



# Information on Traffic Control Devices



## What is the harm in installing an unwarranted traffic control device?

Installing STOP signs and traffic signals where they are not needed can cause significant disruption of traffic flow and increase intersection delay for drivers. The induced delay increases travel time and annoys drivers, and the additional starts and stops result in increased fuel consumption and the consequent production of carbon monoxide, nitrous oxide, particulate matter, and other pollutants.



## What is the harm in installing a STOP sign?

Two-way STOP signs assign the right-of-way at an intersection. The warrants for the installation of two-way STOP signs are in the Manual on Uniform Traffic Control Devices (**MUTCD**) are listed below. Because a STOP sign causes substantial inconvenience to motorists, a STOP sign should be only used where warranted. It may be warranted where one or more of the following conditions exist:

- Intersection of a less important road with a main road where the applications of the normal right-of-way rule would not be expected to provide reasonable compliance with the law
- Street entering a through highway or street
- An unsignalized intersection in a signalized area; and/or
- High speed, restrictive view, or crash records indicate a need for control by a STOP sign.

The amount of delay created by the STOP sign depends on both the major and minor street flow of traffic. The gaps in the major flow traffic stream must be adequate to allow the stopped traffic on the minor flow street to execute the through, right or left movements through the intersection. The term "critical gap" is often used to describe the median gap accepted by drivers for specific turning maneuvers and roadway characteristics. According to the 1997 Highway Capacity Manual, typical critical gaps are 6.2 to 6.9 seconds for right turns from a minor roadway and 7.1 to 7.5 seconds for left turns from a minor roadway. Left-turning movements take longer, as a left-turning driver must cross more traffic streams. Additional delay for the minor street vehicle is also determined by the vehicle arrival rate. The arrival rate of vehicles on the minor street is related to how long drivers will wait in the queue to get to the stop line/sign.

The delay times on the stopped approaches can become excessive if either the major or the minor flow is high. The advantage of a two-way STOP is that the major traffic flows do not have to stop and they incur almost no delay at the intersection (i.e. the majority of the traffic does not have to stop).

Four-way or multi-way STOP control is often controversial as it can often confuse motorists and can cause more average delay than other types of traffic control. The multi-way STOP sign should only be used where the volume on all approaches to the intersection is approximately equal and the traffic volumes are relatively low. However, the multi-way STOP sign alternative can be quite useful in unusual situations where two-way STOP control has not solved the safety problem but where signalization is not yet warranted.

## What is the harm in installing Traffic Signals?



Justification of traffic signal installations requires considerable data collection and analysis. The following is some of the data that needs to be collected and analyzed:

- Traffic volumes by approach and movement
- Pedestrian counts in crosswalks
- Intersection approach speeds
- A condition diagram showing the details of the intersection
- Collision information showing crash experience for the past year

The MUTCD lists nine warrants for the placement of traffic signals. These warrants are summarized below (please refer to the MUTCD website on back for details of each warrant). If none of these warrants are met, a traffic signal should not be installed. In addition, the fulfillment of a warrant or warrants does not in itself justify the installation of a traffic signal.

Warrant 1 - Eight-Hour Vehicular Volume Warrant. The volume of the traffic on the major and minor streets entering the intersection must be above a certain value for a minimum of eight hours of a typical day.

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Warrant 2 - Four-Hour Vehicular Volume Warrant. The volume of the traffic on the major and minor streets entering the intersection must be above a certain value for a minimum of four hours of a typical day. These values are higher than the values in Warrant 1.

Warrant 3 - Peak Hour Warrant. The minor street traffic for a facility that attracts or discharges large numbers of vehicles of a short time suffers major delay or exceeds a certain value for only one hour of an average weekday.

Warrant 4 - Pedestrian Volume Warrant. The volume of pedestrians crossing a major street exceeds a certain value.

Warrant 5 - School Crossing. At an established school crossing, a traffic signal can be placed if the frequency and number of adequate gaps in the vehicular traffic for the number of students to safely cross does not exist.

Warrant 6 - Coordinated Signal System. To maintain the proper grouping of vehicles and to effectively regulate the group speed.

Warrant 7 - Crash Experience. When less restrictive remedies and enforcement has failed to decrease the crash rate.

Warrant 8 - Roadway Network. To encourage concentration and organization of traffic flow on major streets.

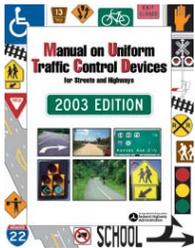
Warrant 9 – Intersection near a Grade Crossing. The intersection near a grade crossing signal warrant is intended for use at a location where the proximity to the intersection of a grade crossing on an intersection approach controlled by a STOP or YIELD sign is the principal reason to consider installing a traffic control signal.

Installing a traffic signal at a low-volume intersection can significantly increase crashes and delay. Again, the increase in delay and stops then translates into higher fuel consumption, increased travel times, and higher point of pollution. The length of delay is directly related to a number of factors. Cycle length is one factor, for example, that is influenced by traffic volumes and the need to safely accommodate pedestrians crossing the intersection approaches. The pedestrian crossing time constraints could significantly increase the necessary cycle lengths. Although traffic signals can reduce the total number of collisions at an intersection, research has shown that certain types of crashes (i.e. rear-end type collisions) may actually increase after a signal is installed. For this reason, the type and number of crashes at an intersection should be analyzed before the installation of a traffic signal.

Traffic signals can represent a positive public investment when justified, but they are costly. A typical traffic signal costs up to \$150,000 to design and install. In addition, there is the cost of electrical power consumed in operating and maintenance of a traffic signal 24 hours a day.

It is important to carefully consider whether a traffic control device is needed before rushing to an implementation decision. The costs and benefits must be carefully evaluated, and a careful analysis and engineering study must be completed.

## What is this MUTCD?



The **MUTCD** stands for the Manual on Uniform Traffic Control Devices. The Federal Highway Administration (FHWA) publishes the **MUTCD**, which contains all national design, application, and placement standards for traffic control devices. The purpose of these devices, which includes signs, signals, and pavement markings, is to promote highway safety, efficiency, and uniformity so that traffic can move efficiently on the Nation's streets and highways. Federal, State and local laws required that government agencies use the **MUTCD** for determining which traffic control devices to use and how each device may be used.

## Want More Information?

This flyer is for general purposes only. For more information, please contact the Beaufort County Traffic & Transportation Engineering Department at (843) 255-2940 or [click here](#)

**NOTE:** The **MUTCD** is used throughout the country as the standard by which traffic control decisions are made. The complete **MUTCD** can be found at: [http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/pdf\\_index.htm](http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/pdf_index.htm)