Spack
SOLUTIONS

Engineering Guide

Control Devices: Stop Sign Benefits

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Limitations and design guidelines

Stop signs are the cheapest traffic control devices for controlling traffic at an intersection. This guide provides background, benefits, limitations, design guidelines, and further resources for designing stop sign installations.

Background

The Manual on Uniform Traffic Control Devices (jargon: MUTCD) governs the use of all traffic control devices in the United States, providing rules and guidelines for how and when to install stop signs. Each state has the right to develop their MUTCD that supersedes the national MUTCD. There are two types of stop sign control: two-way (controlling only the minor-street approaches) and all-way (controlling all of the approaches).

When To Install Two-way Stop Sign Control

Stop signs are appropriate for controlling an intersection if it meets at least one of these criteria according to the MUTCD:

- The major road traffic exceeds 6,000 vehicles per day.
- There have been three or more correctable crashes within 12 months or five or more correctable crashes within two years.
- The intersection has limited visibility.

The MUTCD also suggests two-way stop sign control is more reasonable when one route is more important than the other, which allows traffic on the mainline road to operate with little delay. Issues with the number of approaches, the angle of approaches, average vehicle speeds, and sight distance are other reasons to install stop signs. The MUTCD discourages the use of stop signs as speed control devices as drivers will quickly start to ignore stop signs that are not justified by actual traffic conditions.

When To Install All-way Stop Sign Control

All-way stop sign controlled intersections require more justification than two-way stop sign control. A licensed engineer will prepare a study justifying installation of all-way stop sign control based on at least one of the following criteria from the MUTCD:

- As an interim measure while waiting to install a traffic signal.
- There have been five or more correctable crashes within 12 months.

- The combined vehicular volume entering the intersection from the major street approaches totals at least 2,400 vehicles in the busiest eight hours with the combined vehicular, pedestrian and bicycle volumes entering the intersection from the minor street approaches totals at least 1,600 units for the same eight hours. These criteria apply if the intersection has 85th percentile speeds less than 40 mph on all approaches.
- The combined vehicular volume entering the intersection from the major street approaches totals at least 1,680 vehicles in the busiest eight hours with the combined vehicular, pedestrian and bicycle volumes entering the intersection from the minor street approaches totals at least 1,120 units for the same eight hours. These criteria apply if the intersection has 85th percentile speeds of 40 mph or greater on at least one of the approaches.
- The need to control left-turn conflicts.
- The need to control vehicle/pedestrian conflicts near high
- pedestrian generators.
- All drivers need to stop to counteract bad sight lines.

Design Guidelines For Stop Signs

Typical design guidelines for stop signs include:

Following MUTCD Sections 2B.6 through 2B.7.

Be an octagon shape with white text and border on a red background.

BENEFITS OF STOP SIGNS

- Determines an orderly right-of-way (which driver can proceed) for vehicles at an intersection.
- Can assist pedestrians and bicyclists crossings by stopping one or more approaches of traffic.
- Inexpensive to install compared to roundabouts or traffic signals.
- All-way stop sign control can reduce the number of severe crashes at an intersection.
- All-way stop sign control can be an appropriate interim measure while waiting for an upgrade to either traffic signal or roundabout control.

A minimum 30 inches by 30 inches stop sign size, primarily used for single-lane approaches in residential areas. A 36-inch by 36-inch stop sign is more common and used for multi-lane approaches, high-speed roadways, and any approaches to multilane roadways. Oversized stop signs, 48 inches by 48 inches, are used in special circumstances such as at high crash locations.

Placement on the right side of the road at the point, or as near as possible to, where vehicles are supposed to stop The engineer should include stop signs on the left side of the road at wide intersections. Approaching motorists should be able to see at least one stop sign.

LIMITATIONS OF STOP SIGNS

- Unwarranted stop signs encourage disobedience and the use of alternate, inadequate routes.
- Unwarranted stop signs make drivers stop more frequently, often resulting in drivers driving faster between intersections.
- Adds unnecessary delay to motorists at unwarranted stop-controlled intersections.
- Higher crash rates for left turning vehicles than traffic signals or roundabouts on larger multi-lane approaches/intersections.
- Stop signs do not lower roadway speeds and are not traffic calming devices.

Install Stop Ahead signs if the stop sign is not visible to approaching traffic from a distance equal to the stopping sight distance needed for the prevailing speed.

"All Way" plaques installed under the stop sign at all-way stop sign controlled intersections. Other supplemental plaques beneath a stop sign may be used to indicate special situations such as when traffic from the left does not stop.

Installation in rural areas at least six feet from the edge of a six-foot or wider shoulder or otherwise 12 feet from the edge of the roadway.

Installation in urban areas at least one-foot laterally from the edge of the curb face to the edge of the sign with two feet preferred.

Keeping the bottom of the sign at least seven feet above the edge of the roadway, top of the curb, or adjacent sidewalk.

Painted stop bars or crosswalks as an option to supplement a stop sign and indicate the location where vehicles should stop.

Resources

- National Manual on Uniform Traffic Control Devices
- MUTCDs & Traffic Control Devices Information by State