



TECHNICAL SUMMARY

Technical Liaison:

Mitch Bartelt, MnDOT
Mitch.Bartelt@state.mn.us

Project Coordinator:

Shirlee Sherkow, MnDOT
Shirlee.Sherkow@state.mn.us

Principal Investigator:

Bryan Nemeth, Bolton & Menk, Inc.

LRRB PROJECT COST:

\$64,665



In-street crossing signs are inexpensive and produce high motorist yield rates at low speeds, although they may require regular replacement.



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Putting Research into Practice: A Guide for Pedestrian Crossing Treatments at Uncontrolled Intersections

What Was the Need?

Many agencies face significant public pressure to create pedestrian improvements in their roads, including crosswalks. At intersections that are not controlled by a stop sign, yield sign or traffic signal, however, crosswalks are not necessarily the best solution. Under some conditions, marked crosswalks may increase pedestrian risk if installed without traffic signals or other improvements.

Several factors influence which pedestrian crossing treatments are appropriate at a given site, including pedestrian volume, vehicle traffic volume and speed, and sight lines. Current guidance for crosswalk placement is spread over a variety of manuals and state laws. The LRRB wanted to give engineers a tool to quickly and easily identify the optimal crossing treatment and demonstrate the rationale for their decisions to the public and other stakeholders.

Investigators synthesized best practices in pedestrian crossing treatments from various sources to provide a complete methodology for selecting appropriate treatments at a given site. They also created a training session, flowchart and guidebook to simplify the selection process.

What Was Our Goal?

The objective of this project was to develop a methodology for determining appropriate pedestrian crossing treatments at a given site.

What Did We Implement?

TRB's [Highway Capacity Manual](#) provides a method central to this project for evaluating delays and the level of service at pedestrian crossings. To incorporate safety into this method, investigators synthesized best practices from several sources, including:

- Minnesota and AASHTO design manuals.
- MnDOT's [Minnesota's Best Practices for Pedestrian/Bicycle Safety](#) and [Best Practices Synthesis and Guidance in At-Grade Trail-Crossing Treatments](#).
- NCHRP Report 562, [Improving Pedestrian Safety at Unsignalized Crossings](#).
- FHWA's [Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations](#).

How Did We Do It?

After evaluating the state of the practice regarding pedestrian crossings at uncontrolled intersections, investigators developed a comprehensive decision support process for local engineers to use in selecting appropriate approaches. Detailed instructions are provided for key steps in the process, including collecting traffic and pedestrian data, conducting a field review of the site, evaluating the safety considerations of a site to determine whether it is a good candidate for a marked crosswalk and conducting either a study of gaps between vehicles or a level-of-service evaluation to determine whether a pedestrian can safely cross the roadway at the site under observed traffic levels.

As part of this process, investigators described the advantages and disadvantages, costs, impact on drivers' yield rates and recommended locations for a variety of alternatives.

“Often, the public will clamor for what are perceived as pedestrian improvements. Prior to this project, cities and counties haven’t had a standard, comprehensive methodology to determine the best treatment option, or even if treatment is necessary.”

—Mitch Bartelt,
MnDOT State Aid
Construction Engineer

“The guide we produced summarizes thousands of pages of other manuals and state law. It’s going to save local engineers a lot of time and help them document how they choose pedestrian crossing options.”

—Bryan Nemeth,
Traffic Engineer and
Transportation Project
Manager, Bolton &
Menk, Inc.

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Minnesota Department
of Transportation
Research Services & Library
MS 330, First Floor
395 John Ireland Blvd.
St. Paul, MN 55155-1899
651-366-3780
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Pedestrian crossings at unsignalized intersections often pose challenges for local engineers because public requests for crossing treatments may not match engineering judgment. This project developed a data-based method to evaluate treatment options.

These included signing and marking treatments, uncontrolled crossing treatments (such as adding a flashing signal beacon or employing a school crossing guard), traffic calming options (such as reducing the number of traffic lanes) and high-level treatments (such as adding a traffic signal or pedestrian overpass).

The Technical Advisory Panel also identified eight Minnesota pedestrian crossing sites representing various crossing types and road conditions as case studies to demonstrate how local engineers can use the process at their own sites.

What Was the Impact?

The report provides a useful process for engineers to apply in determining an appropriate pedestrian crossing treatment. In addition, several other tools are included to simplify the evaluation process:

- The Uncontrolled Pedestrian Crossing Evaluation Flowchart.
- A detailed, easy-to-use guidebook for evaluating crossing treatment options.
- The Unsignalized Pedestrian Crosswalk Evaluation Worksheet, an Excel document that uses data about an intersection’s geometry, traffic and pedestrian volume as well as existing site facilities to calculate average pedestrian delay and the crossing’s overall level of service.

The project also included a training workshop attended by city and county engineers, MnDOT staff and consultants who work with local governments.

What’s Next?

The Minnesota Local Technical Assistance Program has created a [Web page](#) where local engineers can access the guidebook and data collection worksheets developed in this project. LTAP also intends to offer the training workshop again.

Pedestrian crossing safety is an active research topic. The guidebook is designed to be updated as more treatment options become available.

This Technical Summary pertains to the LRRB-produced Report 2014-21, “Uncontrolled Pedestrian Crossing Evaluation Incorporating Highway Capacity Manual Unsignalized Pedestrian Crossing Analysis Methodology,” published June 2014. The full report can be accessed at <http://www.lrrb.org/PDF/201421.pdf>.