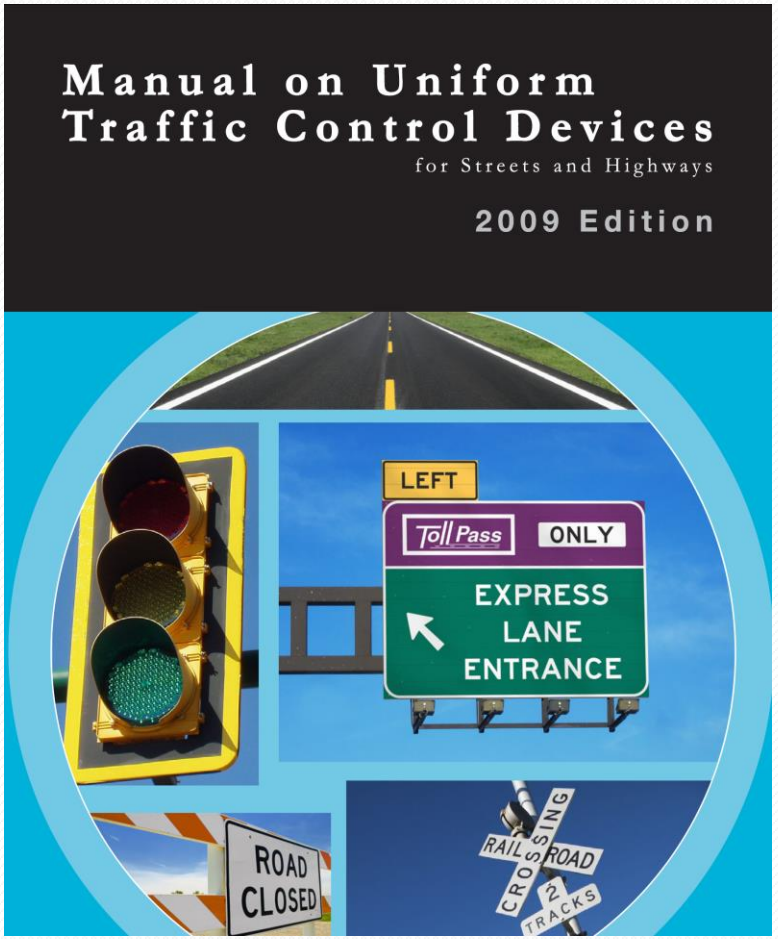
Use of Intersection Stop and Yield Sign Control

Presented by the City of Milwaukee
Department of Public Works

Manual on Uniform Traffic Control Devices (MUTCD)

- Defines the standards used nationwide to install and maintain traffic control devices to obtain basic uniformity on all facilities open to public travel.
- Compilation of all traffic control devices, including road markings, signs, and traffic signals.
- Current version effective on January 15, 2010.
- Conformance required under both State and Federal Law.
- Adopted by Wisconsin DOT effective May 25, 2011.



Summary of Laws Governing Applicability of the MUTCD

Federal Laws Concerning the Applicability of the MUTCD

23 CFR part 655

§ 655.603 Standards.

(a) MUTCD is the national standard for all traffic control devices on any roadway or bicycle trail open to public travel.

(b) State or other Federal MUTCD.

States shall adopt changes to the National MUTCD within two years from the final rule effective date.

State MUTCD's or supplements shall conform as a minimum to the standard statements included in the National MUTCD.

The guidance statements contained in the National MUTCD shall also be in the State Manual or supplement unless the reason for not including it is satisfactorily explained based on engineering judgment, specific conflicting State law, or a documented engineering study.

Wisconsin State Statutes Concerning Applicability of the MUTCD

- **§ 84.02 (4) (e)**
  - Wisconsin DOT must adopt a manual establishing a uniform system of traffic control devices for use on Wisconsin highways of this state consistent with and conforming to current nationally recognized standards for traffic control devices.

- **§ 349.065 Uniform Traffic Control Devices**
  - City must install and maintain traffic control devices on roadways under its jurisdiction to regulate, warn, guide and inform traffic.
  - All traffic control devices placed and maintained by the City must conform to the MUTCD and Wisconsin State Supplement once adopted.

City Ordinances Pertaining to Stop Sign Installation

- Section 101-1
  - Chapter 349 of Wisconsin Statutes is Adopted.

- Section 101-16-1
  - The Commissioner of Public Works ….. shall erect and maintain stop signs or traffic control signals on every intersecting highway where traffic enters or crosses a through highway, and at other locations where needed in the interest of public safety …….

Recommending Traffic Control at Unsignalized Intersections

MUTCD Basics

- **Standard** – A statement of required, mandatory, or specifically prohibitive practice regarding a traffic control device ***("Shall").***

- **Guidance** – A statement of recommended, but not mandatory, practice in typical situations, with deviations allowed if engineering judgment or study indicates the deviation to be appropriate ***("Should").***

- **Option** – A statement of practice that is a permissive condition and carries no requirement or recommendation ***("May").***

Text Excerpt from the MUTCD

Section 2B.05 STOP Sign (R1-1) and ALL WAY Plaque (R1-3P)

Standard:

01 **When it is determined that a full stop is always required on an approach to an intersection, a STOP (R1-1) sign (see Figure 2B-1) shall be used.**

02 **The STOP sign shall be an octagon with a white legend and border on a red background.**

Guidance:

08 *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 at intersections where STOP signs control all but one approach to the intersection, unless the only non-stopped approach is from a one-way street.*

Option:

09 An EXCEPT RIGHT TURN (R1-10P) plaque (see Figure 2B-1) may be mounted below the STOP sign if an engineering study determines that a special combination of geometry and traffic volumes is present that makes it possible for right-turning traffic on the approach to be permitted to enter the intersection without stopping.

Other Traffic Control Recommendation Basics From the MUTCD

- The MUTCD is not a legal requirement for traffic control installation.
- Signs ***should*** be used only where justified by engineering judgment or studies.
- Yield or stop signs ***should not*** be used for speed control.
- Stop and Yield signs are used to assign right of way at an intersection.
- Regulatory and warning signs ***should*** be used conservatively, because these signs, if used to excess, tend to lose their effectiveness.

Determining Recommended Intersection Traffic Control

- The following factors **should** be considered when determining the type of intersection control:
  - Vehicular, bicycle, and pedestrian traffic volumes
  - Number and angle of approaches
  - Approach speeds
  - Sight distance available
  - Reported crash experience
- At intersections where a full stop is not necessary at all times, consideration **should first** be given to using less restrictive measures such as yield signs.

Safe Approach Speed

URBAN

W	≤32'	>32' Two Way	>32' One Way
R	9'	10'	10'
L	½ W-4'	½W-2'	10'

RURAL
(No curbs or parking)

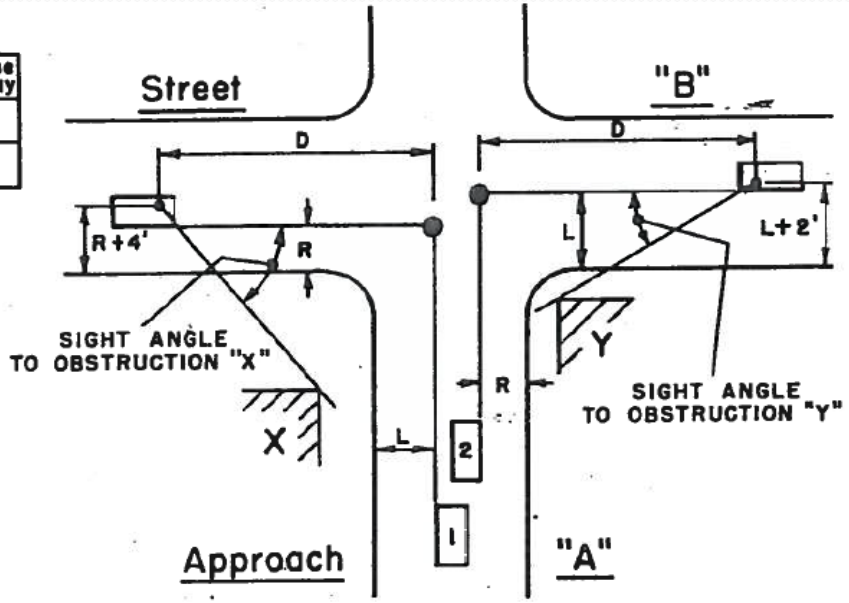
W	≤20'	>20'
R	2'	3'
L	½ W-2'	½ W

D = 70 ft. (20 M.P.H. limit)

D = 90 ft. (25 M.P.H. limit)

D = 120 ft. (30 M.P.H. limit)

W = Street Width



25 M.P.H. Limit	
Sight Angle from Vehicle at Above Speed	S.A.S. for Intersecting Street
Under 15°	0-5 MPH
15°	6 MPH
20°	9 MPH
25°	12 MPH
30°	15 MPH
35°	18 MPH
40°	21 MPH
45°	24 MPH
Over 45°	25 + MPH

Criteria for Two-Way Stop or Yield Control

- At intersections where **two minor streets intersect**, Yield or stop signs **should** be considered when one or more of the following exist:
  - The combined vehicular, bicycle, and pedestrian volume entering the intersection from all approaches averages more than 2,000 units per day.
  - The ability to see conflicting traffic on an approach is not sufficient to allow a road user to stop or yield in compliance with the normal right-of-way rule.
  - Crash records indicate a significant number of "failure-to-yield" type crashes:
    - 5 or more within a 3 year period
    - 3 or more within a 2 year period

Yield Control

- At intersections where a full stop is not necessary at all times, consideration **should first** be given to using less restrictive measures such as yield signs.

- Yield signs **may** be installed:
  - On the approaches where conditions are such that a full stop is not always required.
  - For a channelized turn lane that is separated from the adjacent travel lanes by an island.
  - To assign right-of-way at a roundabout.
  - At an intersection where a special problem exists that is susceptible to correction by a yield sign.

Multi-way Stop Control

- Typically used where the volume of traffic on the intersecting roads is approximately equal.
- Can be useful as a safety measure if certain conditions exist, however, multi-way stop control may introduce new safety concerns if not used properly.
  - Must consider:
    - Road users expect other road users to stop.
    - On arterials and through highways, may disrupt platooned vehicle flow from upstream traffic signals affecting availability of safe gaps at cross streets downstream from the stops.
    - Traffic diversion from through highways.

Multi-way Stop Control (cont.)

- The following criteria **should** be considered for a multi-way stop sign installation:
  - The vehicular volume entering the intersection from the major street approaches average at least 300 vehicles per hour for any 8 hours of an average day.
  - The combined vehicular, pedestrian, and bicycle volume entering the intersection from the minor street approaches average at least 200 units per hour for the same 8 hours, with an average delay to minor-street vehicular traffic of at least 30 seconds per vehicle during the highest hour.

Multi-way Stop Control (continued)

- The following criteria **should** be considered for a multi-way stop sign installation:
  - Five or more reported crashes in a 12-month period that are susceptible to correction by a multi-way stop installation. Such crashes include right-turn and left-turn collisions as well as right-angle crashes.

Current City Traffic Control Guidelines

	NO CONTROL	YIELD SIGN*	STOP SIGN 2-WAY*	STOP SIGN 4-WAY*	SIGNAL
1) Volume Per/Hr. for 8 Hr. Period Major Minor Total (Both) Vol.-24 Hr. Total	Less than 100 Ave./Hr. Less than 2000	100 - 300 Ave./Hr. 2000 or Over	250 Ave./Hr. 3000 or Over	300 Ave./Hr. 200 Ave./Hr. 500 Ave./Hr. 5000 Balanced Volumes	1 Lane / 2 Lanes 500 / 600 Min. 150 / 200 Min. 650 / 800 Min. 8000
2) Critical Speed(Sight Distance) In MPH	Near Speed Limit or 85%	Over 10	10 or Under	Blind	If 85 percentile over 40 MPH then 70% of above
3) Right Angle Accidents Per 12 Month Period	Less Than 3	3 or More	3 or More 5 in 2 yrs	5 or More	5 or More
4) Street Classification	Local-Local	Local-Local Collector-Local	Thru Street Major-Collector Major-Local Local-Local**	Major-Major Collector-Collector	Major-Major Major-Collector
5) Other Factors					Pedestrians Gaps Progression

NOTE: *Intersection should generally meet #4, plus any two of items 1 thru 3.
**Only in unusual circumstances, if other measures have failed or #2 is present.