Planning for Pedestrians & Bicyclists
Creating forgiving and inclusive roadways

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Agenda

- Transportation Evolution
- Transportation Equity
- Safe Systems Approach
- Scoping and Balance
- STEP Countermeasures
- Project Examples and Benefits
Transportation History

1789 AD - Belief in Technology

- We believe that science and technology can solve any problem
  - Disease
  - Poverty
  - Death?
It is quite generally understood that roads are for the common use of all and not the private property of a few rich enthusiasts...[these rights] come to [them] through no statute law. **The doctrine that streets are for the public is part of our common law** and is so old that we may safely hazard a guess that it is coeval with the existence of highways themselves...

- **John Farson, President, American Automobile Association, 1906**
MORTALITY STATISTICS 1929

From 1924 to 1929 there was a continuous increase in the death rate from motor-vehicle accidents in the registration States of 1900, the rates ranging from 19.8 in 1924 to 27.4 in 1929; in the States of 1910, the rates ranged from 19.8 to 28.8 and in the States of 1920, from 17.5 to 26.5. The District of Columbia is always included in the groups “States of 1900, 1910, or 1920.”

1920’s: Social Engineering

• Jaywalking first appears in the dictionary in 1924
• Subdivision 1. **Obey traffic-control signals.**

• Subd. 2. **Rights in absence of signal.**

  (a) ...the driver of a vehicle shall stop to yield the right-of-way to a pedestrian crossing the roadway *within a marked crosswalk or at an intersection with no marked crosswalk*...

  (b) When any vehicle is stopped at a marked crosswalk or at an intersection with no marked crosswalk to permit a pedestrian to cross the roadway, the driver of any other vehicle approaching from the rear shall not overtake and pass the stopped vehicle.

• Subd. 3. **Crossing between intersections.**

  (a) Every pedestrian crossing a roadway at any point other than within a marked crosswalk or at an intersection with no marked crosswalk shall *yield the right-of-way to all vehicles* upon the roadway.

  (c) Between adjacent intersections at which traffic-control signals are in operation pedestrians *shall not cross* at any place except in a marked crosswalk.

  (d) Notwithstanding the other provisions of this section every driver of a vehicle shall (1) **exercise due care to avoid colliding** with any bicycle or pedestrian upon any roadway and (2) give an audible signal when necessary and exercise proper precaution upon observing any child or any obviously confused or incapacitated person upon a roadway.
The matter of running Interstate routes through the congested parts of the cities was entirely against [his] original concept and wishes.

*President Eisenhower, 1960*

- Founded in 1966
- Shifted responsibility from driver to vehicle
- Crashes are inevitable and manufacturers have a safety obligation
- Reduced driver fatalities by addressing the “second collision”

We have drivers performing millions of maneuvers in their automobile adequately, even overpowering the deficiencies of their automobile...and then they make that one mistake, and should they die for that one mistake?...[W]e should build cars that take into effect that one, or those two mistakes...

-Ralph Nader, U.S. Senate traffic safety hearings, 1965
1972: False Sense of Security

- 1972 study by City of San Diego traffic engineer Bruce Herms.
- Risk adaptation taken to the next level

Compassionate road design

- 94% of crashes are the result of human error. Should people have to die for their mistakes?
- Do we have an ethical responsibility to design our communities for vulnerable users?
- How do our investments and decisions reflect our values?
Compassionate road design

- Lower speeds
- Add sidewalks & bikeways
- Improve crossings

Where Are We Now?

Maria Donnelly, PE, PTOE

HNTB Corporation
Ped/Bike Fatalities Compared to Total Fatalities

From Minnesota Walks:

OVERARCHING THEME:
DESIGN FOR ALL

Plan and design streets so that all people are able to safely and comfortably walk or roll to their desired destinations.
Towards Zero Foundation Safe System:

• Nobody should be killed or seriously injured from using the road network
• Views human life and health as paramount
• Four principles
Pedestrian Vulnerability

- Hit by a vehicle traveling at 20 MPH: 9 out of 10 pedestrians survive.
- Hit by a vehicle traveling at 30 MPH: 5 out of 10 pedestrians survive.
- Hit by a vehicle traveling at 40 MPH: Only 1 out of 10 pedestrians survive.

WalkDenver.org

Pedestrian Catcher

Safety Scoop

THE CAR CATCHER (1939)
The Safe System – Principle 2

• The human body has a **limited physical ability** to tolerate crash force
  • Towards Zero – Project Graham
  • “Cars have evolved a lot faster than we have”
  • We’ll never (?) look like Graham – but a safe system provides protection

Project Graham

The Safe System – Principle 3

- Road safety is a shared responsibility amongst everyone, including those that design, build, operate and use the road system.

The Safe System – Principle 4

- All parts of the road system must be strengthened in combination to multiply the protective effects and if one part fails, the others will still protect people.
  - Build a forgiving system for vulnerable people.
What is MnDOT Doing?

A lot!

MnDOT Mission & Vision

VISION

Minnesota’s multimodal transportation system maximizes the health of the people, the environment and our economy.

MISSION

Plan, build, operate and maintain a safe, efficient and reliable multimodal transportation system that connects people to destinations and markets throughout the state, regionally and around the world.
MnDOT Initiatives

MnDOT Statewide Pedestrian System Plan (coming soon)

Non-Motorized Project Scoping

Sonja Piper | MnDOT
Scoping Field Walks

- Why add non-motorized scoping to projects
- Year 2: conducting non-motorized scoping field walks
- Approx. 60 field walks completed in 2018 and 2019

Project Selection Process

- Coordinate project selection with Districts
- Suitability for the Pedestrian and Cycling Environment (SPACE) tool
  - Leverages public data to identify latent demand for non-motorized transportation
Project Considerations

• Purpose and Need

• Mill and Overlay vs Reconstruction

What is this space for?

What to look for?

Roadway Conditions

• Speed limit and speed-related concerns

• Traffic volumes

• Truck volumes

• Cross section

• Crash rates

Bicyclist among high traffic volumes and turning conflicts
What to look for?

**Non-Motorized Conditions**

- Crash history
- Intersection risk assessment
- Crossing distances
- Visibility
- Comfort on facilities

[Image: Poor pedestrian visibility at a major roadway intersection]

10/23/2019

What to look for?

**Types of users on the roadway**

- Motorists
- Farm equipment
- Pedestrians
- Bicyclists
- ATVs
- Snowmobiles
- Amish

[Image: People walking to get groceries using an uncontrolled crossing]

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What to look for?

**Project context**
- Destinations
- Origins
- Welcoming space
  - Sense of community

Wahkon, MN

What to look for?

**Crossing locations and treatment**
- Controlled
- Uncontrolled
- Mid-block

Grass is noticeably worn where people want to walk
What to look for?

Bicyclist with no clear direction or crossing location

Countermeasure Selection
FHWA STEP Countermeasures

Every Day Counts: Safe Transportation for Every Pedestrian (STEP)

- Systemic application of cost-effective countermeasures with known safety benefits

  - Crosswalk visibility enhancements
  - Raised crosswalks
  - Pedestrian crossing/refuge islands
  - Rectangular rapid flashing beacons
  - Pedestrian hybrid beacons
  - Leading pedestrian intervals
  - Road diet/reconfiguration

Countermeasure Selection

- Roadway characteristics determine appropriate countermeasures
- Combinations of countermeasures can be used
Crosswalk Visibility Enhancements

- Warn motorists to expect pedestrian
- Indicate to pedestrians preferred crossing location

Raised Crosswalks

- Typical Context:
  - 2-3 lane roads
  - 30 mph or less
  - AADT’s less than 9,000
- Typical width 10-15 ft
- Effective speed reduction measure
Pedestrian Refuge Islands

- Staged crossing
- Consider when:
  - Curbed roadway
  - Urban, surburban multi-lane roadways
  - Mid-block crossings
  - Near transit or other pedestrian generators

Rectangular Rapid Flashing Beacon (RRFB)

- Warning lights and signs
- Unsignalized intersections or mid-block crossings
- Can be user actuated or automated
Pedestrian Hybrid Beacons

- Beacon to warn and control traffic at unsignalized marked crosswalks
- Typically used on higher speed roadways
- Consider education and outreach efforts with installation

Leading Pedestrian Interval

- Gives 3+ sec head start to pedestrians at traffic signal
- Pedestrians more visible to motorists
- Improves driver yielding
- 60% Reduction in Pedestrian Crashes
Road Diets or Roadway Reconfiguration

- Reduces speed differential
- Improved mobility and access
- Allows reclaimed space to be allocated for other uses
- See also: FHWA Road Diet Informational Guide
- **19-47% Crash Reduction**

Combination of Treatments

This example combines curb extensions, high-visibility markings, overhead lighting, and in-street signs on a two-lane roadway.
Example Projects

Glenwood

• Intro to Glenwood
• Location
• Issues and process overview

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Glenwood - After

Mahnomen

- Highway 59 (AKA 3rd St NE)
  - Wide shoulders frequently used for walking
  - MnDOT project will add turn lanes and reduce shoulder width
  - Transportation Alternatives Grant
  - Free Bikes 4 Kids
  - Safe Routes to school Planning
- Partners: City, County, Headwaters RDC, White Earth, Norman – Mahnomen Co. SHIP

Source: Google Maps 2012
Mahnomen - After

Hometown Transitions
If you build it, they will come

- Walking the Walk report found 1 point increase in the WalkScore correlates to
  - $700-$3,000 increase in home values
  - Higher property tax revenues for local governments
- For every $1 spent on implementing active transportation strategy
  - + $8.41 in sales output
  - + $2.65 in personal income
  - + $5.20 in value added

Source: walkingthewalk.org

Thank You!

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Source: FHWA Strategies for Accelerating Multimodal Project Delivery
2016 Southern California Association of Governments