



Stop-Controlled Intersection Safety Through Route Activated Warning System

Purpose

More fatal crashes occur at stop-controlled than signalized intersections. Two thirds of these crashes involve right-angle collisions. Recently, States have been using some infrastructure-based Intelligent Transportation System (ITS) technologies in innovative ways to help reduce the potential for and severity of these crashes. One of these technologies, the **Through Route Activated Warning System**, has been successfully deployed at several intersections. The addition of a Through Route Activated Warning System shows greater potential to decrease crashes compared to traditional sign and marking enhancements alone.

Operation

Detectors on the stop approach activate flashing LED beacons on intersection warning signs. This provides real time warning to through route drivers of the presence of a vehicle that may enter the intersection from the approaching cross street. The Through Route Activated Warning System is often deployed at rural stop-controlled intersections that have limited sight distance and/or a history of crash experience.

Potential Benefits

The addition of a Through Route Activated Warning System shows greater potential to decrease crashes compared to traditional sign and marking enhancements alone.

- Simple "before and after" crash comparisons in Missouri indicate the following:
 - Overall average crash reductions – 51 percent.
 - Reduction in severe angle crashes – 77 percent.
- North Carolina expects to complete crash analysis by late 2011.

Agency Experience

Missouri and North Carolina have successfully implemented these systems in multiple locations:

- Both States are satisfied with the operation and safety performance of the systems and continue to implement the technology at additional intersections as funds allow.
- The **reliability, performance, and maintenance of the systems have been very good**, in part due to the simplicity of the system and design parameters used.
- Both States indicate **minimal maintenance** with rare call outs and have experienced no known tort suits.
- Unsolicited **feedback from drivers and local governments in Missouri and North Carolina has been overwhelmingly positive.**



This summary is one in a series describing Innovative Intersection Safety Treatments. The summaries identify newer technologies and techniques to improve intersection safety developed since NCHRP Report 500 Volumes 5 and 12 were published in 2003 and 2004, respectively. These treatments show promise for improving safety but comprehensive effectiveness evaluations are not yet available.



Figure 1: Through Vehicle Activated Warning Sign System warns through drivers of a vehicle on a cross street stop approach
Photo Courtesy North Carolina DOT

Implementation Considerations

Location

Candidate stop-controlled intersections for Through Route Activated Warning Systems should be initially screened to determine potential success using the following criteria as a guide:

- This system has been most successfully deployed in rural areas or in areas where the through route speed limit is 45 mph or greater.
- Through Route Activated Warning System is ideal for the following:
 - Stop-controlled intersections with a history of total or angle crashes.
 - Isolated high-speed stop-controlled intersections with substantial sight distance limitations which either cannot be readily mitigated or are too costly to correct.
 - Isolated stop-controlled intersections on multi-lane divided high-speed at-grade arterials that have the potential for and/or a history of severe angle crashes where J-Turn (Restricted-Crossing U-turn) treatments are not appropriate safety solutions.
- Intersections that are at or near one or more of the warrants to consider traffic signals as a potential solution to known safety concerns are not suitable candidates for this system.

Public/Stakeholder Involvement

Conduct early public outreach to gain public acceptance and buy-in. Outreach efforts can include a public meeting with local officials including law enforcement and nearby residents to provide information on the system, including installation and how the system will increase safety for drivers.

Design

- For signs, legend is preferred rather than symbol.
- Preferred message sets are:
 - "Vehicles Entering when Flashing."
 - "Watch for Entering Traffic when Flashing."
- Both diamond and rectangular sign shapes are acceptable.
- Dual flashers should be used on both diamond shaped and rectangular signs.

Placement

- **For Single Lane Through Approaches**– One sign with flashers on the right side is recommended.
- **For Multilane Through Approaches with a median**– Dual signs with flashers, one on the right side and one on the left side, are recommended.

Maintenance

The successful operation of the system depends on minimizing down time for maintenance and any possible malfunction of the system. Therefore a plan to address these should be in place.

Costs

Implementation cost for the system is **relatively low**, ranging from \$15,000 to \$35,000 per intersection.

Learn More

Please read the full report on this system:
Stop–Controlled Intersection Safety:
Through Route Activated Warning System,
FHWA-SA-11-15 available at
<http://safety.fhwa.dot.gov/intersection/resources/>

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