

## Multiway Stop Sign Installation

STOP signs are one of the most common traffic signs and also one of the most often misused. In particular, multiway STOP signs are commonly placed in an effort to control speed on local streets.

Multiway stop control should be used where the volumes of traffic on the intersecting roads are approximately equal. This type of traffic control can be an effective method for improving a hazardous location or controlling traffic congestion and safely assigning right-of-way.

### Multiway Stop Warrants

A warrant is a guideline to determine the need for installation of a sign rather than absolute criteria. The use of a warrant, tempered with professional judgment and local knowledge, will result in effective implementation of multiway STOP signs. Multiway STOP signs should not be used for speed control and should only be used where warranted since they can cause inconvenience to motorists and are not effective at controlling speeds.

Knowledge of the local road system will quickly identify problem and crash areas that may be improved by proper sign placement. As outlined in the following warrants, vehicular volume counts, intersection corner sight distance measurements, crash data analysis, and possibly vehicle delay estimates are required to properly evaluate the warrants. Additionally, review of intersection geometry, adjacent roadway features, and vehicle speeds through the area are necessary to determine the need for a multiway STOP sign application.

The decision to install multiway stop control must be based on an engineering and traffic study. Publication 212, *Official Traffic Control Devices*, Section 212.4 (b), states that engineering and traffic studies can be performed by police officers, roadmasters, maintenance supervisors, or traffic technicians except as noted in Sections 212.109 and 212.117 (relating to bridge speed limits and weight, size, and load restrictions).

Multiway STOP sign warrants are outlined in:

- Section 2B.07 of the MUTCD  
[http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/pdf\\_index.htm](http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/pdf_index.htm)
- PennDOT's Publication 212, *Official Traffic Control Devices*  
<ftp://ftp.dot.state.pa.us/public/PubsForms/Publications/PUB%20212.pdf>

The following information and warrants are found in the following publications:

### MUTCD

Multiway stop control can be useful as a safety measure at intersections if certain traffic conditions exist. Safety concerns associated with multiway stop controls include pedestrians, bicyclists, and all road users expecting other road users to stop. Multiway stop control is used where the volume of traffic on the intersecting roads is approximately equal.

The restrictions on the use of STOP signs, described in Section 2B.04 and 2B.06 of the MUTCD and the LTAP technical information sheet #137, *Effective Stop Sign Placement*, also apply to multiway stop applications.

The following criteria should be considered in the engineering and traffic study for a multiway STOP sign installation:

- A) Where traffic-control signals are justified, the multiway stop as an interim measure that can be installed quickly to control traffic while arrangements are being made for the installation of the traffic-control signal.
- B) A crash problem, as indicated by five or more reported crashes in a 12-month period, that is amenable to correction by a multiway stop control installation. Such crashes include right- and left-turn collisions as well as right-angle collisions.

C) Minimum volumes:

- 1) The vehicular volume entering the intersection from the major street approaches (total of both approaches) averages at least 300 vehicles per hour for any eight hours of an average day, and
- 2) 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 eight hours, with an average delay to minor-street vehicular traffic of at least 30 seconds per vehicle during the highest hour, but
- 3) If the 85th-percentile approach speed of the major street traffic exceeds 40 mph, the minimum vehicular volume warrants are 70 percent of the above values.

D) Where no single criterion is satisfied, but where Criteria B, C.1, and C.2 are all satisfied to 80 percent of the minimum values. Criterion C.3 is excluded from this condition.

Other criteria that should be considered in an engineering study include:

- A) The need to control the left-turn conflicts;
- B) The need to control vehicle/pedestrian conflicts near locations that generate high-pedestrian volumes;
- C) Locations where a road user, after stopping, cannot see conflicting traffic and is not able to reasonably and safely negotiate the intersection and less conflicting cross traffic is also required to stop; and
- D) An intersection of two residential neighborhood collector (through) streets of similar design and operating characteristics where multiway stop control would improve traffic operational characteristics of the intersection.

### **Publication 212**

Publication 212 provides additional criteria for multiway stop applications:

- 212.106(c)(1): The five reported crashes in a 12-month period for Warrant B may include both reportable crashes and nonreportable crashes documented in police files, which occurred throughout a 12-month period during the most recent three years of available crash data.
- 212.106(c)(2): Multiway stop applications may not be used because of limited available corner-sight distance unless there is no practical method of improving the corner-sight distance or reducing the speed limit to satisfy the minimum corner-sight distance.

### **Improper Use of Multiway STOP Signs**

Unfortunately, multiway STOP signs are commonly installed in an effort to control speed on local streets, more specifically

residential streets, even though the MUTCD states that STOP signs should not be used for speed control. Many people believe that forcing motorists to stop at each intersection will decrease overall speed on the road.

However, studies show that STOP signs only reduce speed immediately adjacent to the sign. Many drivers accelerate between intersections to make up for time lost at the STOP sign. Engineering studies indicate that the unwarranted installation of multiway STOP signs may cause additional problems, such as rear-end collisions, a redistribution of traffic onto side streets, wasted fuel, traffic noise, automobile pollution, cost of enforcement, and drivers ignoring the unwarranted STOP signs. If speed control is a concern, municipalities can use PennDOT Publication 383, *Pennsylvania's Traffic Calming Handbook*, to help with this problem.

### **Ordinances**

Multiway STOP signs need an ordinance to make their use “legal” and enforceable. After you complete your engineering and traffic study examining the warrants mentioned above and document all findings and results, work with your solicitor to craft or amend the appropriate ordinance.

### **Multiway STOP Supplemental Signs**

In addition to the placement standards and guidance provided above, Section 2B.05 of the MUTCD requires that at intersections where all approaches are controlled by STOP signs, an ALL WAY supplemental plaque (R1-3P) must be mounted below each STOP sign. Supplemental plaques with legends, such as 2-WAY, 3-WAY, 4-WAY, or other numbers of ways, may not be used with STOP signs. PennDOT's Publication 236, *Handbook of Approved Signs*, also addresses the use of these required plaques. PennDOT Publication 236 is available from the PennDOT Sales Store at (Click on Pub 236 on page 35.):

<http://www.dot.state.pa.us/Internet/Bureaus/pdBOS.nsf/FormsAndPubsHomePage?OpenFrameSet>

For intersections where STOP signs control all but one approach to the intersection, plaques with the appropriate alternative messages of TRAFFIC FROM LEFT (RIGHT) DOES NOT STOP (W4-4aP) or ONCOMING TRAFFIC DOES NOT STOP (W4-4bP) should be used, unless the only non-stopped approach is from a one-way street. CROSS TRAFFIC DOES NOT STOP signs may be used beneath a STOP sign when engineering judgment indicates that conditions are present that are causing or could cause motorists to misinterpret the intersection as an all-way stop. Refer to the MUTCD and PennDOT Publication 236 for specific guidance on these supplementary signs.

## **Multiway Stop Intersections and the EXCEPT RIGHT TURN Sign**

Section 2B.05 of the MUTCD, Section 212.107, of PennDOT Publication 212, and PennDOT Publication 236 provide specific guidance about justifying and placing the EXCEPT RIGHT TURN sign. In general, the EXCEPT RIGHT TURN sign will be authorized for use below a STOP sign to allow right-turn movements without stopping at an intersection when the major flow of traffic makes a right-hand turn rather than proceeding straight through.

Its use should be limited to those locations where a significant energy saving can be realized by minimizing the number of vehicles required to stop or substantially reduce their speeds. When used, STOP signs are required on all other intersection

approaches except for the approach with a corresponding left-turn movement. Care should be taken to ensure that no traffic conflicts exist. An engineering and traffic study is required for this sign.

### **Final Note**

By following the appropriate steps prior to installing multiway STOP signs, municipalities can ensure that the signs' use and location will help to reduce accidents and properly regulate traffic through an area. Improper signing and ignoring the warrants creates dangerous conditions for both drivers and the responsible municipality. Unwarranted or substandard traffic-control devices contributing to a crash can sometimes be grounds to award judgment against an agency involved in a legal dispute.