

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 _____.