

STOP Signs

Purpose of a STOP Sign

The STOP sign is a regulatory sign that is used when traffic is required to stop. It is a red octagon that has a white border and large white capital letters that read STOP. At multiway stop intersections, where all approaches are controlled by STOP signs, an “ALL WAY” plaque is required below the stop sign to inform the driver that the intersection is an “all-way” stop intersection. Flashing beacons are sometimes used to supplement STOP signs, especially in rural areas.



Figure 1: All Way Stop Sign

The Manual on Uniform Traffic Control Devices (MUTCD) provides information on the design, application, and placement of STOP signs (R1-1). The purpose of STOP signs is to assign vehicular right of way at an intersection. If installed where warranted, STOP signs can be very effective. However, STOP signs can be an inconvenience to motorists and a potential safety issue and should only be used where warranted. STOP signs should not be used to control vehicle speeds.

Where Should a STOP Sign Be Installed?

STOP signs should be located where vehicles are required to stop, or as near to that point as possible. The sign may also be supplemented with a STOP line and/or the word STOP marked on the pavement as text.

Where there is a marked crosswalk, the STOP sign should be located approximately 4 feet in advance of the crosswalk line. A STOP sign shall be placed to the right of the lane it controls. Where there is a pattern of drivers missing the STOP sign on the intersection approach, placement of a supplementary STOP on the left-hand side of the roadway or in the median or overhead has been shown to reduce crashes. Where the visibility of the STOP sign on the approach to the intersection is insufficient to slow traffic and allow drivers to stop in ample time, placement of a STOP AHEAD symbol warning sign is required.

If two lanes of traffic exist on an approach, the STOP sign should be visible to each lane of traffic.

Under What Conditions Should a Two-Way STOP Control Be Installed?

Intersections should have one or more of the following conditions for a two-way STOP control to be installed:

- At an intersection of a minor and major road, where the application of the normal right-of-way-rule would be inappropriate.



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- At a street entering a through highway or street.
- At an unsignalized intersection in a signalized area.
- At locations where high-speed traffic, restricted view, or crash records indicate a need for STOP sign control.

The advantage of a two-way stop is that the major traffic flows do not have to stop and thus incur almost no delay at the intersection (i.e., the majority of the through traffic does not have to stop).

Under What Conditions Should a Four-Way (Multiway) STOP Control Be Installed?

Four-way STOP control is often used at the intersection of two roadways that exhibit approximately equal traffic volumes. As with other traffic-control devices, installation of a multiway stop should be based on an engineering study. The following criteria, as described in the 2003 edition of the MUTCD, should be considered:

- A traffic signal is going to be installed and the intersection needs a temporary solution to control the traffic.
- At least five crashes have occurred at the intersection in a 12-month period that are susceptible to correction by STOP signs (crash reports should be analyzed to determine the probable cause of each crash).
- Minimum traffic and pedestrian volumes are as follows:
 - o The vehicular volume entering the intersection from the major street approaches (total of both approaches) averages at least 300 vehicles per hour for any 8 hours of an average day.
 - o The combined vehicular, pedestrian, and bicycle volume entering the intersection from the minor street approaches (total of both approaches) averages at least 200 units per hour for the same 8 hours, with an average

delay to minor-street vehicular traffic of at least 30 seconds per vehicle during the highest hour, but if the 85th-percentile approach speed of the major-street traffic exceeds 65 km/h or exceeds 40 mph, the minimum vehicular volume warrants are 70 percent of the above values.

- The need to control vehicle/pedestrian conflicts exists near locations that generate high pedestrian volumes crossing the major street.
- A four-way STOP control is needed at locations where a road user, after stopping, cannot see conflicting traffic and is not able to safely negotiate the intersection unless conflicting cross traffic is also required to stop.
- An intersection of two residential neighborhood collector (through) streets of similar design and/or operating characteristics where multiway stop control would improve traffic operational characteristics of the intersection, and the minimum traffic and pedestrian volume requirements are satisfied.

Failure to Stop at Existing STOP Signs

- Approximately 72 percent of fatal crashes occur at unsignalized intersections. Most often, the cause of the crash can be attributed to a driver failing to yield the right of way. When there is a history of drivers failing to heed STOP signs that are clearly visible, the following approaches could be considered:
 - Install STOP AHEAD sign.
 - Increase size of STOP and STOP AHEAD signs.
 - Install an additional STOP and/or STOP AHEAD sign on the left-hand side of the road or in the median on the left side of the approach.
 - Install an overhead STOP sign.
 - Install intersection illumination.
 - Install a red reflective strip or post insert on the STOP sign post.

- Consider adding a flashing red beacon in conjunction with the STOP signs mounted either on top of the sign or on an overhead span wire or mast arm.
- Place actuated red flashing beacons (see MUTCD Section 4K.05) on the top of a STOP sign. A detector would be in the pavement in advance of STOP sign. As a vehicle approaches, the red beacons would begin to flash. This solution would address the driver expectancy problem and give more attention to the STOP sign.
- Under rural road conditions, install two sets of transverse rumble strips in the approach lane (one in advance of the STOP AHEAD sign and the other before the STOP sign). Consider installation of two additional sets of transverse rumble strips to supplement the first two locations.

Resources

Manual on Uniform Traffic Control Devices. Washington, DC, USA: Federal Highway Administration, 2003. Accessible via <http://mutcd.fhwa.dot.gov>.

A review of published research on multi-way stop intersections: <http://www.ite.org/traffic/documents/AHA99B49.pdf>.

Ellison, James W., P.E. *Case Study: Failure to Stop at a Stop Sign: A Progressive Approach*. <http://www.ite.org/library/IntersectionSafety/Ellison.pdf>.

Neuman, Timothy R., R. Pfefer, K.L. Slack, K. Kennedy Hardy, D.W. Harwood, I.B. Potts, D.J. Torbic, and E.R. Kohlman Rabbani. NCHRP Report 500, Volume 5: *A Guide for Addressing Unsignalized Intersection Collisions*. Washington, DC: Transportation Research Board, 2003.

Intersection Safety Brief #8: *Toolbox of Countermeasures and Their Potential Effectiveness to Make Intersections Safer*. Federal Highway Administration/Institute of Transportation Engineers.



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