Developing Consistency in ITS Safety Solutions: Intersection Conflict Warning Systems

AASHTO Subcommittee on Traffic Engineering
June 19, 2012
Agenda

• Intersection conflict warning systems (ICWS)
• ENTERPRISE project
  – Design and evaluation guidance
• Roadmap to standardization
  – SCOTE resolution
• Intersection conflict warning systems
  – Used at stop-controlled intersections to provide drivers – on both major and minor roads – with dynamic warning of other vehicles approaching the intersection.
Intersection Conflict Warning Systems

Agencies with ICWS Experience

- Gwinnett County, GA
- Iowa
- Florida
- Louisiana
- Maryland
- Michigan
- Minnesota
- Scott County, MN
- Wright County, MN
- Missouri
- Maine
- North Carolina
- Ohio
- Pennsylvania
- South Carolina
- Virginia
- Washington
- Wisconsin
Intersection Conflict Warning Systems
Intersection Conflict Warning Systems

  - http://safety.fhwa.dot.gov/intersection/resources/fhwasa11015/
ENTERPRISE Project

• ENTERPRISE
  – FHWA Pooled Fund Study since 1991
  – 16 members (including Ontario and Dutch Ministry of Transport)
  – Forum for collaborative ITS research, development, and deployment ventures

For more information, visit
www.enterprise.prog.org
Scope

Bring together organizations that have developed and deployed intersection warning systems to develop a consistent approach for accelerated, uniform deployment and further evaluation of intersection warning systems, and to recommend preliminary design and evaluation guidance for MUTCD consideration.
ENTERPRISE Project

• Anticipated results
  – Increase **awareness** of systems deployed
  – Develop **design guidance** to support accelerated and more consistent deployment
  – Establish **evaluation framework**
  – Create **roadmap** for reaching standards in MUTCD and Highway Safety Manual

• Participating states included **ID, IA, KS, ME, MI, MN, MO, NC, PA, WA** and **WI**
ENTERPRISE Project

- Released version 1
  December 2011

- Design
  - Typical system components
  - Layouts based on current practice
  - Conditions, intended drivers use, options, notes and references

- Evaluation
  - Common framework
  - Goal, strategy, hypotheses and parameters
ICWS 4: Major and Minor Road Alert for 2-Lane/2-Lane (or Multi-Lane) Intersection

Conditions
- Crash history exhibits a higher than expected rate and/or severity.
- Systems are typically used to address conditions where sight distance and/or gap acceptance are poor.
- Appendix A contains additional information regarding road volumes, posted speeds and potential benefits from individual deployments.

Intended Driver Use
- System provides drivers on the major road with additional warning of vehicle presence on the major road.
- The system may also provide drivers with an indication of which direction major road traffic is approaching from.

Layout
- Illustrations are not drawn to scale and are shown from the minor road, northbound vehicle (V1) perspective. Refer to Options for sign placement and other details.

Options Placement
- Warning signs may be placed on the far-side opposite corner (1) from STOP, far-side corner (2) from STOP or suspended above the minor road (3) in the intersection.

Sign combinations
- Sign site should follow current standards in MUTCD Table 2C-2. Warning Sign and Plaque Signs. Following are sign combinations that have been used.

Message Sets
- VEHICLES APPROACHING (ENTERING)
- CROSS TRAFFIC
- LOOK FOR TRAFFIC
- Messages may also be combined with WHEN FLASHING plaque.

Notes and References
- Systems have been deployed in Missouri, Minnesota, North Carolina and Georgia on state and local roadways. See Appendix A, signs 3-5, for further details.

Design and Evaluation Guidance for Intersection Conflict Warning Systems
Version 1 – Page 7
Similarities

- Problem being addressed
  - Sight distance, gap acceptance, major road speed
  - High right angle crash rates
- Warning sign design
  - Supplemental vs. regulatory
- Warnings are dynamic based on conditions at the intersection
  - Actuated beacons, LEDs, dynamic message sign

Differences

- Evaluations of effectiveness have varied greatly
  - Some have not conducted any formal evaluation
  - Others have used conflict studies or B/C analyses
  - Still others have focused on customer and human factors research
- Sign legend
- Sign placement (particularly minor road)
Roadmap to Standardization

ENTERPRISE Project

2000 – 2011

Jun 2011

Jul 2011

Sep 2011

Webinar #1
Compile and assess lessons learned from individual development and field testing

- Florida
- Georgia
- Iowa
- Kansas
- Maine
- Michigan
- Minnesota
- Missouri
- North Carolina
- Pennsylvania
- Virginia
- Wisconsin

Workshop #1
Develop preliminary design guidance

- Function
- Placement
- Sign Size/Legend
- Failsafe
- Liability
- Costs/benefits
- Vehicle vs. infrastructure

Workshop #2
Develop evaluation framework

- Review preliminary design guidance
- Develop evaluation framework
- Discuss future deployment plans
Roadmap to Standardization

- **February-April 2012**
  - ATSSA TCD Pooled Fund
  - MarketPlace Solutions Seminar
  - Review human factors research

- **May-June 2012**
  - Low Cost Pooled Fund
  - AASHTO SCOTE NCUTCD

- **Summer-Winter 2012**
  - Research Concept of Operations System Requirements

- **2013**
  - Pooled Fund Coordination SCOTE/NCUTCD Oversight NCHRP Recommendations

- **2014**
  - FHWA MUTCD Language

- **Beyond...**
  - Fewer intersection crashes!

**ENTERPRISE**
Roadmap to Standardization

Unique opportunity for collaboration among three pooled funds and 38 states!
AASHTO SCOTE
- Meet June 17-20, 2012 in Orlando, FL
- Summarize webinar/workshop proceedings and guidance document
- Request consideration of a resolution

NCUTCD RWSTC
- Meet June 20-22, 2012 in Orlando, FL
- Summarize webinar/workshop proceedings and guidance document
- Request consideration of task force to evaluate MUTCD prospects
Questions?

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