

# SIGNALIZED INTERSECTION SAFETY STRATEGIES



## Construct Special Solutions

### WHERE TO USE

Signalized intersections with high frequencies of crashes that are not reduced through other lower-cost solutions.



Photo by: FHWA

### DETAILS

Signalized intersections may have such a significant crash problem that the only alternative is to change the nature of the intersection itself. Thus, low-cost, short-term solutions will often not be available. Implementing these strategies will necessitate significant public involvement and stakeholder activity.

Safety problems associated with left turns at signalized intersections are magnified at intersections with high volumes of left turns. Indirect left-turn treatments, such as jughandles before the crossroad, directional median crossovers, and loop roadways beyond the crossroad, can address both safety and operational problems related to left turns. These treatments remove the left-turning vehicles from the traffic stream without causing slow down or stoppage in a through-traffic lane. Right-angle crashes are also likely to decrease after implementation. Alternative left-turn designs are discussed in various publications and included in the Federal Highway Administration (FHWA) *Signalized Intersection Guide*.

A roundabout can have a better crash experience than a conventional signalized intersection (for low- to medium-volume roads). Consult the FHWA's *Roundabouts: An Informational Guide* for the current state of the practice on the design, operation, and safety of roundabouts. Refer to Unsignalized Strategy F3 for more detailed information.

When two-way streets are converted to one-way streets (typically in a central business district environment), it is generally to increase capacity, but removing opposing traffic flows can improve safety as well. Removing one direction of traffic from a two-way street allows better signal synchronization and progression of platoons. Smooth progression and reduced congestion can



reduce rear-end crashes. Removing one direction of traffic can improve safety by

- reducing the number of vehicle-vehicle conflict points at intersections,
- allowing for unopposed turn maneuvers,
- simplifying operations and signal phasing at multileg intersections,
- allowing pedestrians to have to deal with traffic from only one direction, and
- providing more gaps for vehicles and pedestrians at unsignalized crossings.

Safety-related drawbacks to conversion to one-way streets may include the following:

- pedestrians may not look in the correct direction for oncoming vehicles.
- minor sideswipe crashes related to weaving maneuvers may occur.
- supplemental and redundant signing is recommended.
- transit operations may be adversely affected.
- increase in vehicle speed may occur.

Consider providing a grade separation or interchange for signalized intersection locations with extremely high volumes, extremely poor crash histories, or other mitigating factor(s). Other solutions may include quadrant design, superstreet, and diverging diamond designs, and continuous flow intersections

### KEY TO SUCCESS

Major construction projects have a greater chance of success when all key stakeholders—including owners of nearby businesses, transit agencies, neighborhood/resident groups, and other primary users of the intersection—get involved.

### TIME FRAME ●●●●

In general, the time frame for most projects of this magnitude is lengthy.

### COSTS ●●●●●

Costs will generally be high when constructing special solutions.

### EFFECTIVENESS

**TRIED:** It is expected that these strategies will reduce both rear-end collisions resulting from the conflict between vehicles waiting to turn left and following vehicles and right-angle collisions resulting from the conflict between vehicles turning left and oncoming through vehicles.

### COMPATIBILITY

With major changes to an intersection, other solutions are not likely to be appropriate and not necessarily compatible.

### SUPPLEMENTAL INFORMATION

Refer to the *FHWA Signalized Intersections: Informational Guide* for more information on this strategy.

**For more details on this and other countermeasures:** <http://safety.transportation.org>

#### For more information contact:

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