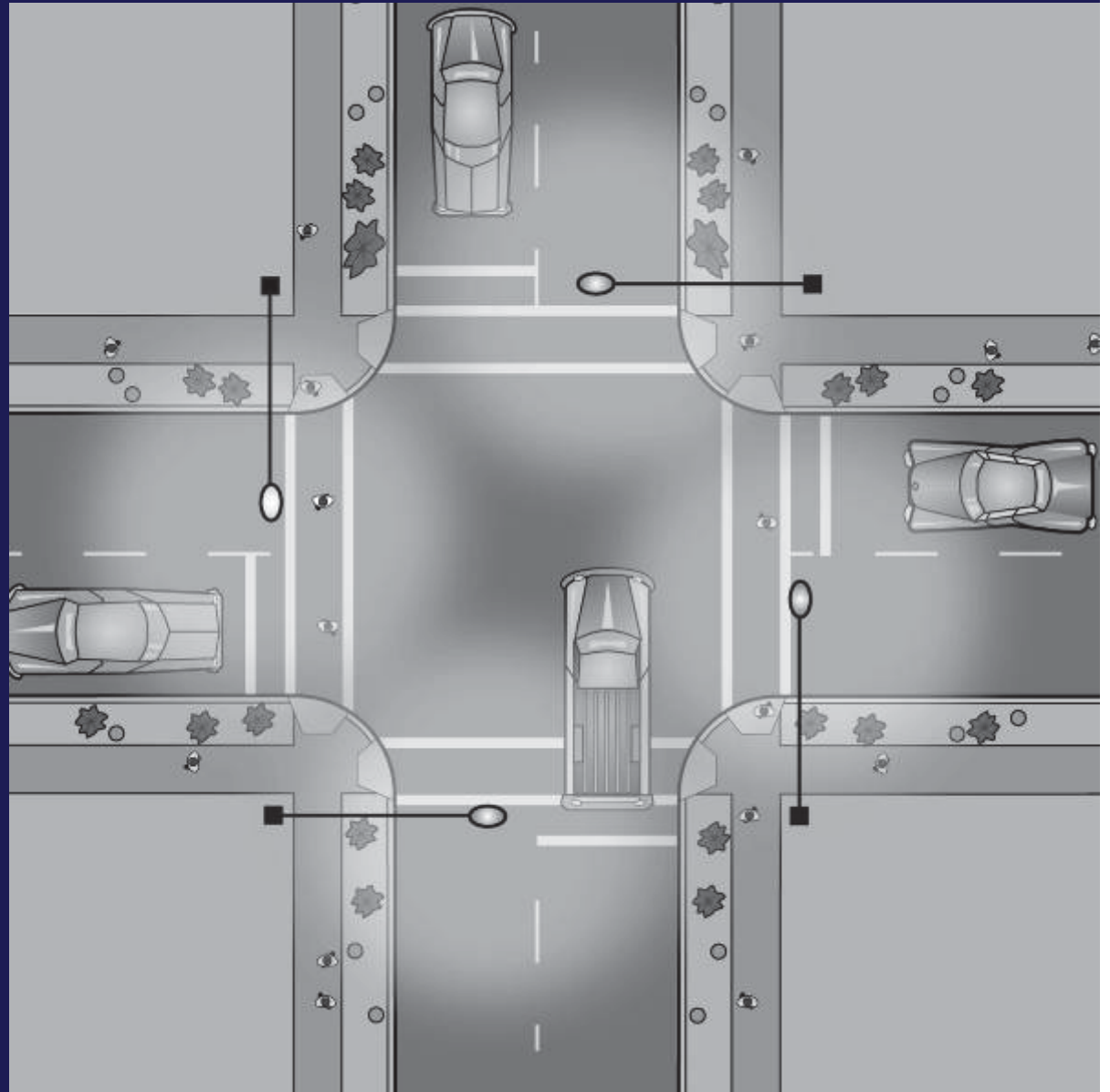
Longitudinal markings are more visible to driver from

Illumination – Essential For Any Crossing

Marked crosswalk?

— Light it.

Up to 50% of pedestrian crashes occur at night



Lighting Location is Important

Old Way

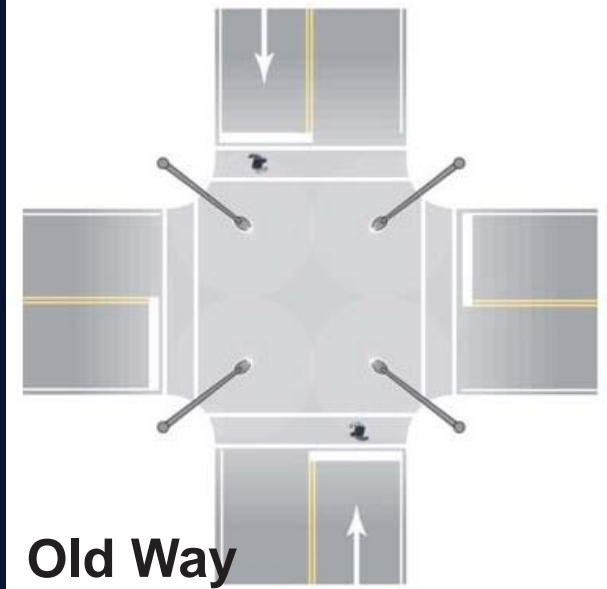


Figure 11. Drawing. Traditional midblock crosswalk lighting layout.

New Way

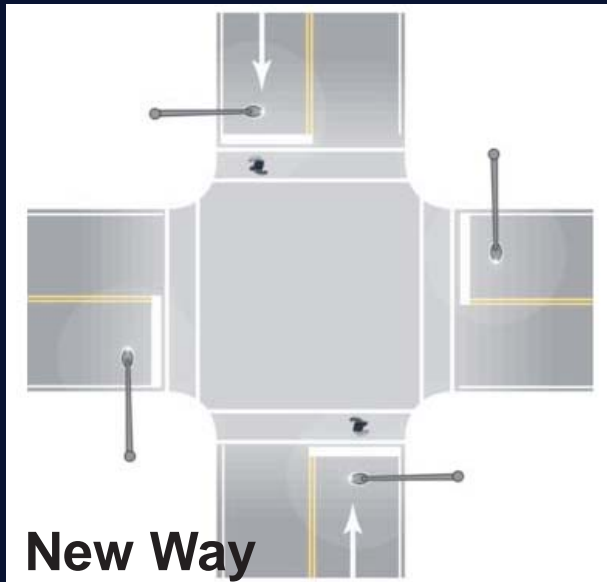


Figure 12. Drawing. New design for midblock crosswalk lighting layout.



Old Way

Figure 13. Drawing. Traditional intersection lighting layout.



New Way

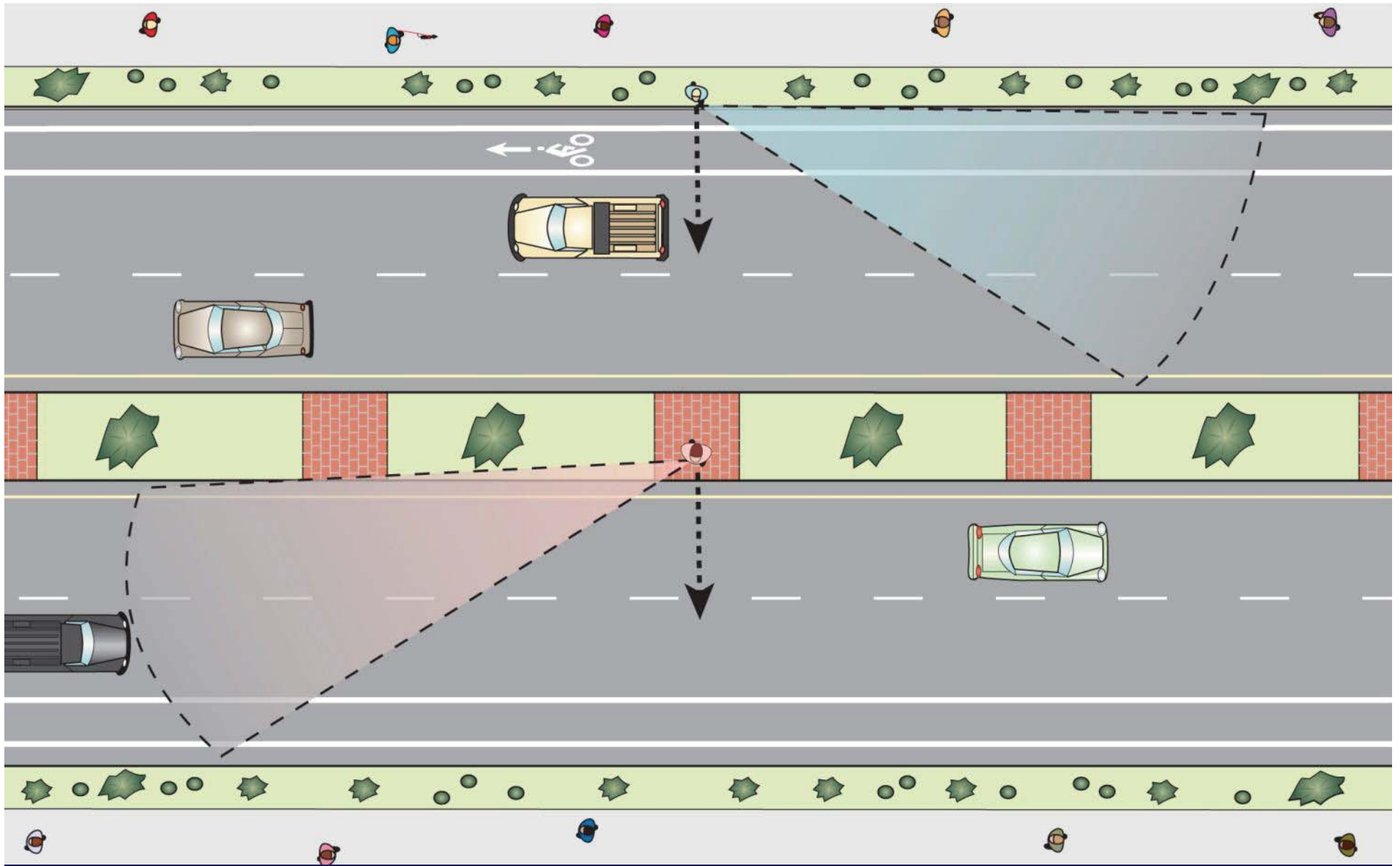
Informational Report on Lighting Design for Midblock Crosswalks (www.tfhr.gov/safety/pubs/08053/08053.pdf)

Raised Medians And Islands Reduce Pedestrian Crashes

At marked crosswalks: CRF = 46%

At unmarked crosswalks CRF = 39%

Crash Reduction Factor (CRF): % fewer crashes experienced on a road with a given countermeasure than on similar road without the countermeasure (www.cmfclearinghouse.org)



Continuous raised median — basic principle:
Breaks long complex crossing into two simpler crossings

Pedestrian Hybrid Beacon aka “HAWK” (High Intensity Activated Crosswalk)



Included in the 2009 MUTCD

CRF = 60%

2009 MUTCD Chapter 4F Pedestrian Hybrid Beacons

Tucson AZ

Drivers see
Hybrid
Beacon



Pedestrians
see
Pedhead



Tucson AZ

Pedestrian Hybrid Beacon Sequence



1

Blank for
drivers



2

Flashing
yellow



3

Steady
yellow



4

Steady
red



5

Wig-Wag



Return
to 1



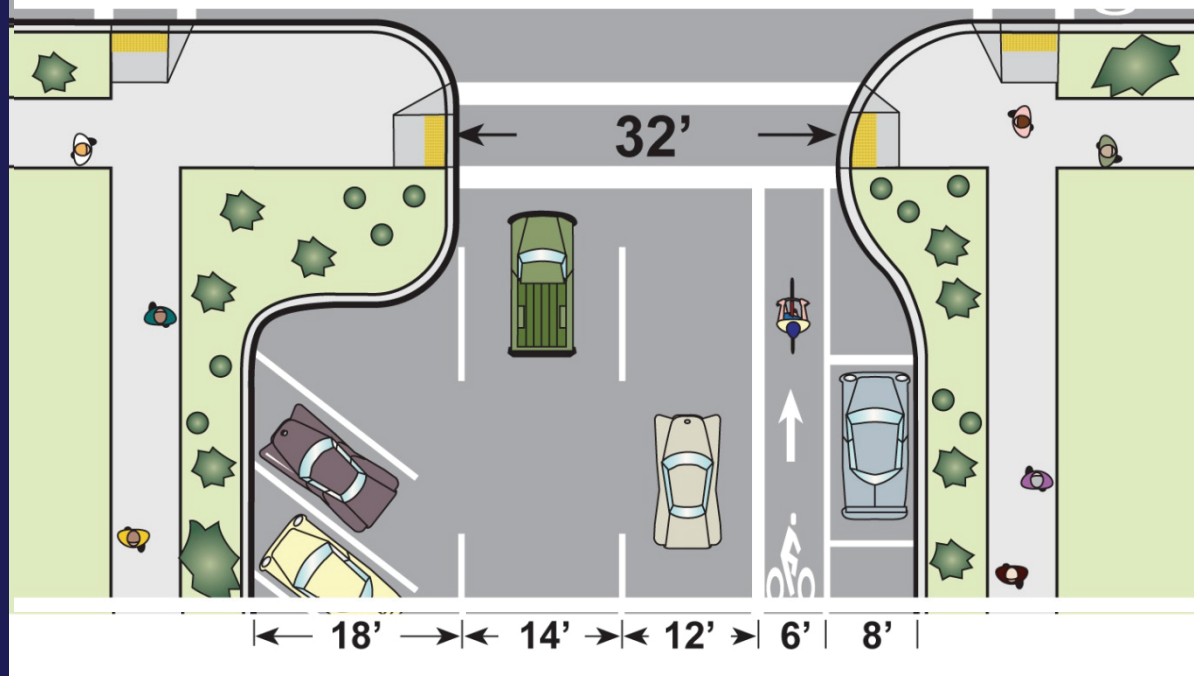
Curb extensions

Most focus is on reduced crossing distance

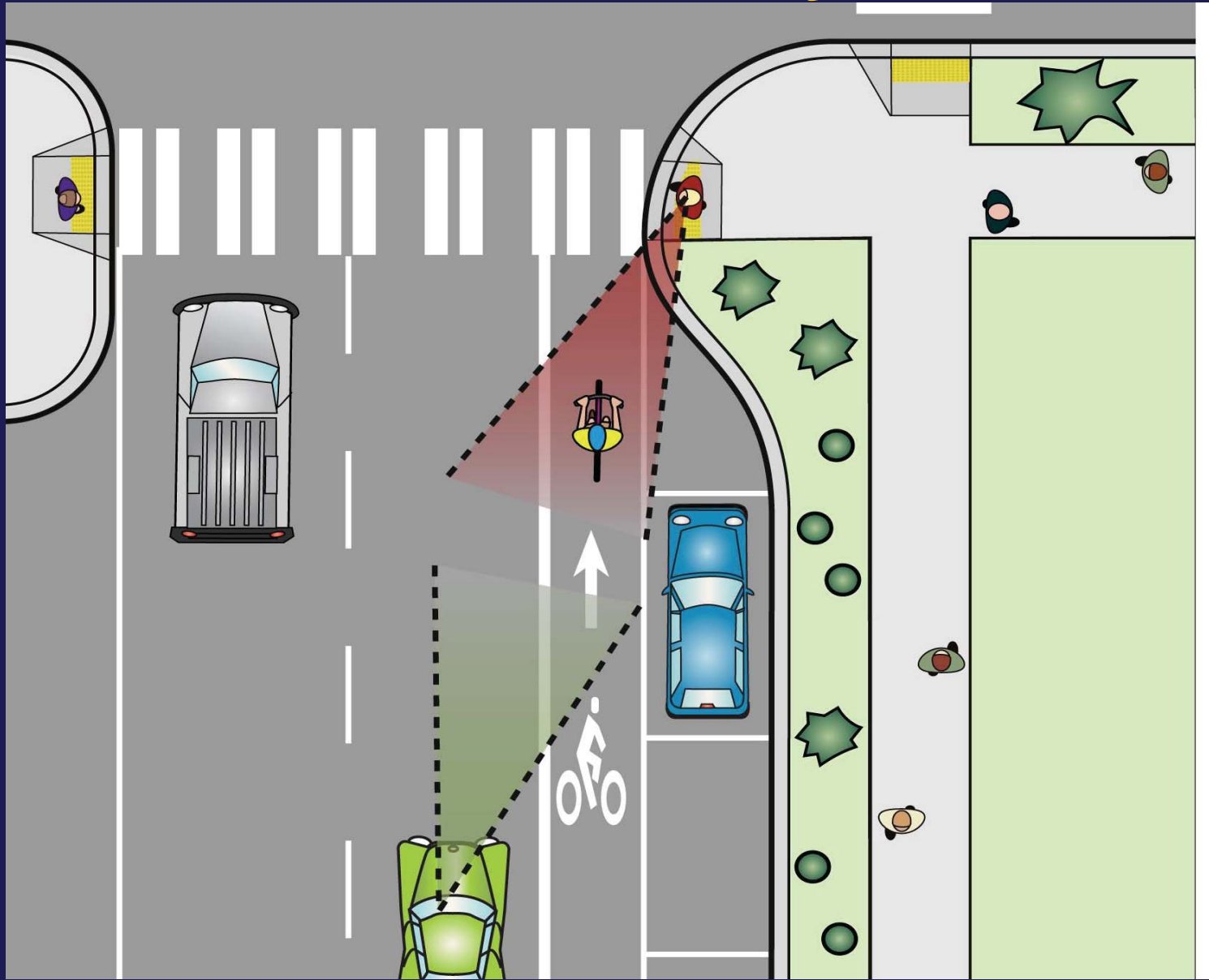
Other advantages:

- Better visibility between peds and motorists
- Traffic calming
- Room for street furniture

Curb extensions should be the width of the parking lane and not encroach on bike lanes or travel lanes



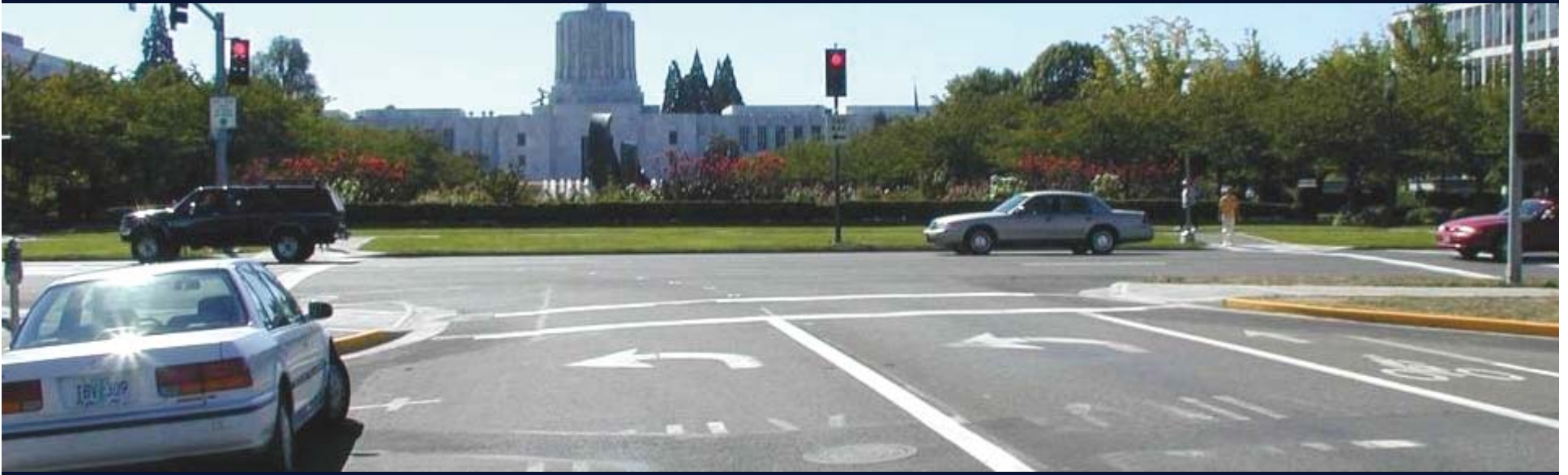
Better Visibility



Lead Pedestrian Interval (LPI)



Looks like a regular signal to drivers: green-yellow-red





LPI : WALK comes on at least 3 seconds prior to the green signal; pedestrians enter crosswalk before turning vehicles arrive there.



On-street parking

Median

***Bike
Lanes***

Center Turn-Lane

Road diets: reclaim street space for other uses

Seattle WA

Case study: Edgewater Drive Resurfacing Project (Orlando FL)

- \$589,000 project scheduled in FDOT 5-year work plan
- FDOT open to 3-lane option if City takes over jurisdiction
- Changes must be accepted by neighborhood and business associations; before/after studies

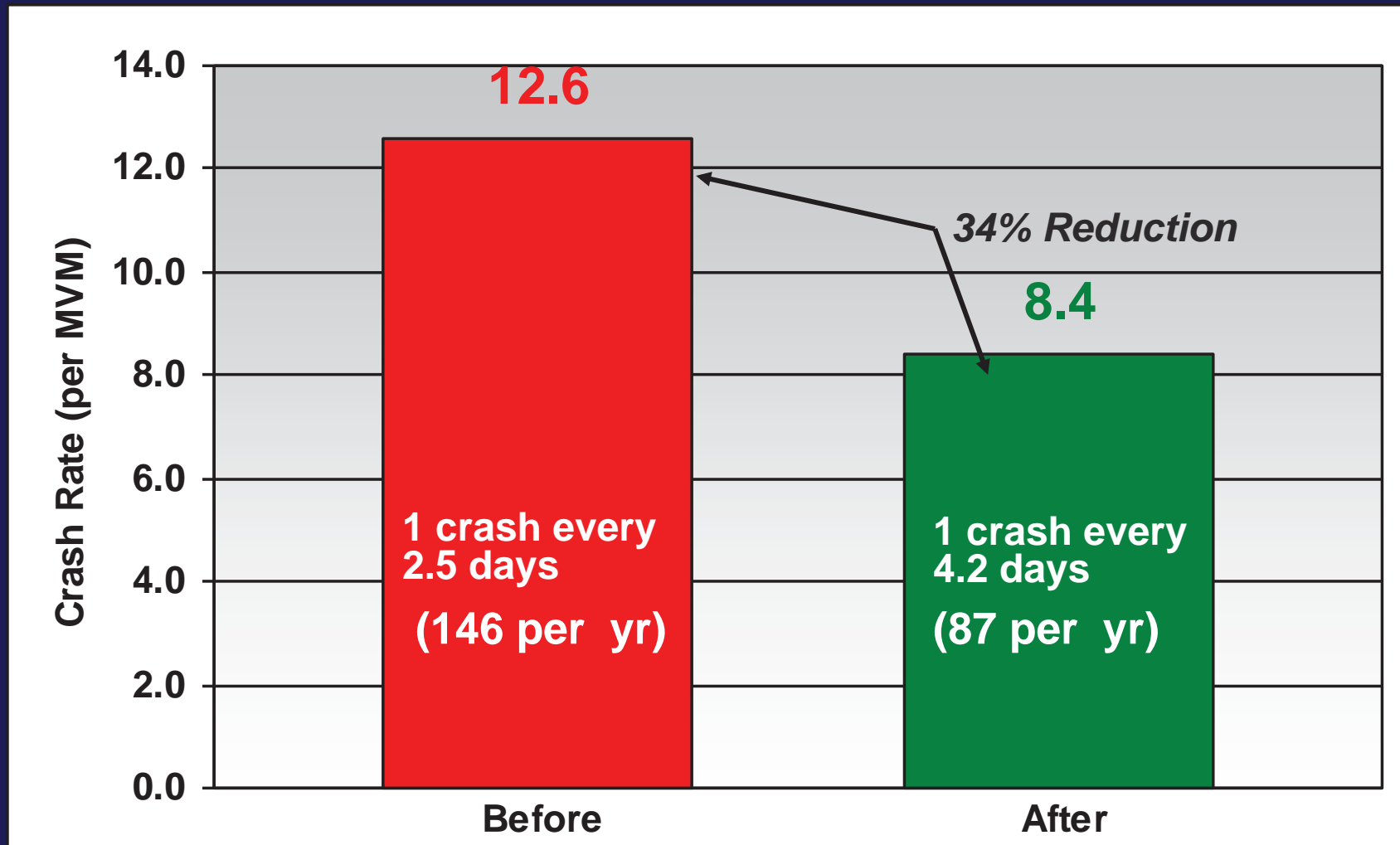


Before

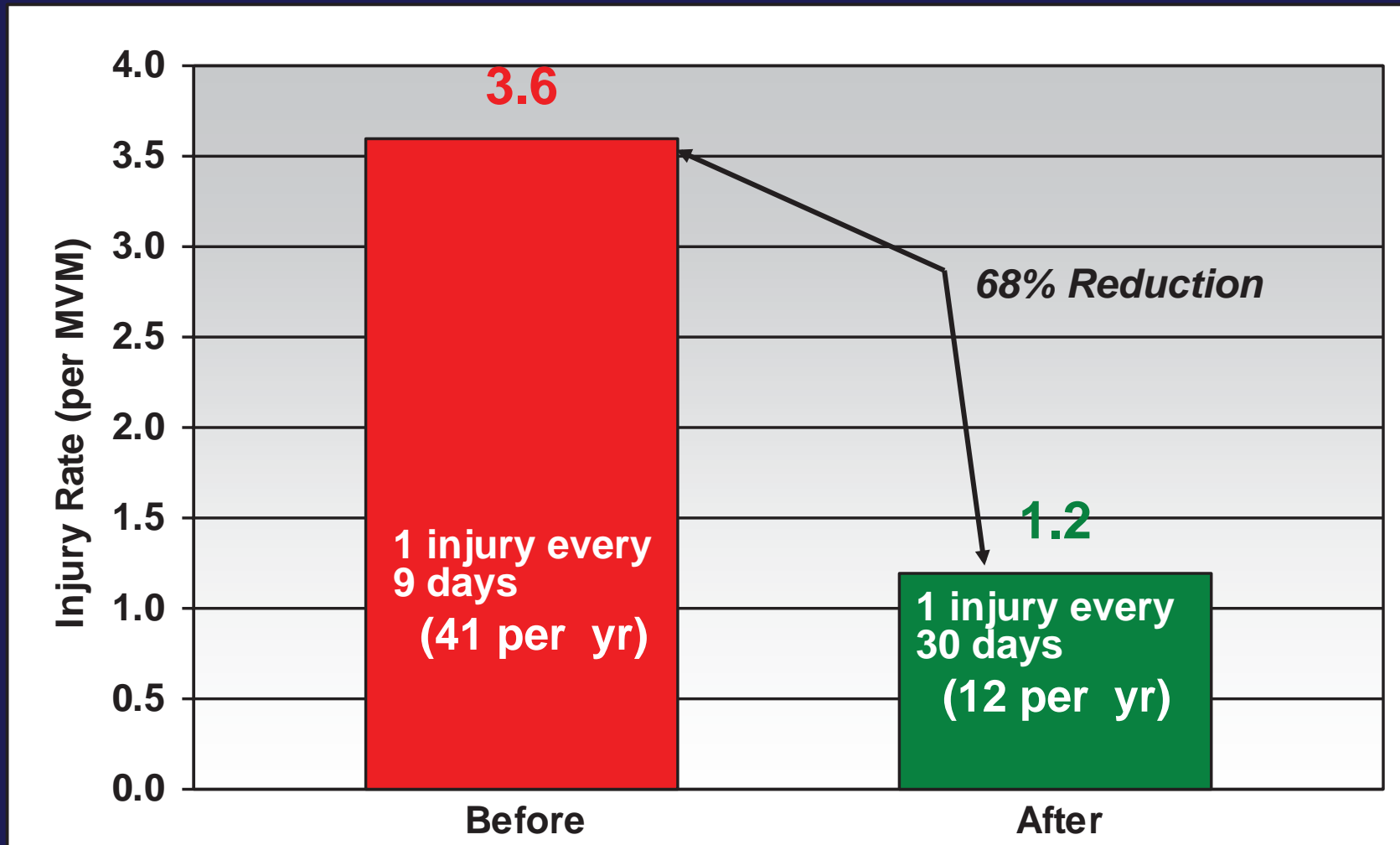


After

Before/after studies: 1. Crash rate



Before/after studies: 2. Injury rate



Pedestrian Safety

Education Strategies

Who Needs Educational Messages?

- Pedestrians – all ages
- Drivers
- Commuters, employees
- Elected officials, decision-makers, transportation officials
- Neighbors



Developing Educational Messages

Messages need to be specific about behavior change:

- “Be Alert” and “Be Safe” is not enough
- Be descriptive: “Look for cars at driveways”



Developing Educational Messages

Messages need to be realistic:

- Telling someone to “cross at a crosswalk” won’t help if the crosswalk is a mile away
- Engineering changes may need to be made first



Targeting Specific Audiences

Must consider:

- What is the best way to reach audience?
- When and how should audience receive information?
- Are there demographic factors to consider — language and cultural sensitivities?



Educating Pedestrians

- Reach out to most vulnerable: children and seniors



Why Children and Seniors?

They are:

- Overrepresented in pedestrian crashes
- More vulnerable in a crash
- Less likely to understand how to cross safely
- Less able to judge traffic or understand signals



Educating Elementary and Middle School Children

- Education campaigns teach children about safe practices
- Teach skills early:
 - Children need to learn and practice safety skills right away
 - These are life-long skills



Educating Seniors

- Initiate campaigns in targeted settings
 - Retirement communities
 - Healthcare clinics/hospitals
 - Libraries
 - Churches



Key Messages for Drivers

- Avoid multiple threat: never pass a car that may be stopped for pedestrians



Educating Drivers

1. Plug into local media; take advantage of existing resources and programs
2. Distribute driver and pedestrian safety material together:
 - Maps, brochures, bumper stickers
3. Couple education with enforcement
4. Add pedestrian safety information to traffic publications
5. Motorist training programs such as “Brakes” and “Master Drive”

Examples of Successful Education Programs

“Willy Whistle” Education Campaign

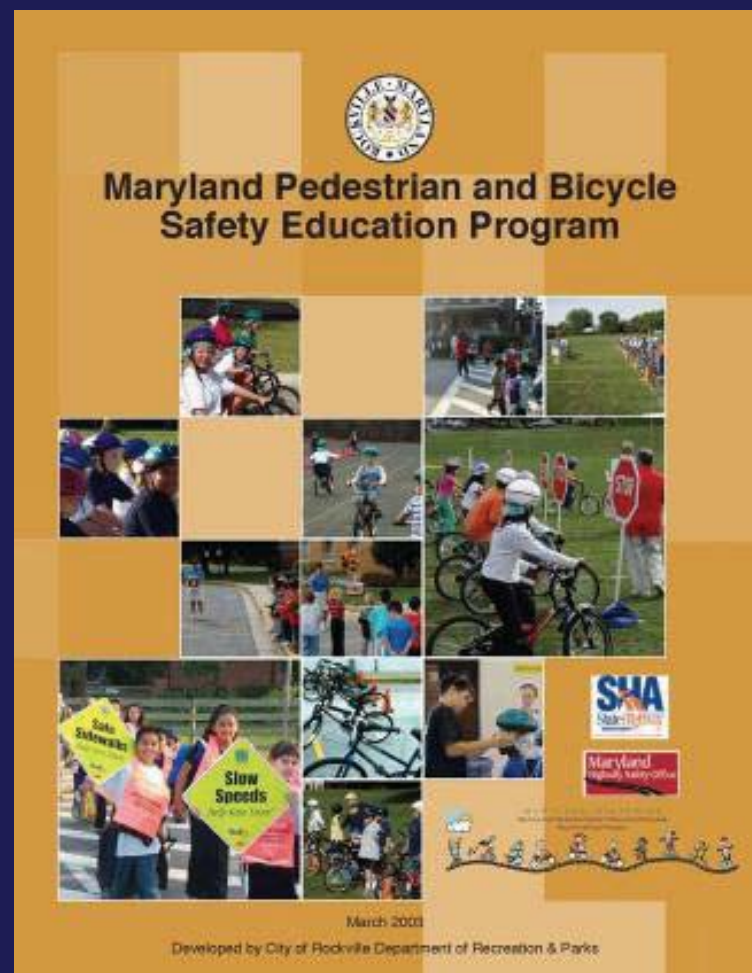
- **Target Audience:**
 - Children ages 4 to 7
- **Message:**
 - How to look before crossing the street and safely cross midblock
- **Success:**
 - Dart-out ped crashes involving 4-6 year old children decreased by approximately 30%



(Blomberg et al., 1983)

Maryland Statewide Education Curriculum

- Comprehensive, hands-on K-2 curriculum:
 - Series of lessons and skill training
 - Administrators Guide, Teachers Guide, and Lesson Handbook
 - Has reached over 7,000 students at 10 schools



Components For Success

- Combine and coordinate with planning, engineering, and enforcement measures
- Use short- and long-term efforts
- Supplement informational programs with opportunities to put learning into practice



Pedestrian Safety

Enforcement Strategies

Role of Enforcement

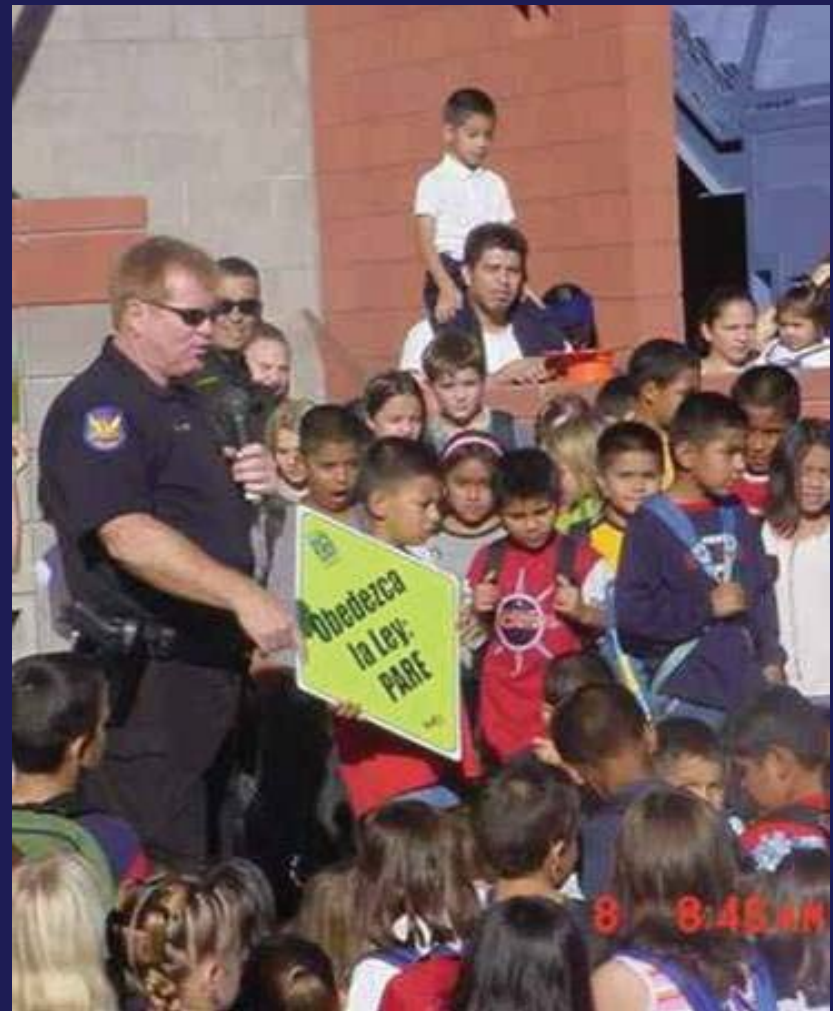
- Increase awareness
- Improve behavior
- Reduce traffic safety problems

More important to be visible than to write a lot of tickets



Role of Law Enforcement Officers

- Teach safety
- Evaluate traffic concerns
- Provide police presence
- Monitor drivers and pedestrians
- Not “just hand out tickets”



Dangerous Driver Behaviors

- Speeding
- Failure to yield
- Running lights
- Passing stopped car (multiple threat)
- Distracted Driving



No brake lights!

Dangerous Pedestrian Behaviors

- Disobeying signals
- Crossing at undesirable locations
- Distracted Walking




The 85% Concept



- *If 85% of motorists are doing the wrong thing, then enforcement will do little*
- *If 85% of motorists are doing the right thing, then enforcement can effectively manage the other 15%*

The 6-Week Concept

- 
- *Enforcement changes behavior for up to 6 weeks*
 - *Behavior will return without additional enforcement*
 - *Engineering and education needed for permanent change*

Potential Law Enforcement Approach

1. Involve community
2. Educate public
3. Provide officer training
4. Follow up



Law Enforcement Methods

- Speed trailers and monitors
- Traffic complaint hotline
- Photo enforcement
- Pedestrian decoy
- Progressive ticketing
- Double fines



Speed Trailers

- Provide awareness
- Reduce speeds
- Enhance enforcement



Active Speed Monitors

- Regulatory device
- More permanent than trailers
- May be solar powered



Photo Enforcement

- Not always allowed
- Supplement police efforts
- Movable or fixed units



Pedestrian decoys



Bring media attention to yielding problems

Progressive ticketing

- First: Educate
- Second: Warn
- Third: Ticket



Conclusions

- 3 E's approach:
 - Education, Enforcement and Engineering
 - Coordinated approach yields effective results
- Understanding Pedestrian Principles
 - “Right design invites right use”



Group Discussion

- Workshop attendees are invited to use microphone to provide input by topic
 - Education
 - Enforcement
 - Engineering
 - Others?
- Please complete the handout provided tonight and write any additional comments you might have.



Thank You and Safe Travels



Local Government Commission

www.lgc.org