



A Guide for Reducing Collisions at Signalized Intersections

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One of a Series of Guides to Help States Improve Highway Safety

Making Signalized Intersections Safer

Although intersections are but a small part of the overall highway system, they are the point at which traffic movements most often conflict with one another. As a consequence, nearly 25 percent of all fatal crashes occur at intersections, and about 30 percent of those are at intersections controlled by signals. Fatal crashes at signalized intersections are predominantly multi-vehicle incidents, with 85 percent of them occurring in urban areas.

Good geometric design combined with appropriate traffic controls can result in intersections that operate efficiently and safely. This guide focuses on reducing fatalities at signalized intersections through low-cost, short-term improvements. The approach is to provide comprehensive strategies that include comprehensive design features, as well as traffic operational and enforcement factors, and improved emergency response measures, such as signal preemption.

Objectives and Representative Countermeasures

✓ **Reduce frequency and severity of intersection conflicts through traffic control and operational improvements:** Employ multi-phase signal operation; optimize clearance intervals, restrict or eliminate turning maneuvers, employ signal coordination along

corridor or route, employ emergency vehicle preemption, improve operation of pedestrian and bicycle facilities at signalized intersections, and remove unwarranted signals.

- ✓ **Reduce frequency and severity of intersection conflicts through geometric improvements:** Provide or improve left-and right-turn channelization, improve geometry of pedestrian and bicycle facilities, revise geometry of complex intersections, and construct special solutions.
- ✓ **Improve sight distance at signalized intersections:** Clear sight triangles, and redesign intersection approaches.
- ✓ **Improve driver awareness of intersections and signal control devices:** Improve visibility of intersections on approaches, and improve visibility of signs and signals at intersections.
- ✓ **Improve driver compliance with traffic control devices:** Provide public information and education, provide targeted conventional enforcement of traffic laws, implement automated enforcement of red-light running and enforcement of approach speeds, and control speed on approaches.





- ✓ **Improve access management near signalized intersections:** Restrict access to properties using driveway closures or turn restrictions, and restrict cross median access near intersections.
- ✓ **Improve safety through other infrastructure treatments:** Improve drainage in intersection and on approaches, provide skid resistance in intersection and approaches, coordinate closely spaced signals near at-grade railroad crossings, relocate signal hardware out of clear zone, and restrict or eliminate parking on intersection approaches.
- ✓ **Related strategies:** Public information programs, better enforcement of traffic laws, improved EMS and trauma systems, improving safety management systems, and strategies detailed in other emphasis area guides.

How the Implementation Guide Helps You

The guide lists practical countermeasure strategies categorized by relative cost to implement. Many of these strategies have been formally evaluated to demonstrate

effectiveness. Other strategies lack formal evaluation, but have been implemented with promising results.

The guide lays out the technical attributes of each countermeasure strategy in detail: target audience, expected effectiveness, keys to success, potential difficulties, appropriate measures and data, and associated need for support services.

The guide discusses organizational, institutional, and policy issues; issues affecting implementation time; costs involved; training and other personnel needs; and legislative needs (if any).

Web-Based Support for More Information

Backing up the guide is a series of appendixes and exhibits developed specifically to provide in-depth information useful to anyone implementing this part of the Strategic Highway Safety Plan, together with a collection of general knowledge sharing documents providing background, data, and information of significant value to state and local implementers.

This guide is one in a series developed to assist states in their efforts to improve highway safety. Copies of the plan, the guides, the Integrated Safety Management System, the Self-Assessment Tool, and related documents, may be obtained on the Internet at <http://safety.transportation.org>.



Printed copies of the guides and the Integrated Safety Management Process can be obtained from:

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Implementing the AASHTO Strategic Highway Safety Plan