



Executive Summary

Project Overview

The number of traffic-related fatalities at rural intersections has become a major concern for Minnesota motorists as well as officials from local, state and national transportation agencies. Among the 494 traffic fatalities in Minnesota in 2006, one out of every three occurred at intersections. Furthermore, one out of three of these intersection fatalities occurred at rural intersections with thru-stop control.

In response to this issue, the Minnesota Department of Transportation (Mn/DOT) sponsored the development and evaluation of the Intersection Warning System (IWS). This project, as part of the Department's Innovate Ideas Program, developed an active roadside warning system to detect mainline traffic and alert cross-street drivers to look for an acceptable gap in traffic.

The IWS project features a low-cost system that utilizes innovative methods of vehicle detection, data processing, wireless communications, signing and solar/battery power systems. In order to meet these goals the project progressed through a number of phases including: design, laboratory deployment, acceptance testing and a six-month field operational test.

For the purposes of evaluation, four test plans were developed to enable a qualitative assessment of the system's performance as well as a quantitative analysis to compare the before and after data from the field operational test of the system. The test plans were developed in consultation with project team members and aimed to evaluate a number of factors related to the system itself and to the public and owners' perception of the system. These test plans are listed below.

- Evaluate safety impacts of the system
- Evaluate owner satisfaction
- Evaluate owner perception of the system
- Evaluate system performance

The location of the six-month field operational test field test was chosen to be the intersection of Hennepin County Road 47 and Lawndale Lane, located in a rural area of Hennepin County, Minnesota.

Findings

Comparison of the “before” and “after” conditions at the field operational test site reveals that the number of traffic conflicts (sudden braking, sudden acceleration or swerving) was reduced by 54 percent. In the “before” condition a conflict rate of 3.9 conflicts per 1,000 vehicles was observed compared to a conflict rate of 1.8 conflicts per 1,000 vehicles in the “after” condition.

Upon interviewing the system owners it was determined that the Intersection Warning System is very reliable and effective at warning drivers of approaching cross-street traffic. The system was also noted to be easy to maintain and install, having a relatively fixed low cost and transferability to similar intersections.

From surveys that were distributed to the general public, it became clear that drivers were aware of the sign and understood its meaning, despite some minor confusion over what conditions caused the sign to activate. Half of the survey respondents indicated that they would pay more attention at the intersection when seeing the sign flash. Overall, as indicated by a 55 percent return rate and many comments included in the surveys, the general public appreciates the sign and has a desire to increase road safety.

The system operated with a 98.6 percent uptime, experiencing only three failures during the six month field operational test. In all weather conditions during the field operational test, the sign continued to operate, notifying drivers of oncoming cross-street traffic. The data indicates that the Intersection Warning System is an effective method to increase safety at rural intersections.

The system was accepted by motorists, performed reliably and increased safety at the field operational test site.