Development and Evaluation of an Advanced LED Warning System for Rural Intersections: Phase 2 (ALERT 2)

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Outline:

• Motivation – Project Need
• Project Objectives
• ALERT-2 Implementation
• Snapshots !
• Current Status
• Report on The Ongoing Data Analysis
Project Need

• Rural Thru/Stop Intersection Safety Performance

  *Minnesota Experience*

  – For 2009-2011:
    » 55% of all statewide fatal intersection crashes occur at this intersection type\(^1\)
    » 47% of all statewide incapacitating injury crashes occur at this intersection type\(^1\)

  – Most frequent crash diagram for this intersection type is right-angle at 25%\(^1\); tend to be most severe

• Rural Engineering Safety Priorities
  1. Run-off-the-road
  2. Intersection
  3. Cross-centerline

Project Need

- **ITS Safety Plan: ITS Critical Strategy 5:** Use Intersection Collision Warning Systems
  - 5.1 Install rural intersection warning and decision support systems².
Project Goal

- Low cost, low maintenance, dynamic intersection warning system based upon presence of traffic
  - Effect a reduction in speed for vehicles on the major approach when approaching the intersection
    - System warns driver on the major approach of a vehicle stopped or entering the intersection from the minor approach
  - Reduce the probability of a conflict at the intersection between a turning vehicle from the minor approach and a vehicle on the major approach
    - System warns driver on minor approach of an approaching vehicle on the major approach
  - Reduce the percentage of roll-throughs by vehicles on the minor road
    - Blinker STOP signs will be activated when a vehicle on the minor road is detected approaching the intersection
Project Concept

• System will utilize existing “off-the-shelf” technologies
• Can be assembled by traffic/sign technicians
• Wireless communications between components; no “hardware connections”
  – Wiring
  – Conduits
  – In-pavement detectors
• Nonintrusive vehicle detection (e.g. radar)
• Utilize alternative energy source (solar and/or wind)
• Utilize LED blinker signs
Before ALERT-2 Implementation
Looking east on Lismore Rd. approaching Lakewood Rd.
ALERT-2 Implementation

Lismore Rd/Lakewood Rd Intersection, Duluth MN

Using the posted speed limit = 55 MPH:
- Minimum advance placement distance for major road warning sign = 320 ft (Mn MnTCD Table 20-4)
- Passenger vehicle time gap (tg) for case B1-left turn from minor road = 7.5 sec (AASHTO Gr Book Table 9-5)
- Intersection Sight Distance (ISD) = 1.47*Vmajor*tg = 1.47 * 55 * 7.5 = 606 ft = 610 ft
ALERT-2 Pictures
ALERT-2 Pictures
Status of ALERT-2 Project

• Video data collection system installed: 6/25/12
• Before data collected: 42 days
• ALERT-2 System Installation: 8/26/2012
• After-data collection started: 9/14/2012
• After-data collection will end: 5/31/2013
• Data analysis will be done by: 10/2013
Data Collection from the Lismore Rd.

Data Analysis Software
Data Collection from the Intersection
Three Roll-Through Scenarios:
1- Turning right
2- Going through
3- Turning left
Stop Case 1:
Stop Case 2:
Roll-through Case:
Acknowledgments and Special Thanks

- Local Road Research Board (LRRB)
- Taek M. Kwon, Ph.D
- Victor Lund, Robert Ege, Alan Rindels