

State of the Art of ITS to Address Non-Signalized Rural Intersection Safety in Minnesota

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Mn/DOT's Strategic Highway Safety Plan (SHSP) identified addressing intersection related crashes as one of the State's Safety Emphasis areas. To address crashes at rural thru-STOP intersections Mn/DOT has been developing several different new technologies. These are:

- Cooperative Intersection Collision Avoidance System – Stop Sign Assist;
- Intersection Conflict Warning Systems;
- Stop Sign Warning System; and
- Safe Intersections Project.

COOPERATIVE INTERSECTION COLLISION AVOIDANCE SYSTEM – STOP SIGN ASSIST

The Cooperative Intersection Collision Avoidance Systems (CICAS) initiative is one of nine intelligent transportation systems (ITS) initiatives supported by the U.S. Department of Transportation's (USDOT). The CICAS initiative focuses on determining the optimal combination of infrastructure and in-vehicle systems needed to address a full range of intersection crash problems by integrating infrastructure-based and vehicle-based infrastructure-vehicle cooperative systems to give drivers the best possible information to help avoid a collision.

The Field Operational Test (FOT) includes three intersections in Minnesota began in January 2010 and is expected to be completed in December 2012.

INTERSECTION CONFLICT WARNING SYSTEMS

An Intersection Conflict Warning (ICW) system provides warning to drivers approaching and entering an intersection of potentially conflicting vehicles to drivers at a STOP sign and/or to drivers on the through road.

There are currently six of these systems operating in Minnesota and others are being planned. An independent evaluation of these systems is being conducted and detailed crash analysis over time is being planned.

STOP SIGN WARNING SYSTEM

The Stop Sign Warning System provides warning to drivers approaching the stop sign at an intersection, to alert them of the approaching stop ahead and to be more aware. The sign will flash when vehicles fail to decelerate at a safe rate for a safe stop.

There is one of these systems in Minnesota and an evaluation of operations is planned for the spring of 2011.

SAFE INTERSECTIONS PROJECT

Mn/DOT currently has a project to investigate the use of proven cost effective Commercial Off-the-Shelf (COTS) traffic components to provide the detection, processing, communications, and display for an ICW system. This project will evaluate several such systems, with the intent of finding a design that Mn/DOT

could deploy on a more widespread basis. The systems are anticipated to be installed and operational in June 2011.

PRESENTATION PURPOSE

The purpose of this presentation will be to outline the history of these systems, review the systems engineering and design, review the evolution of these designs, and discuss the performance of these systems. The presentation will also identify concerns regarding the ability of these systems to address and improve traffic safety at rural non-signalized intersections.

CONCLUSION

Rural thru-STOP controlled intersections not only present a challenge to the highway safety professional, they present an opportunity to develop new technologies to aid in reducing fatal and life changing crashes on our highways. Development of these technologies, along with continued evaluation of crashes at these intersections should provide additional tools for the traffic safety professional to address this problem.