Locating, Design and Liability Issues of

Mid-block Crosswalks

The Greenway Collaborative, Inc's 2009 Webinar Series

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What is a Mid-block Crosswalk?

- Technically, a Marked Crosswalk Located Away From an Intersection
- In Practice, a Marked Crosswalk Located Away From a Standard Signalized Intersection
- Guidance to Pedestrians on an Appropriate Place to Cross the Road
- Warning to Motorists to Expect Pedestrians
- May Be Signalized or Unsignalized

At The Intersection of Two Roads Where Sidewalks Are Present on Opposite Sides, A Crosswalk Technically Exists Between Those Sidewalks Even If It Is Not Marked.

Motorists Must Yield to Pedestrians **IN** a Crosswalk, But Pedestrians Are Required to Yield To Motorists At Unsignalized Mid-block Crosswalks

Mid-block Crosswalks

Location, Location, Location

- Respond to Demand
- Respect Directness of Travel
- Fix, Do Not Ignore

Locating Crosswalk – Determining Demand

- Existing Crossing Activity
  - May Be Time Sensitive
- Map Out Mixed Land Use On Opposite Sides of Road
  - Housing and Retail
  - Office and Restaurants
- Major Transit Stops – Look for Shelters
- School Routes
- Bike Routes
- Local Road Connectors
- Trail Crossings

Don't Only Rely on Existing Activity. Some Traffic Is So Intimidating That It Inhibits Trips. Evaluate the Latent Demand. Look at a Road As It Were a River and Locate the Crosswalk as You Would Locate a Bridge.

Locating Crosswalks – Evaluate Out-of-Direction Travel

- Average Walking Trip for Personal Business is About ½ Mile. This Equals A 10 Minute Walk
- Think of Out of Direction Travel as a Percentage of the Total Trip Distance and Walking Time
- Thus A 10% Detour for An Average Walking Trip is 264' (less than a city block)
- A Catchment Area for Bus Stop is Even Less, Typically ¼ Mile

Directly Behind You Is A Large Married Student Housing Complex.

So How Effective Do You Think This Sign Was?

Locating Crosswalks – Evaluate Out-of-Direction Travel

Locating Crosswalks – Evaluate Out-of-Direction Travel

- In 10 Minutes, 8 of 9 Pedestrian Crossed Mid-block
- Accommodate Mid-Block Crossings If Signalized Crossings are Spaced Greater Than 660' (1/8 Mile) Or Less If There Is A Direct Connection
- Where Demand Exists The Typical City Block (330') Is About the Right Spacing For Crosswalks

There Is Now A Crosswalk In This Location

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Location – Evaluating Bicycle and Pedestrian Crashes

- A Typical Crash Analysis Periods is 3 Years – This Works Fine for Automobiles
- To Get A Similar Sample for Pedestrians You Would Have to Have A 20 to 60 Year Time Frame
- Pedestrian/Motor Vehicle Crashes Typically Result in Server Injury or Death
- This is Why It Often Takes A Severe Injury or Fatality to Get a Crosswalk
- Pedestrian and Bicycle Safety Issues Are Best Handled By Road Safety Audits – Looking For Near Misses

Too Often Bicycle and Pedestrian Safety Issues Are Not Given The Same Attention as Motorized Safety Issues Because They Do Not Have the Same Concentration of Crashes.

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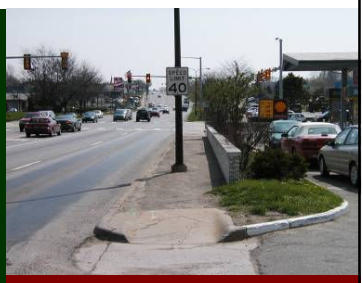
Location – Redirect to a Signalized Intersection?

- Too Often the Default Choice Without Analysis
- Is The Signalized Intersection Really A Safer Option?
  - Generally More Lanes
  - Turning Movements
  - Many Things Vying for the Driver Attention
- Is The Route To The Intersection Safe?
- Will Pedestrians Really Go That Far Out of Their Way?



In Many Cases A Unsignalized Mid-Block Crossing May Be the Safer Alternative

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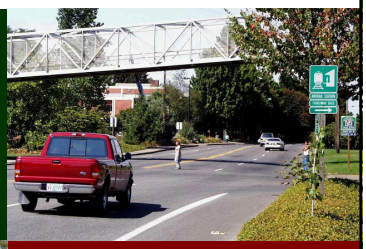
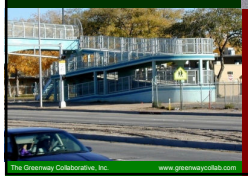
Location – Go Overhead?

- Overpasses Are Often A Poor Allocation of Limited Resources
- Ramps Add A Lot Of Distance To Trips
- Many People Are Afraid To Use Them





You Can Put in About 30 Crossing Islands for the Cost of One Overpass

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Mid-block Crosswalks
Design

- Context
- Visibility and Intent
- Crosswalk Surfacing
- Lighting
- Signing Options
- Trail Intersections

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Design Context – Influence of Urban Form

- Review of 24 Cities and 130,000 Crashes Shows that Safety Grows as Street Networks Grow Denser
- Newer Cities, Primarily Developed Since 1950 Are the Most Unsafe
- Newer Cities Tend to Concentrate Traffic on a Few Main Roads
- Newer Cities Tend to Have Fewer Busier Intersections
- Older Cities Tend to Have Grid Road System

Speed Is a Key Safety Factor – When Vehicle Speeds Drop 5%, Injuries Drop 10%, Fatalities Decrease by 20%. Grid Road Systems Tend to Be Slower Road Networks.

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Design Context – Safety in Numbers

- The Concept Applies Community Wide and To Specific Locations and Times
- Less Frequent Use Needs More Visible Facilities to Increase Motorists Awareness
- This is The Opposite of How Motorized Facilities Are Dealt With

Dangerous Designs and Situations May be Off-Set By Expectations of Encountering Pedestrians.

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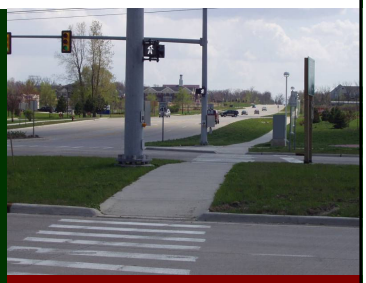
Design Context – The Suburban "Perfect Storm"

- If You Look At The Suburban Context It Typically Consists of:
  - Four + Lanes of Traffic
  - 35 to 50 MPH Speeds
  - Highest Traffic Volumes Per Lane
  - ½ to 1 Mile Between Signals
  - Limited or Non-Existent Transit Service
  - Deep Building Setbacks
  - Few Pedestrians and Bicycles



The Conditions of a Suburban Context Warrant Significant Pedestrian and Bicycle Facilities for Relatively Few Bicyclists and Pedestrians

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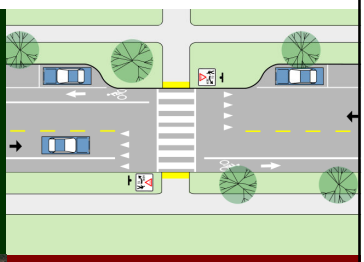
Design – Intent and Visibility

- Make Sure Pedestrians and Motorists See Each Other:
  - Use Curb Extensions to Improve Visibility Where On-Street Parking Exists
  - It Should Be Obvious If Someone Is Waiting to Cross the Road
- Obvious Crosswalks



Sidewalks on the Back of Curb Make It Difficult to Distinguish Between The Person Walking Down the Road and the Person Wishing to Cross the Road.

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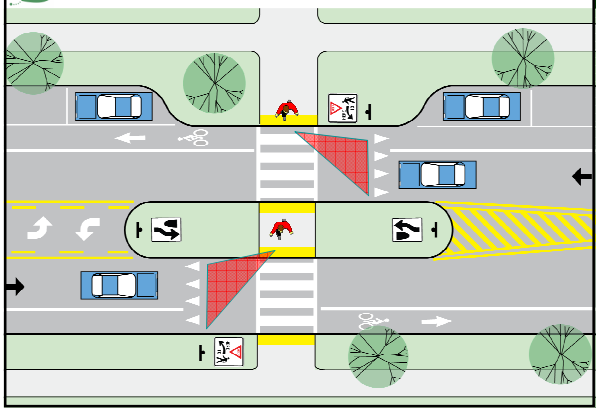
Design – Splitting the Trip Into Two Phases



Design – Crossing Island Example

- Reflective Red and White Bollards
- Reflective Band on Sign
- Overhead Lighting and Signs
- Angled Walk on Island
- Brick Paving

Oak Valley Drive
Scio Township, Washtenaw County, Michigan

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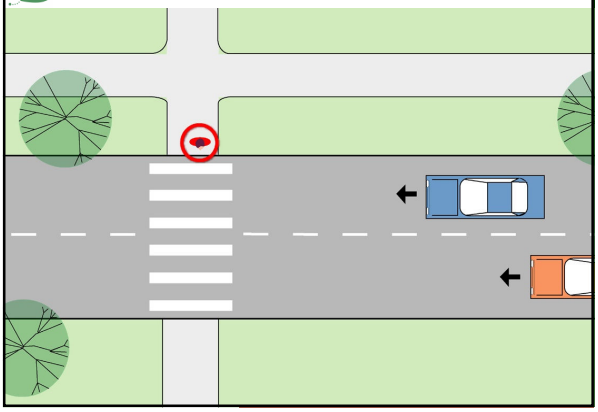
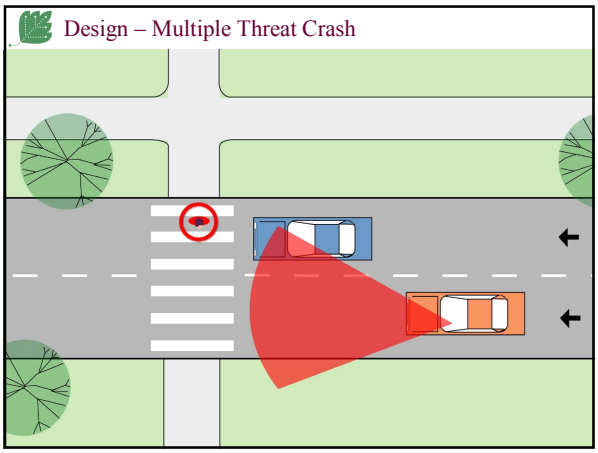
Design – Multiple Threat Crash

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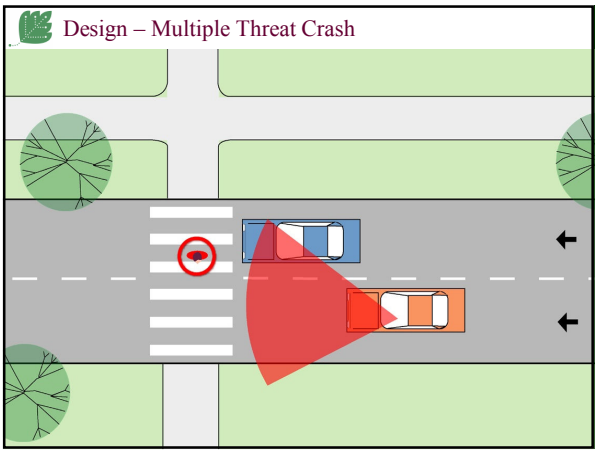
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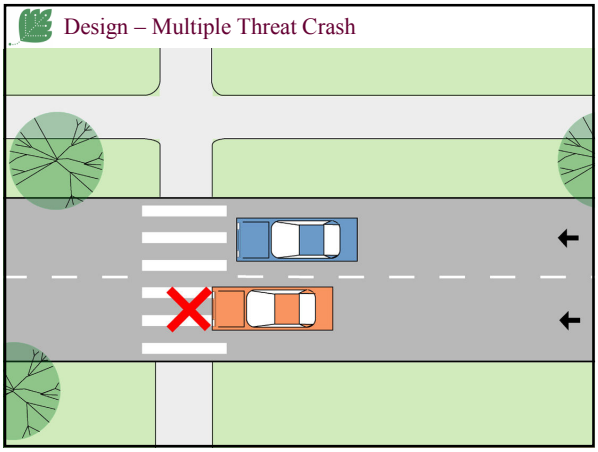
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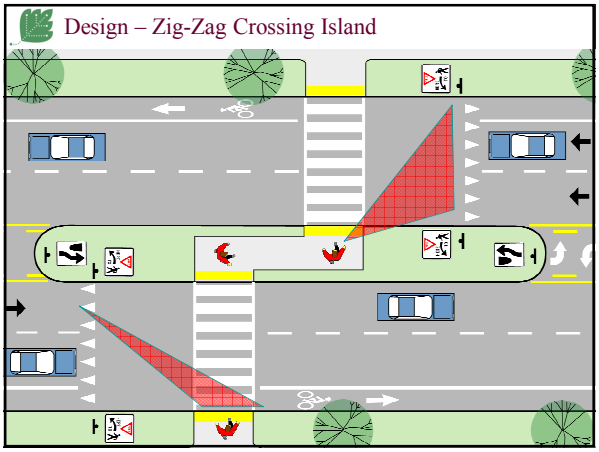
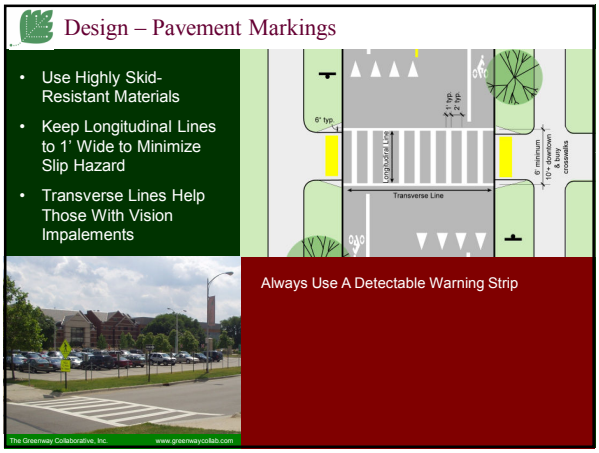
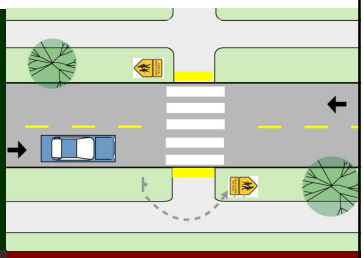

Design – Zig-Zag Crossing Island


Design – Zig-Zag Crossings Island Example
Zig-Zap Crossing Provide Room for Multiple Bicycles, Trailers and Tandems
Reflective Bollards
Overhead Lighting and Signs
Clinton River Trail
Rochester Hills, Michigan


Design – Pavement Markings
Use Highly Skid-Resistant Materials
Keep Longitudinal Lines to 1' Wide to Minimize Slip Hazard
Transverse Lines Help Those With Vision Impalements
Transverse Line
Always Use A Detectable Warning Strip

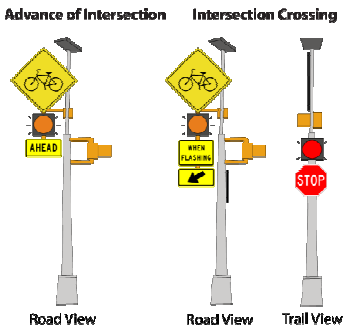
Design – Sign Placement

- Sometimes Large Sign Assemblies Can Obscure The Thing They Are Meant to Call Attention To
- Keep Bottom of Signs 7' From Ground And/or Locate Sign to Far Side of Walkway



Design – Actuated Beacon

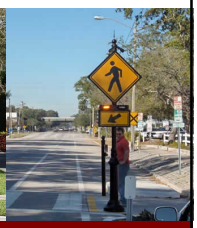
- Key Aspect Is It Only Flashes When Someone Crosses A Road
- Passive Activation Requires A Good Detection Area
- Solar & Wireless Options
- Can Be Linked to Advance Warning Signs



There Is Also A Signal for The Trail Users

Design – Actuated Rectangular Rapid Flash Beacon

- High Intensity LED Flashers Area Paired With Crosswalk Signs
- Alternating Flashers Get Motorists Attention When Activated
- Can Be Passively or Push-Button Activated
- Solar Power Options
- Can Be Linked to Advance Warning Signs
- 80 to 90% Adherence After 1 Year in Test
- Interim Approval by FHWA To Use

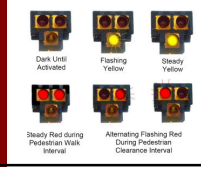


Some Tested Versions Included a Motion Activated Voice Prompt in Multiple Languages Requesting User To Push the Button To Activate The Signal

Design – Hybrid Pedestrian Beacon

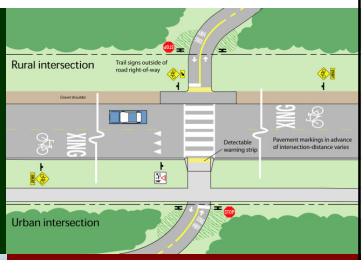
- Address Many of the Problems With Traditional Pedestrian Signals
- Minimize Delay to Motor Vehicle Traffic
- Lower Warrants
- Will Be In Next Version of MMUTCD
- Good For Locations Where There Are Few Usable Gaps In Traffic or Crossing Island Is Not Feasible
- Roundabout Applications

Sequence of Pedestrian Beacon



Design – Trail / Road Intersections

- Pave Gravel Shoulders
- Pave Trail As It Approaches the Road
  - Change In Materials Signals Something New
  - Traction Provided Where It is Most Needed
  - Can Use Pavement Markings and Detectable Warning Strips



When Changing Alignment to Cross the Road At 90 Degrees, Do So As Far Back As Possible and Go Around Something to Minimize Cut-Through Traffic

Design – Crosswalk Paving Treatments

- To Be An Official Crosswalk It Must Have Some Pavement Markings
- Brick and Concrete Crosswalks Have Poor Contrast With Asphalt
- Brick Crosswalks Can Be Difficult for Wheel Chair Users
- Maintenance Issues With Dissimilar Materials

A Key Purpose of A Crosswalk Is to Draw Motorist's Attention To The Crosswalk

Design – Crosswalk Lighting

- Directly Overhead Lighting Does Little to Illuminate Someone In the Crosswalk
- Position Lighting Such That It Illuminates the Side of the Person Facing Traffic
- Off-Set Lighting Can Be Used In Combination With Reflective Bollards and Reflective Sign Posts To Increase the Visibility of a Crossing Island

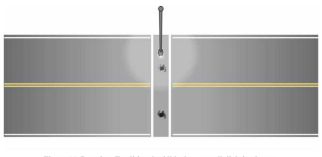


Figure 11. Drawing. Traditional midblock crosswalk lighting layout.

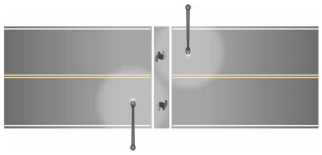


Figure 12. Drawing. New design for midblock crosswalk lighting layout.

Liability – Highway Exception

Risk is Low Because Exception is Limited:

- Only a Duty to "Repair" and "Maintain"
- No Design Liability
- Excludes Signs, Signals and Structures Outside the Road Surface
- Liability for Only Unreasonably Unsafe Defects

The Highway Exception:

"… each governmental agency shall maintain the highway in reasonable repair so that it is reasonably safe and convenient for public travel."

Governmental Tort Liability Act – MCL 691.1402(1)

Liability – Crosswalks are Legally Defendable

- All Involve Design Decisions
- All Are Recognized as Reasonable Measures to Address Specific Safety Problems
- All Involve Signs, Signals, or Features Outside the Road Bed Surface
- All Empirically Proven to Make Travel Safer
- Individual Employee Liability Slight – No Gross Negligence

Liability Limited to Vehicular Travel Lanes:

"The duty…extends only to the improved portion of the highway designed for vehicular travel and does not include sidewalks, trail ways, crosswalks, or any other installation outside of the improved portion of the highway designed for vehicular travel."

Grimes v MDOT (2006)

Applies to State and County Roads Only

Questions or Comments

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