



6. SAFETY IMPROVEMENT STRATEGIES

The Six E's of Safety

The Six E's of safety - **Engineering, Education, Enforcement, Encouragement, Evaluation, and Equity**

are the components of effort to improve pedestrian safety. Based on national, state, and Minneapolis-specific data, pedestrians tend to be at higher risk of injury and death when:

- Crossing at intersections
- Traveling on arterial streets and streets with higher speed limits
- Major left-turning movements conflict with pedestrian routes
- Traffic volumes are highest, specifically during the afternoon rush-hour
- Natural light levels are low, such as at dawn and dusk and in the fall

The following sections summarize some of the key strategies for each one of the E's. These strategies are based on findings from Minneapolis crashes and from trends documented in national studies.

Engineering

Street and intersection design is one of the tools that the city and other agencies will need to employ to reduce pedestrian crashes. Good design improves the comfort of the pedestrian realm and reduces conflicts between pedestrians and other modes. This section suggests several strategies to be considered relative to street design and operation.

Engineering strategies that can help improve pedestrian safety include:

- **Visibility of Crosswalks and Crossings** - While Minnesota State Statute establishes pedestrians' right to cross at any intersection regardless of the presence of a marked crosswalk, marked crosswalks serve as a guide for pedestrians and as a way to communicate pedestrian right-of-way to motorists. Unsignalized marked crosswalks should be considered for additional treatments such as flashers or median refuge.
- **Pedestrian Refuges** - Refuge islands reduce the distance and time that pedestrians are exposed to vehicle traffic. They are best applied where vehicle volumes or number of lanes make crossing difficult.
- **Intersection Radii** - Minimizing corner radii serves to reduce vehicle turning speeds and shorten pedestrian crossings at the intersection.
- **Curbs Extensions** - Bumping curbs out at intersections improves the visibility of pedestrians, as well as reducing crossing distance. Where curb extensions are not feasible, parking clearance of 20 to 25 feet from the crosswalk can still be used to make sure drivers and pedestrians can see each other.
- **Road Narrowing** - Fewer lanes and conflict points will help reduce pedestrian crashes. Reduce crossing distances by eliminating lanes when feasible.
- **Leading Pedestrian Interval (LPI)** - A LPI is a signal design feature that gives the walk signal to pedestrians prior to a green light for automobiles. This strategy has the most benefit where there are significant conflicts or crashes with turning vehicles, especially left-turning vehicles.
- **Reducing Speed Limits** - Higher vehicle speeds result in greater chance of a pedestrian crash resulting in a fatality or serious injury.
- **Left Turn Treatments** - When a fully protected left turn phase is not feasible, a Flashing Yellow Arrow can include a protected only phase only when the push button is pressed.
- **Appropriate Design Speeds** - Advocate for lower design speeds to reduce required width and number of lanes and ultimately increase pedestrian comfort.

Narrowing lanes, shortening crossing distances, reducing conflicts with turning vehicles, reducing vehicle speeds, and other traffic calming measures decrease pedestrian fatality and serious injury rates.

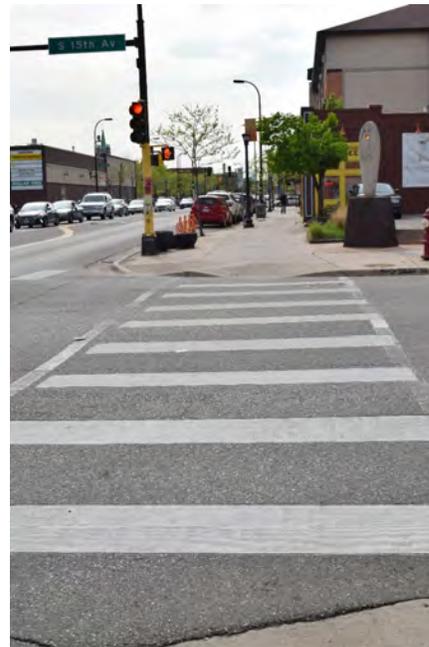
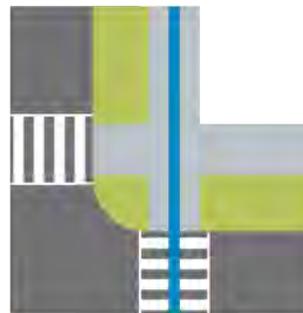


Figure 6-1. Example of Zebra Crosswalk
The intersection of 15th Avenue South and Franklin Avenue has visible, zebra-style crossings that reinforce pedestrian presence.

Desirable



Undesirable



- | | |
|---------------------------|---------------------------|
| ➤ Wide pedestrian zone | ➤ Narrow pedestrian zone |
| ➤ Small corner radius | ➤ Large corner radius |
| ➤ Ample corner space | ➤ Little corner space |
| ➤ Straight path of travel | ➤ Indirect path of travel |

Figure 6-2. Access Minneapolis Design Guidelines for Streets and Sidewalks

The design guidelines in Access Minneapolis note that small corners and straight pedestrian travel paths are preferred over large radii and indirect pedestrian paths.



LEFT TURN LANES PROTECT PEDESTRIANS

Recommendations from the “Left Turn Pedestrian & Bicyclist Crash Study” completed by the New York City Department of Transportation in August 2016

Both Minneapolis and national crash trends showed that drivers turning left are much more likely to be involved in a pedestrian crash than those turning right. The New York City Department of Transportation studied left-turn pedestrian crashes in detail and determined that protected left turn lanes and phases reduce crashes by simplifying the left-turning maneuver and decision-making for drivers. A protected left turn phase eliminates the possibility that a driver will misjudge the gaps in road and sidewalk traffic; the driver simply turns when there is a green arrow. Additionally, left turn lanes reduce the “back pressure” that results when a driver waits to turn left while other drivers who want to move through the intersection are forced to wait behind the turning vehicle.

Education

- **Vulnerable Populations** - Education campaigns should take age into consideration. Seniors are more likely to be involved in a crash during the day time, while younger people are more likely to be involved in a crash at night.
- **Distracted Driving** - Education campaigns should address driver inattention and failure to yield, which are frequent contributing factors to pedestrian crashes.
- **Pedestrians Under the Influence** - Because pedestrians under the influence are at a higher risk for a major crash, education campaigns could highlight actions that pedestrians can take to increase their own safety.
- **Safe Routes to School** - Programs like Safe Routes to School can be used to teach children lifelong safe walking practices.

Enforcement

- **Failure to Yield** - This was the primary cause of pedestrian crashes in Minneapolis. Targeted enforcement at high-crash intersections can help draw attention to the issue, especially in spring when the number of pedestrians increases, and in fall when there are fewer daylight hours.
- **Speeding** - Yielding to pedestrians is more challenging when drivers speed and crash severity increases at higher vehicle speeds. Enforcing safe travel speeds may reduce the number and severity of pedestrian crashes.
- **Tougher Prosecution and Sentencing** - Prosecution of drivers at fault in pedestrian crashes and tougher sentences on drivers may result in more awareness of the issue and more cautious driving.

Encouragement

- **Neighborhood Events** - Ongoing support of Open Streets, neighborhood events, and temporary installations such as parklets encourage people to walk in their neighborhoods.
- **Pedestrian Realm** - Creation of inviting spaces in public right-of-way or by adjacent property owners enhances the pedestrian experience and can create a buffer from traffic.
- **Land Use and Zoning** - Walking is encouraged by pedestrian-friendly land use policies such as mixed-use zoning, minimal setbacks, and lower parking requirements.

Evaluation

- **Before/After** - Follow-up studies after implementation of safety measures are key to identify the most effective treatments.
- **Monitoring** - Tracking pedestrian volume and crash data over time will allow the city to identify and address evolving trends and needs.

Equity

- **ACP50s** - Prioritize improvements in ACP50s and in areas that have disproportionate numbers of crashes to the population that lives there.
- **High Pedestrian Activity Areas** - Prioritize engineering improvements in the areas with the most pedestrians in order to have the largest impact on the pedestrian mode.

