

## TRAFFIC AND SAFETY INFORMATIONAL SERIES

### FREQUENTLY ASKED QUESTION #13

#### WHY CAN'T WE HAVE STOP SIGNS TO REDUCE SPEEDING ALONG MY STREET?

One of the complaints that people have in residential areas is that vehicles constantly speed by the front of their house. They are concerned about the safety of their children. These residents frequently request the erection of additional stop signs. The addition of a stop sign, however, usually does not solve the problem.

##### *WHY DON'T WE JUST INSTALL ANOTHER STOP SIGN?*

A stop sign is an inconvenience to motorists. Because of this, stop signs should only be placed if they meet a *Manual on Uniform Traffic Control Devices* (MUTCD) warrant. Stop signs are frequently violated if unwarranted. Before warrants are even considered, however, less restrictive measures (such as a yield sign) are usually considered. In certain cases, the use of less restrictive measure or no control at all will accommodate traffic demands safely and effectively.

##### **Warrants for a stop sign**

Because a stop sign is an inconvenience to through traffic, it should be used only where needed. A stop sign may be warranted at an intersection where one or more of the following conditions exist:

- intersection of a less important road with a main road where application of the regular right-of-way rule is hazardous;
- street entering a through highway or street;
- unsignalized intersection in a signalized area;
- other intersections where a combination of high speed, restricted view, and serious accident record indicates a need for control by the stop sign.

A yield sign can also be considered where a full stop is not necessary. Existing sign installations should be reviewed to determine whether the use of a less restrictive control or no control at all could accommodate the existing and projected traffic flow safely and more effectively.

##### **WHERE SHOULD A STOP SIGN BE INSTALLED?**

Stop signs should be installed/located where the vehicles are 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 on the pavement. A yield sign is erected in the same manner. Where there is a marked crosswalk, the stop or yield sign should be erected approximately four feet in advance of the crosswalk line.

When only one stop or yield sign is used on an intersection approach it should be on the right side of the roadway. At wide intersections, however, violations of the yield or stop sign may be reduced by the erection of an additional sign on the left side of the approach. If two lanes of traffic exist on an approach, at least one stop sign should be visible to each lane of traffic.

## ***CAN STOP SIGNS CONTROL SPEED?***

Many studies have shown that stop signs are not an effective measure for controlling or reducing midblock speeds. In fact, the overuse of stop signs may cause drivers to carelessly stop at the stop signs that are installed. In stop sign observance studies approximately half of all motorists came to a rolling stop and 25 percent did not stop at all. Stop signs can give pedestrians a false sense of safety if it is assumed that all vehicles will come to a complete stop at the proper location. A study conducted by Beaubien also showed that placing stop signs along a street may actually increase the peak speed of vehicles, because motorists tend to increase their speed between stop signs to regain the time spent at the stop signs.

## ***WHAT CAN WE DO INSTEAD OF INSTALLING A NEW STOP SIGN?***

There are many alternatives to stop signs. For example, a concept called *traffic calming*, the combination of physical controls and community support, might be a good alternative for some communities. Calming measures can be installed as part of an areawide traffic management plan or on a single street and involve local law enforcement, emergency and maintenance officials, engineers, and the community.

Some communities also start interneighborhood programs to address the problem of the speeding and safety in their neighborhood areas. Often times, the true problem stems mostly from drivers that live in the neighborhood. By simply raising awareness of the issue, drivers in the neighborhood may adjust their driving and decrease their speeds.

Unfortunately, there is no general solution to the problem of speeding traffic. There will always be drivers that speed through residential areas. It is important for residents in a neighborhood to be aware of this issue.

### **For more information**

For more information, please contact \_\_\_\_\_.

## TRAFFIC AND SAFETY INFORMATIONAL SERIES

### FREQUENTLY ASKED QUESTION #13

#### **Can we have stop signs placed at intersections in our neighborhood to reduce speeding?**

We get many complaints from people in residential areas about cars speeding in their neighborhoods. They often ask us to install more stop signs. This concern is very understandable. Unfortunately, adding stop signs may not be the best solution. In fact, you may be surprised to learn, adding stop signs can sometimes make the problem worse. Here is why:

##### **Stop signs don't always slow traffic**

Strange as it may seem, installing stop signs may not result in reduced traffic speeds. Studies have shown that stop signs are not effective at controlling drivers' speeds between intersections. In fact, motorists sometimes drive even faster between stop signs to make up for time "lost" while stopped—actually increasing peak speeds and potentially making neighborhoods more dangerous.

##### **Installing stop signs can do more harm than good**

Too many stop signs may also actually discourage good driving habits. Studies have shown that if stop signs are overused or are located where they don't seem to be necessary, some drivers become careless about stopping at them. This can be especially dangerous for pedestrians and bicyclists who may have a false sense of safety from the existence of a stop sign.

##### **Other solutions**

Fortunately, there are other ways to encourage traffic to slow down. Sometimes even a simple neighborhood awareness program can be effective.

##### **For more information**

For more information, please contact \_\_\_\_\_.

## **TRAFFIC AND SAFETY INFORMATIONAL SERIES FREQUENTLY ASKED QUESTION #14**

### **WHY CAN'T WE HAVE A FOUR-WAY STOP TO REDUCE ACCIDENTS?**

Four-way stop signs are not always the answer to reducing intersection crashes. Crash analysis is very complicated and usually identifies multiple causes. Stop signs delay drivers, and many times the drivers become impatient. Impatient drivers may cause crashes. Not all four-way stop intersections are dangerous, but they must be warranted and other less-restrictive options should be considered before they are installed.

#### **WHAT IS REQUIRED FOR THE INSTALLATION OF FOUR-WAY STOP CONTROL?**

The addition of four-way stop control is an inconvenience to all the drivers using the intersection. For this reason, three warrants have been developed and are listed in the *Manual on Uniform Traffic Control Devices* (MUTCD). A multiway stop control installation may be warranted at an intersection if any of the following conditions exist:

1. Traffic signals are warranted and urgently needed, and the multiway stop signs are an interim measure that can be installed quickly to control traffic while arrangements are being made for the signal installation.
2. A crash problem, as indicated by five or more reported accidents of a type susceptible to correction by a multiway stop installation in a 12-month period. Such accidents include right- and left-turn collisions as well as right-angle collisions.
3. Minimum traffic volumes. (a) The total vehicular volume entering the intersection from all approaches must average at least 500 vehicles per hour for any eight hours of an average day; and (b) the combined vehicular and pedestrian volume from the minor street or highway must average at least 200 units per hour for the same eight hours, with an average delay to minor street vehicular traffic of at least 30 seconds per vehicle during the maximum hour; but (c) when the 85-percentile approach speed of the major street traffic exceeds 40 miles per hour, the minimum vehicular volume warrant is 70 percent of the above requirements.

A four-way stop installation should only be used when traffic volumes on the intersecting roadways are approximately equal. However, if volumes are particularly large a traffic signal may be more appropriate (see informational series answer to “What is the harm in installing an unwarranted traffic control device?” for signal warrant). Investigating the warrants listed above will require an extensive traffic engineering study. This study may indicate whether or not a multiway stop control installation is appropriate.

#### **WON'T CRASHES BE REDUCED IF A STOP SIGN IS INSTALLED?**

One of the multiway stop control warrants is crash related. If an intersection meets this requirement (see above) and it has approximately equal approach volumes, a multiway stop control installation may be warranted for safety purposes. However, the overall results of the traffic engineering study and the professional judgement of the engineer should also be considered. In fact, research has shown that under certain conditions other traffic control

measures may be more effective and safer than the addition of a multiway stop sign (other options are discussed below). A study conducted by the city of Irvine, California, indicated that simply improving intersection visibility can sometimes be a successful approach to crash reduction at intersections.

### **WHAT CAN BE DONE OTHER THAN TO ADD STOP SIGNS?**

Every intersection has unique characteristics. A thorough analysis of the traffic, safety, and geometric characteristics of an intersection is required to provide the validity of certain traffic control measures at a specific location. The following are some of the less restrictive alternatives that can be considered at an intersection before the installation of a multiway stop sign or traffic signal:

- install warning signs and/or flashing beacons along the major roadway to warn users approaching the intersection;
- relocating the stop line(s) to improve sight distance and visibility at the intersection;
- installing a flashing beacon at the intersection to supplement the existing stop signs;
- adding one or more lanes on a minor roadway approach to reduce the number of vehicles per lane on the approach;
- installing roadway lighting to reduce the frequency of accidents at night;
- restricting one or more turning movements;
- limiting the number of driveways in close proximity to an intersection, since unexpected movements from these driveways could cause vehicles on the street to suddenly stop.

Four-way stop signs are needed in certain situations, and careful studies must be made before any installation is approved. There are countermeasures available (see above) that do not include the addition of stop signs. The ultimate goal is to provide a safe intersection for vehicles, pedestrians, and bicyclists.

For more information

**For more information, please contact** \_\_\_\_\_.

## TRAFFIC AND SAFETY INFORMATIONAL SERIES FREQUENTLY ASKED QUESTION #14

### **Wouldn't installing a four-way stop reduce accidents at an intersection?**

Adding four-way stop signs may seem like it would slow drivers down and make the streets safer, but additional stop signs do not necessarily increase safety. In fact, in some cases, especially when they are not really needed, the overuse of signs can lead to them being ignored by drivers. Therefore, traffic engineers make careful decisions concerning the use of four-way stop signs. Here are some of the factors they consider:

#### **Too many signs can lead to ineffectiveness**

Studies have shown that when stop signs are placed at intersections where they are not really needed, some motorists become careless about stopping. Moreover, overuse of four-way stop signs can contribute to the number of frustrated and impatient drivers on the streets, and these drivers may start driving recklessly.

#### **Where four-way stop signs are used**

Four-way stop signs are often used at the intersection of two roadways that contain similar traffic volumes. The intersection must, however, meet at least one of the following conditions:

- a traffic signal is going to be installed and the intersection needs a temporary solution to control the traffic;
- within 12 months at least five crashes have occurred at the intersection that could have been prevented by stop signs;
- relatively high volumes and/or high major-street vehicle speeds exist.

#### **Other solutions may provide just as much safety**

To make travel efficient and safe, four-way stop signs are usually installed only where they are absolutely necessary. Before four-way stop signs are installed, other solutions should be considered. Here are a few examples:

- Relocate the line where vehicles stop to improve visibility at the intersection.
- Limit the number of driveways in close proximity to an intersection since unexpected movements to/from these driveways sometimes cause drivers to suddenly stop or swerve, resulting in crashes.
- Install flashing lights before or at the intersection to warn drivers or to supplement existing stop signs, respectively.
- Install roadway lighting to reduce the frequency of crashes at night.

#### **For more information**

**For more information, please contact \_\_\_\_\_.**

## TRAFFIC AND SAFETY INFORMATIONAL SERIES

### FREQUENTLY ASKED QUESTION #15

#### WHAT IS THE HARM IN INSTALLING AN UNWARRANTED TRAFFIC CONTROL DEVICE?

Installing stop signs or 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 two-way stop signs in the *Manual for Uniform Traffic Control Devices* (MUTCD) are listed below. Because a stop sign causes substantial inconvenience to motorists, it should be used only where warranted. It may be warranted where the following conditions exist:

1. the intersection of a less important road with a main road where the applications of the normal right-of-way rule is hazardous;
2. a street entering a through highway or street;
3. an unsignalized intersection in a signalized area;
4. other intersections where a combination of high speed, restricted view, and serious accident record indicates a need for control by the stop sign.

The amount of delay created by the stop sign depends on both major and minor street flows. The gaps in the major flow traffic stream must be adequate to allow the stopped traffic to execute the through, right, or left movement 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, and left-turning drivers must cross more traffic streams. Additional delay for minor street vehicles 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.

The delay times at stopped approaches can become excessive if either major or minor flow is high. The advantage of a two-way stop is that the major 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 stop control is often controversial as it can often confuse motorists and can cause more average delay than other types of control. The multiway 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 four-way stop sign alternative can be quite useful in unusual situations where two-way stop control has not solved the safety problems but where signalization is not yet warranted.

## WHAT IS THE HARM IN INSTALLING TRAFFIC SIGNALS?

Justification of signal installation requires considerable data collection and analysis. The following data need to be collected and analyzed:

- traffic volumes by approach and movement for the 16 highest hours in a day,
- pedestrian counts in crosswalks,
- intersection approach speed distributions,
- collision diagrams for recent crashes, and
- condition diagram for the intersection.

The MUTCD lists 11 warrants for the placement of traffic signals. These warrants are summarized below (please refer to the MUTCD for details). If none of these warrants are met, a traffic signal should not be placed. In addition, the fulfillment of a warrant or warrants also does not in itself justify the installation of a signal. Please

1. *Minimum vehicular volume.* The volume of intersecting traffic must be above a certain value.
2. *Interruption of continuous traffic.* The traffic volume on a major street is so significant that the traffic on the minor street cannot safely merge, enter, or cross the major street.
3. *Minimum pedestrian volume.* The volume of pedestrians crossing a major street exceeds a certain value.
4. *School crossing.* At an established school crossing, a signal can be placed if it is shown that there are not enough gaps in the traffic for the children to safely cross.
5. *Progressive movement.* To maintain the proper grouping of vehicles and to effectively regulate the group speed.
6. *Accident experience.* When less restrictive remedies and enforcement has failed to decrease the accident rate below levels expected with signalization.
7. *Systems warrant.* A common intersection that serves a principle network for through traffic flow.
8. *Combination of warrants.* If warrants 1 and 2 are each satisfied by 80 percent of the stated values, a signal placement could be justified.
9. *Four-hour vehicular volume.* The traffic volumes on the major and minor streets exceed a certain value for each of any four hours on an average day.
10. *Peak hour delay.* The minor street traffic suffers major delay in entering or crossing the major street for only one hour of an average weekday.
11. *Peak hour vehicular volume.* The traffic volumes on the major and minor streets exceed a certain value for only one hour of the day.

Installing a traffic signal at a low-volume intersection can significantly increase crashes and delays. Again, the increase in delay and stops then translates into higher fuel consumption, increased travel times, and higher point source 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. 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 (e.g., rear-end collisions) may actually increase after a signal is installed. For this reason, the type and number of crashes at an intersection should be considered before the installation of a signal.



Traffic signals can represent a positive public investment when justified, but they are costly. A modern signal can cost \$80,000 to \$100,000 to install. In addition, there is the cost of the electrical power consumed in operating a signalized intersection 24 hours a day (which can average about \$1,400 per year).

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.

**For more information**

For more information, please contact \_\_\_\_\_.

## TRAFFIC AND SAFETY INFORMATIONAL SERIES

### FREQUENTLY ASKED QUESTION #15

#### **What is the harm in installing traffic signs and signals that aren't really needed?**

It may surprise you to learn that adding more stop signs or traffic signals along a roadway does not necessarily slow drivers down or increase safety. In fact, in some cases, especially when they are not really needed, the overuse of signs and signals can lead drivers to ignore or not properly obey them.

##### **Too many signs can lead to ineffectiveness**

Studies have shown that when stop signs are placed at intersections where they don't appear to be needed, motorists become careless about stopping.

##### **Too many traffic signals can negatively impact traffic flow**

Installing traffic signals where they are not needed can create traffic congestion, add travel time, and frustrate drivers, who may start driving impatiently.

##### **Other options can provide safety**

To make travel efficient and safe and to help ensure the proper observance of stop signs and traffic signals, they are usually installed only where they are absolutely necessary. Other solutions—for example, a yield sign—may also provide enough safety, without any detriment to traffic flow.

##### **For more information**

For more information, please contact \_\_\_\_\_.

## TRAFFIC SAFETY AND INFORMATIONAL SERIES FREQUENTLY ASKED QUESTION #16

### WON'T A TRAFFIC SIGNAL REDUCE ACCIDENTS?

Traffic signals are not always the answer to reducing crashes at intersections. Crash analysis is very complicated and multiple causes for a crash are usually identified. For this reason, the solution to a safety problem at a particular intersection is not always obvious, and the placement of any type of traffic control device must be considered carefully. The incorrect installation or placement of a traffic signal can actually result in additional crashes at an intersection.

#### WHAT ARE THE WARRANTS FOR A TRAFFIC SIGNAL?

Traffic control signals should not be installed unless one or more of the signal warrants contained in the *Manual on Uniform Traffic Control Devices (MUTCD)* are met. Among other things, these warrants are related to intersection vehicular and pedestrian volumes, crash history, and the presence of a school crossing. However, fulfillment of a warrant or warrants does not in itself justify the installation of a signal. A comprehensive engineering study should also be done to indicate that the installation of a traffic signal would improve the overall safety and/or operation of the intersection. If the study indicates otherwise, a traffic signal should not be installed even though one or more of the warrants are met. A complete listing of the 11 signal warrants in the MUTCD is included in the answer to the "What is the harm in installing an unwarranted traffic control device?" question within this informational series.

#### WHAT CONTRIBUTES TO INTERSECTION CRASHES?

According to the US Department of Transportation's 1994 *Technical Report on Intersection Crossing Path Crashes*, intersections controlled with traffic signals represent approximately one-third of all intersection crossing path crashes. Most of the crashes related to traffic signals are rear-end collisions. The Iowa Governor's Traffic Safety Bureau has published several fact sheets containing information about crashes. The major contributors to crashes are summarized below:

- *Young drivers* are major contributors to crashes in Iowa. In 1996, although 16 and 17 year olds only represented 3.5 percent of Iowa's licensed drivers, they contributed to 11 percent of all at-fault drivers in vehicle crashes.
- *Alcohol* is a major contributing factor of traffic fatalities and the leading cause of death among people 1 to 34 years of age. In 1998, there were 2,626 Iowa alcohol-related traffic injuries and approximately 17,000 operating-under-the-influence (OWI) arrests.

- *Speeding* ranks just behind alcohol and stop light/stop sign violations as a contributing factor to fatal crashes in Iowa. When a vehicle is traveling at a faster speed, a much greater distance is required to make the same driving decisions as when traveling at a slower speed.
- *Red light running* also results in a large number of crashes at signalized intersections. For example, in 1998 there were 89,000 red light running crashes in the United States that resulted in 80,000 injuries and 986 deaths.

## WHAT CAN BE DONE TO REDUCE THESE CRASHES?

The goal of an intersection crash analysis is to develop countermeasures that should lead to a reduction in crashes. However, no two intersections are the same. Each intersection has its own unique characteristics that must be studied and analyzed in detail. The traffic engineer observes the site, uses proper analysis techniques and his or her background and experience to identify solutions.

Signalization may not eliminate the crash concerns at an intersection. It may change the type of crashes or simply shift them to another location. The installation of a traffic signal (especially an unwarranted signal) can cause excessive delay. Violation of these types of signals can contribute to crashes or result in a diversion of traffic to parallel residential streets.

The evaluation of an intersection and its characteristics may indicate that measures other than a traffic signal could result in adequate and less intrusive intersection safety improvements. Some countermeasures that might be considered for crash reduction have been identified by the Institute of Transportation Studies in the fourteenth edition of the *Fundamentals of Traffic Engineering*. The countermeasures at an intersection include

- prohibiting a turning movement,
- providing turn lanes,
- installing or improving warning signs,
- improving roadway lighting,
- providing a stop sign,
- installing or improving pedestrian crosswalk,
- improving skid resistance for wet-weather accidents,
- creating truck escape ramps,
- providing rumble strips to improve drift-off-road accidents, and
- correcting the roadway curve.

## WHAT ABOUT INSTALLING A TRAFFIC SIGNAL?

The installation of a traffic signal (or four-way stop control) must be preceded by a thorough engineering study to determine whether the location meets minimum signalization warrants. Traffic signals, when warranted, can produce a more orderly movement of traffic, increased intersection capacity, a reduction in certain types of crashes (especially right-angle collisions), nearly continuous movement along a route, and an interruption of traffic to permit other traffic or pedestrians to cross. However, improperly installed or unwarranted traffic signals can produce excessive delay, disobedience of the signal indications, increased use of minor roadways (to avoid signals), and an increase in certain types of crashes (especially rear-end collisions). There are 11 warrants for signal installation (see informational series answer to “What is the harm in installing an unwarranted traffic control device?” for signal warrants). A traffic signal should only be installed if the intersection meets one or more of these warrants.

There is only one traffic signal warrant related to the crash history of an intersection. This warrant requires that remedies less restrictive than a traffic signal be considered first, that there be at least five reportable crashes in a year that could be corrected by a traffic signal, and that certain minimum volume levels be met.

**For more information**

For more information, please contact \_\_\_\_\_.

## TRAFFIC SAFETY AND INFORMATIONAL SERIES FREQUENTLY ASKED QUESTION #16

### **Wouldn't installing a traffic signal reduce the number of accidents at an intersection?**

It may surprise you to learn that adding traffic signals would not necessarily increase safety at an intersection. In fact, in some cases, especially when the traffic signals do not seem to be needed, some drivers may begin to ignore them or run yellow lights in an attempt to avoid delays. Therefore, officials in your area make careful decisions concerning the use of traffic signals. Here are some of the factors they consider:

#### **Too many traffic signals can negatively impact traffic flow**

Installing traffic signals where they are not needed can create traffic congestion, add travel time, and frustrate drivers, who may start driving impatiently and make inappropriate decisions. To make travel efficient and safe and to help ensure the proper observance of traffic signals, they are usually installed only where they are absolutely necessary.

#### **Where traffic signals are installed**

At least one of 11 conditions must be met for a traffic signal to be installed. The conditions include high vehicle and/or pedestrian volumes, a record of severe crashes, and school crossings where there is not enough of a gap in traffic flow for children to cross safely.

#### **Other solutions**

Many crashes at intersections are not caused by a lack of a traffic signal. Inexperienced drivers, drunk drivers, and speeding are often the cause. Therefore, traffic signals do not always offer increased safety at an intersection. Other solutions that might be considered include providing turning lanes, installing warning signs, improving roadway lighting, and installing a pedestrian crosswalk.

#### **For more information**

For more information, please contact \_\_\_\_\_.

# TRAFFIC AND SAFETY INFORMATIONAL SERIES

## FREQUENTLY ASKED QUESTION #20

### WHEN DO INTERSECTIONS RECEIVE STOP SIGNS (TWO-WAY AND FOUR-WAY) AND SIGNALS?

Traffic control devices are present to safely assist and guide drivers. Several people believe that many of our traffic problems would be solved by the addition of a stop sign or traffic signal. Some would even like a traffic signal or a stop sign at every intersection. In fact, there are situations in which the absence of a stop sign or traffic signal actually provides a safer situation.

Based on the *Manual on Uniform Traffic Control Devices (MUTCD)*, traffic control devices should meet five basic requirements. They should

- fulfill a need;
- command attention;
- convey a clear, simple meaning;
- command respect of road users; and
- give adequate time for proper response.

#### WHAT IS THE APPROPRIATE USE AND PLACEMENT OF STOP SIGNS?

The stop sign is a regulatory sign used to stop traffic. It is a red octagon that has a white border and large white letters that read "STOP." At multiway stop intersections, a small plate is placed below the stop sign to inform the driver of how many approaches are required to stop.



Because stop signs inconvenience drivers, they should only be used where they are strictly warranted. The following warrants for the placement of stop signs are found in the MUTCD:

1. the intersection of a less important road with a main road where application of the normal right-of-way rule is unduly hazardous;
2. a street entering a through highway or street;
3. an unsignalized intersection in a signalized area;
4. other intersections where a combination of high speed, restricted view, and serious accident record indicates a need for control by the stop sign.

There are also locations where the use of stop signs should be avoided. Every time a stop sign is considered, a less restrictive method such as a yield sign should first be considered.

#### WHAT DETERMINES THE PLACEMENT OF A MULTI-WAY STOP SIGN?

The multiway stop sign may improve the safety of an intersection. Normally, it is used at the intersection of two roads that contain similar traffic volumes. A three-way stop is used at intersections that have only three approaches (e.g., a T-intersection). According to the MUTCD, the warrants for placing multiway stop signs are as follows:



1. where traffic signals are going to be placed soon and the intersection needs a temporary solution to control the traffic;
2. an intersection that has several crashes ( $\geq 5$  correctable accidents in 12 months);
3. when an intersection has the following traffic volumes: (a) the total volume of traffic entering the intersection from all approaches must average at least 500 vehicles per hour for any eight hours of an average day; (b) the combined vehicular and pedestrian volume that enters the intersection from the minor street must average at least 200 units per hour for the same eight hours, with an average delay to the minor street traffic of at least 30 seconds per vehicle during the maximum hour; (c) the 85th percentile approach speed (this is the speed at or below which 85 percent of the vehicles travel on a given roadway) of the major street traffic exceeds 40 miles per hour, and the minimum vehicular volume warrant is 70 percent of the above requirements.

### **WHY CAN'T WE PLACE A TRAFFIC SIGNAL AT EVERY SCHOOL CROSSING?**

The fourth MUTCD warrant for traffic signalization explains traffic signal placement with regard to school crossings. If a traffic study shows that the number and length of gaps in the traffic flow are not adequate to allow the children to cross safely, then a traffic control signal may be warranted. When the gaps are sufficient, the addition of a traffic control device may not be necessary. A crossing guard or school crossing sign at the crosswalk with warning signs at the approaches can also help control traffic during peak traffic flow times.

When traffic control signals are installed entirely because of this warrant, the MUTCD notes the following:

- Pedestrian indications shall be provided for each crosswalk established as a school crossing.
- At an intersection, the signal normally should be traffic-actuated. As a minimum, it should be semi-actuated, but full actuation with detectors on all approaches may be desirable. Intersection installations that can be fitted into progressive signal systems may have pretimed control.
- At nonintersection crossings, the signal should be pedestrian-actuated, parking and other obstructions should be prohibited for at least 100 feet in advance of and 20 feet beyond the crosswalk, and the installation should include suitable standard signs and pavement markings. Special police supervision and/or enforcement should be provided for a new nonintersection location.

### **WHAT DETERMINES THE PLACEMENT OF TRAFFIC SIGNALS?**

The warrants for the placement of traffic signals are found in the MUTCD. Please refer to the informational series answer for the question, "What is the harm in installing an unwarranted traffic control device?"

#### **For more information**

For more information, please contact \_\_\_\_\_.

# TRAFFIC AND SAFETY INFORMATIONAL SERIES

## FREQUENTLY ASKED QUESTION #20

### When do intersections receive stop signs and signals?

It may surprise you to learn that adding stop signs or traffic signals would not necessarily slow drivers down or increase safety at an intersections. In fact, in some cases, especially when the signs or signals do not seem to be needed, some drivers may begin to ignore them. Therefore, officials in your area make careful decisions concerning the use of stop signs and traffic signals. Here are some of the factors they consider:

#### **Too many signs can lead to ineffectiveness**

Studies have shown that when stop signs are placed at intersections where they are not really needed, motorists become careless about stopping. Installing traffic signals where they are not needed can also create traffic congestion, add travel time, and frustrate drivers, and these drivers may become impatient and make unsafe maneuvers.

#### **The use of signs and signals should be restricted to locations where they will be effective**

Signs and signals are only effective and should only be used when they meet the following four requirements. They should (1) fulfill a need, (2) convey a clear, simple meaning, (3) command attention and respect, and (4) give adequate time for drivers to respond.

Locations must have one or more of the following the conditions for two-way stop signs to be installed:

- an intersection of a minor and a major road, where the application of the normal right-of-rule would be hazardous;
- a street enters a highway;
- an unsignalized intersection in a signalized area;
- there is high-speed traffic, it is hard to see, and there is a previous crash record.

Four-way stop signs are often used at the intersection of two roadways that contain similar traffic volumes. The location must have at least one of the following conditions:

- a traffic signal is going to be installed and the intersection needs a temporary solution to control the traffic;
- within 12 months at least five crashes have occurred at the intersection that could have been prevented by stop signs;
- relatively high volumes and/or high major-street vehicle speeds exist.

At least one of 11 conditions must be met for a traffic signal to be installed. The conditions include high vehicle and/or pedestrian volumes, a record of severe crashes, and school crossings where there is not enough of a gap in traffic flow for children to cross safely.

#### **Other options**

To make travel efficient and safe and to help ensure the proper observance of stop signs and traffic signals, they are installed only where they are absolutely necessary. Other solutions—for example, a yield sign—should be considered first and may be more appropriate.

#### **For more information**

For more information, please contact \_\_\_\_\_.