

PedSmart: ITS Applications for Pedestrians



The Pedestrian and Bicycle Safety Research Program focuses on identifying problem areas for pedestrians and bicycles, developing analysis tools that allow planners and engineers to better understand and target these problem areas, and evaluating countermeasures to reduce the number of crashes involving pedestrians and bicycles.



U.S. Department of Transportation
Federal Highway Administration



www.walkinginfo.org/pedsmart

To date, the development and application of Intelligent Transportation System (ITS) technologies has primarily focused on motor vehicle safety and mobility. However, recent developments in hardware and other technologies offer the potential of improving pedestrian safety and access by addressing specific problems associated with crossing the street. Properly installed and operated, the application of these devices can enhance the traveling environment.

One of the keys to improving the pedestrian environment through the use of ITS technologies is making the public and those responsible for employing such devices aware of the capabilities and requirements for using such technology. **PedSmart** is a means of describing the technologies in use and providing links to manufacturers and other resources through both a web site (*see address above*) and a CD-ROM. Provided on both are the devices identified to date, including a description of the products and a discussion of the locations where the products are currently installed.

Problems

There are a number of problems pedestrians experience as they are crossing a street for which ITS technologies can be applied. The specific categories of problems addressed in **PedSmart**, which are likely candidates for ITS applications, include:

Increased Motorist Awareness

Traditional pavement markings used for crosswalks are obvious to pedestrians, but can be difficult to detect by approaching motorists.

Feedback to the Waiting Pedestrian

Requiring pedestrians to push a button for the WALK signal is intended to increase the time allotted to cross the street. Many pedestrians are unaware of this concept or believe the button does not work.

Feedback to the Crossing Pedestrian

Pedestrians crossing the street are sometimes unaware that vehicles may be turning across their path during the WALK signal, which can result in a serious conflict. Crossing pedestrians may also lack an understanding of the flashing DONT WALK phase of the signal, which can produce unsafe crossing behaviors.

Pedestrian Detection

Detecting pedestrians has traditionally relied on push buttons. Unfortunately, the lack of feedback to pedestrians and poor installation and maintenance practices often leads to nonuse.

Visual Impairment Issues

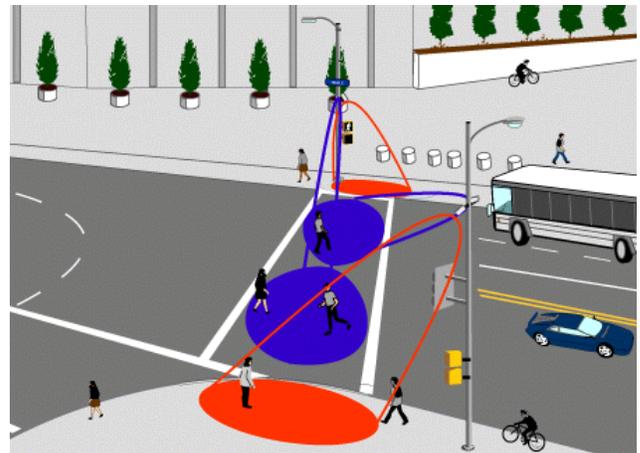
Visually impaired pedestrians may have difficulty with a number of tasks associated with crossing the street, from simply locating the crosswalk to understanding the type of traffic control in place.

Solutions

There are a variety of ITS technologies currently being used to improve pedestrian mobility and access and enhance pedestrian safety by addressing each of the problem areas just noted. Specific devices discussed in **PedSmart** include:

Microwave and Infrared Detectors

Both of these devices provide the means to automatically detect the presence of pedestrians in the targeted curbside area. The microwave detector may also be used to detect pedestrians while moving in a designated crosswalk area.



When used at the curbside area, they may either replace or augment the standard push button used to activate the pedestrian call feature. When used to detect pedestrians in the crosswalk, the function is to detect the presence of individuals requiring additional time to cross and, accordingly, extend the clearance interval and provide more time to cross.

Illuminated Pushbutton

This device is very similar to an elevator button in that it lights up when pushed and provides instantaneous feedback to the



pedestrian that the button is working and that the signal will change.

Animated Eyes Display

This device is intended for use at pedestrian crosswalks as an alternative to conventional pedestrian signals and are expected to encourage pedestrians to look for turning vehicles traveling on an intersecting path by including a prompt as part of the pedestrian signal. The prompt is a pair of animated eyes that scan from side to side at the start of the WALK indication.



Count-Down Signal

Count-down signals are used in conjunction with conventional pedestrian signals to provide information to the pedestrian regarding the amount of time remaining to safely cross the street. It is hypothesized that pedestrians will use this information to make better decisions about when to enter the crosswalk. Depending on user preference, the count-down timer starts either when the WALK or Walking Person indication appears or when the flashing DONT WALK or Hand indication appears. The timer continues counting down through the flashing DONT WALK (Hand) clearance interval. When the steady DONT WALK or Hand appears, the countdown signal will be at zero.



In-Pavement Lighting

In-pavement lights are being used at crosswalks to alert motorists to the presence of a pedestrian crossing or preparing to cross the street. The amber lights are embedded in the pavement on



both sides of the crosswalk and oriented to face oncoming traffic. When the pedestrian activates the system, either by using a push-button or through detection from an automated device, the lights begin to flash at a constant rate, warning the motorist that a pedestrian is in the vicinity of the crosswalk ahead.

Accessible Signals

Accessible pedestrian signals are products that supplement the visual signals and cues used by sighted pedestrians and enable visually impaired pedestrians to safely and independently negotiate intersections. Categories of accessible signals include signal-mounted speakers, transmitter/receiver systems, and push-button systems.

Signal-Mounted Speakers

These devices have traditionally been referred to as audible pedestrian signals and are specifically designed to help visually impaired pedestrians by emitting a buzzing, whistling, beeping, or chirping sound that is correlated with the visual WALK/DONT WALK signal. The two most popular audible pedestrian signals used in the US emit either a buzzer or a birdcall



sound. The audible signal most frequently used in the western US emits a “peep peep” tone for the east-west direction and a “cuckoo” tone for the north-south crossings. Audible signals indicate only that the WALK indication is displayed, not that the intersection is clear. The devices are meant to complement rather than be a substitute for a visually impaired persons’ orientation and mobility skills.

Transmitter/Receiver Systems

These systems use infrared or LED transmitters located at the ped-head to transmit a speech message to hand-held receivers. Talking Signs® is a product of this type. Messages may identify the location and direction of travel of the pedestrian, give the name of the street to be crossed, and provide real time information about WALK and DON'T WALK intervals. It is an infrared wireless communications system that is designed to work in both interior and exterior applications and makes confident independent travel possible for visually impaired individuals.



Push-Button Systems

Accessible push-button systems include vibratory and/or audible signals and range in complexity. The very simple system includes a tactile (raised) arrow to indicate the direction of the crossing associated with the button. The more complex systems include a series of tactile messages about the street crossing, locator tones to aid pedestrians in finding the push button, and audible signals to indicate when the signal has changed.



For More Information

The web site and CD-ROM were developed by David L. Harkey, Christian Valiulis, and Ron Hughes of the University of North Carolina Highway Safety Research Center. Visit the web site at www.walkinginfo.org/pedsmart to learn more and to register to receive a copy of the CD-ROM. For more information, please contact either of the individuals below:

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