



Web source: http://www.walkinginfo.org/pdf/PedSynth/Ped_Synthesis_Report.pdf

SUMMARY AND DISCUSSION

This synthesis report reviewed existing pedestrian research, particularly as it relates to pedestrian crash characteristics and the effects of various engineering and roadway safety treatments.

- The U.S. is the most motorized nation on earth (motor vehicles per capita),
- Pedestrian deaths annually number approximately 5,000 to 6,000 and represent approximately 12-15 percent of traffic deaths each year.

Research since the 1970s of pedestrian crash databases has given us a better understanding of crash causes and related factors. Significant findings include:

- Night conditions greatly increase pedestrian crash risk
- Pedestrian collisions primarily occur in urban areas



- Higher speed rural collisions more often result in pedestrian deaths.
- Fridays and Saturdays are the most common days for pedestrian collisions
- Children are over-involved in pedestrian collisions per population.
- Older pedestrians (particularly above age 65) are much more likely to be killed
- Alcohol consumption by the pedestrian is a factor in 40 percent of pedestrian deaths
- The most common pedestrian crash types include
 - dart-outs,
 - intersection dash, and
 - turning-vehicle collisions.
- Cited as being solely at fault in collisions:
 - Pedestrians - 43.2 percent of the time
 - Motor Vehicle Drivers - 34.8 percent of the time

Overview of Pedestrian Crash Countermeasures and Safety Programs

Some major findings are:

- There is evidence that substantially improved nighttime lighting can enhance pedestrian safety in certain situations.
- At uncontrolled crosswalks (i.e., no stop sign or traffic signal on the approach roadway) on a two-lane road, the presence of a marked crosswalk is associated with no difference in pedestrian crash rate, compared to an unmarked crosswalk. On multi-lane roads with traffic volumes above 12,000 vehicles per day, having a marked crosswalk alone, without other substantial improvements, is associated with a higher pedestrian crash rate (after controlling for other site factors) compared to an unmarked crosswalk. More substantial improvements are recommended to provide for safer pedestrian crossings at many such pedestrian crossings, such as adding traffic signals with pedestrian signals when warranted, providing raised medians, initiating speed-reducing measures, and/or others.
- Providing raised medians on multi-lane roads can substantially reduce pedestrian crash risk and can help pedestrians cross the street.
- At intersections with traffic signals, adding a WALK/DON'T WALK signal with a standard timing scheme (i.e., motorists move parallel to pedestrians and may turn right or left on a green light across pedestrians' path) has no significant effect on pedestrian crashes. Providing an exclusive pedestrian interval (i.e., motorists are stopped in all directions during the same interval each cycle while pedestrians cross in any direction) reduces pedestrian collisions by half. However, exclusive timing schemes can increase pedestrian and motorist delay



- and are most appropriate at downtown intersections with a combination of heavy pedestrian volumes, good pedestrian compliance, and low vehicle volumes.
- Allowing vehicles to make a RTOR maneuver appears to result in a small but clear safety problem for pedestrians. In fact, 21 percent of motorists violate NTOR signs if given the opportunity, and 23 percent of RTOR violations result in a conflict with a pedestrian. Countermeasures that have been effective in reducing pedestrian risks related to RTOR include illuminated NTOR signs, offset stop bars at intersections where RTOR is allowed (i.e., motorists are more likely to make a full stop often), variations in NTOR signs, and others.
 - Various innovative pedestrian and motorist warning signs have been found to reduce vehicle speeds or conflicts between pedestrians and motorists. These devices include the "strong yellow green" pedestrian warning sign, YIELD TO PEDESTRIANS WHEN TURNING sign, PEDESTRIANS WATCH FOR TURNING VEHICLES sign, three section WALK WITH CARE signal head, a DON'T START display to replace the flashing DON'T WALK display, and others.
 - Curb medians provide a safer environment for pedestrians compared with two-way left turn lanes (TWLTLs). Undivided highways present the highest crash risk for pedestrians.
 - Numerous treatments can address the needs of pedestrians with disabilities: textured pavements, audible and vibrating pedestrian signals, larger signs and pedestrian signals, wheelchair ramps, and others. While formal safety studies are very difficult to conduct on such treatments, certain benefits may result from such devices, depending on site conditions and pedestrian needs.
 - Careful placement of bus stops can affect pedestrian safety. It is clearly beneficial to put bus stops on the far side of an intersection and at locations with good sight distance and alignment (e.g., not on steep grades or on horizontal curves).
 - School trip safety can be enhanced by sidewalks and proper signalization, but also by well-trained adult crossing guards and selective police enforcement. Certain warning signs (e.g., flashing school speed limit signs) and markings (e.g., school crosswalks) are also appropriate and beneficial to pedestrians in many school zones.
 - Pedestrian safety and mobility are enhanced by sidewalks and walkways. This is a critical component of a pedestrian transportation network in urban and suburban areas.
 - Rural roads should have shoulders for pedestrian travel.



- Overpasses and underpasses can substantially improve safety for pedestrians needing to cross freeways or busy arterial streets at certain locations. However, such facilities must be carefully planned and designed to encourage pedestrians to use the facilities and not continue to cross at street level.
- Pedestrians can make themselves more visible by using a flashlight, jogger's vest, dangle tags, and rings (retroreflective material on the head band, wrist bands, belt, and ankle band). Such measures can increase a pedestrian's visibility distance up to 397 m (1300 ft), compared with about 61 m (200 ft) for a "base pedestrian" wearing blue jeans and a white t-shirt.
- Several studies have shown that converting from two-way to one-way streets can substantially reduce pedestrian collisions. However, converting from two-way to oneway streets may not be solely justified by pedestrian safety considerations. More often, several concerns such as capacity, traffic circulation, and overall traffic safety are major considerations. One-way streets can greatly simplify the task of crossing a street, particularly if the one-way street conversion does not result in increased vehicle speeds.
- While traffic-calming measures are primarily intended for neighborhood streets to reduce vehicle speeds and/or reduce cut-through vehicle traffic, such measures as street closures, speed humps, chicanes, traffic curbs, diverters, and others are in use in various U.S. cities. While controversial, many of these measures have been found to be effective in improving safety for pedestrians and/or traffic as a whole based on reductions in crashes, vehicle speeds, and/or reductions in cut-through traffic on neighborhood streets.
- Education for pedestrians has been found in a few studies to reduce crashes involving child pedestrians. However, most U.S. educational programs were found to have received little if any formal evaluations or to have had only limited measurable effects.
- Enforcement of traffic laws and regulations represents another important element in safe pedestrian activity in a roadway environment. This includes not only enforcing pedestrian regulations (e.g., jaywalking, crossing against the signal) but also motorist actions related to pedestrians (e.g., speeding, yielding to pedestrians when turning, drunk driving). While a number of U.S. cities (e.g., Seattle, Milwaukee, San Diego) have had active police enforcement programs in recent years, no quantitative studies are known that have determined the specific effects of police enforcement on pedestrian crashes and injuries. Further, such a study would be very difficult to conduct because of the many other contributing crash factors in a city.

