

UNH T² Center Technical Note

Correct Sign Installation Improves Safety



Signs are a low cost safety improvement to reduce run off the road crashes. Install signs in safe location so they do not become a roadside hazard.

The Manual on Uniform Traffic Control Devices (MUTCD) describes where to place signs (see pages 3-4 of this note). A new version of the MUTCD is expected at the end of 2008. It is in comment period until July 31, 2008 (<http://mutcd.fhwa.dot.gov>).

According to a General Motors study, 85% of run off the road incidents recover safely within 30 feet of the roadway, in the clear zone.



Although not always possible, a 30-foot clear zone is a worthy goal. The fewer hazards in clear zone, the safer motorists will be.

The following list illustrates methods to create a clear zone and improve roadside safety:

1. Remove the obstacle.
2. Redesign the obstacle for safe traversal.
3. Relocate the obstacle.
4. Make the obstacle breakaway.
5. Shield the obstacle.
6. Delineate the obstacle.

Sign Hazards

According to the MUTCD, "Sign posts and their foundations and sign mounting, shall be so constructed as to hold signs in proper and permanent position, to resist swaying in the wind or displacement by vandalism. In areas where ground mounted sign supports cannot be sufficiently offset from the pavement edge, sign supports should be of suitable breakaway or yielding design."

Sign Placement

When possible, place signs where they are not likely to be

struck by out-of-control vehicles. Consider the following when installing signs:

- Place signs outside the clear zone.
- Avoid placing signs on curbs.
- Avoid installing signs on the outside of horizontal curves.
- Avoid placing signs next to lane drops or places where the pavement narrows.
- Provide an unobstructed view of signs along the roadway.
- If possible, place signs behind guardrails or other barriers.
- Avoid placing signs in the bottom of the ditches.
- Space signs so they don't obstruct the view of each other. (Recommended spacing is 150 to 200 feet apart. Do not cluster signs together.)

Sign Posts

A sign post must be durable and structurally adequate. Posts should fail in a safe and predictable manner if struck by a vehicle.

Sign post construction and foundations are critical. Use safe sign supports.

Posts must be able to hold

a sign in the proper position and withstand normal wind yet safely yielding when struck by a vehicle.

Use two or more sign posts when signs are large (over 50 square feet).

Sign Installation Tips

- Bury posts in firm ground 3.5 to 4.0 feet deep.
- Loose or sandy soil may require deeper post placement.
- Use breakaway sign supports to enhance roadside safety.
- Bolt sign panels to the post with oversized washers.
- Use sign connections that prevent vandalism.

Sign Height

The MUTCD states, “signs erected at the side of the road in rural districts shall be mounted at a height of at least five feet, measured from the bottom of the sign to the near edge of the pavement.”

Where there is parking and/or pedestrian movement or where obstructions are present, the clearance to the bottom of the sign must be at least seven feet. The height at the bottom of a sign, mounted below another sign, may be one foot less than the appropriate height specified above.

Lateral Clearance

Signs should be at least six feet from the shoulder. When there is no shoulder, 12 feet away from the edge of the roadway. In urban areas, a minimum of two feet is recommended, a clearance of one foot from the curb face is permissible where the sidewalk width is limited or where existing poles are close to the curb.

Sign Panels

Bolt sign panels to the post using oversized washers. Oversized washers:

- Prevent the panel and post from separating on impact.
- Prevent the sign from breaking loose from the post when hit by a vehicle.
- Prevent the bolt from pulling through the sign

panel from wind vibrations.

Set the bottom of the sign panel a minimum of seven feet above the pavement or ground. Do not confuse this with the mounting height of five foot above the roadway surface. The new MUTCD will require a seven-foot mounting height. A seven foot mounting height reduces the possibility that the sign and the post might hit the car’s windshield.

U-Channel Steel Posts

The U-channel rolled steel post is the most commonly used small sign support. It is considered breakaway as it will bend or break away at the post/base connection at the ground line when it is hit.

Maximum Post Sizes for U-Channel Steel Posts

Maximum Size Panel	Post Size
18" x 24"	2 lb./ft.
30" x 30"	3 lb./ft.
36" x 36"	2 @ 2 lb./ft.

Purchase posts to breakaway on impact and at ground level.

The U-channel steel post manufacturer must certify that posts and hardware have the same chemistry, mechanical properties, and geometry used in the FHWA tests and will meet the FHWA change in velocity requirements.

All U-channel steel posts must be galvanized according to ASTM A-123. The connecting bolts can be cadmium plated according to ASTM A-165 or zinc plated according to ASTM B-633.

Drive the post base into the ground. Do not encase in concrete. The posts base is 3.5 feet in length. When installation is completed, no more than four inches of the base should be above the ground.

Refer to the manufacturer’s wind-load charts for determining post size for other sign panel sizes.

Splicing U-Channel Steel Posts

To splice U-Channel steel posts, follow these steps:

- Drive a 3.5 foot base post to within approximate-

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Section 2A.16 Standardization of Location--2003 MUTCD

Support:

Standardization of position cannot always be attained in practice. Examples of heights and lateral locations of signs for typical installations are illustrated in Figure 2A-1 (of MUTCD), and examples of locations for some typical signs at intersections are illustrated in Figure 2A-2 (of MUTCD).

Standard:

Signs requiring different decisions by the road user shall be spaced sufficiently far apart for the required decisions to be made reasonably safely. One of the factors considered when determining the appropriate spacing shall be the posted or 85th-percentile speed.

Guidance:

Signs should be located on the right side of the roadway where they are easily recognized and understood by road users. Signs in other locations should be considered only as supplementary to signs in the normal locations, except as otherwise indicated.

Signs should be individually installed on separate posts or mountings except where:

- A. One sign supplements another, or
- B. Route or directional signs are grouped to clarify information to motorists, or
- C. Regulatory signs that do not conflict with each other are grouped, such as turn prohibition signs posted with one-way signs, street name signs posted with a stop or yield sign, or a parking regulation sign posted with a speed limit sign.

Signs should be located so that they:

- A. Are outside the clear zone unless placed on a breakaway or yielding support (see section 2A.1, of MUTCD)
- B. Optimize nighttime visibility;
- C. Minimize the effects of mud splatter and debris;
- D. Do not obscure each other; and
- E. Are not hidden from view.

Support:

The clear zone is the total roadside border area, starting at the edge of the traveled way, available for use by errant vehicles. The width of the clear zone is dependent upon traffic volumes, speeds, and roadside geometry. Additional information can be found in the "AASHTO Roadside Design Guide"

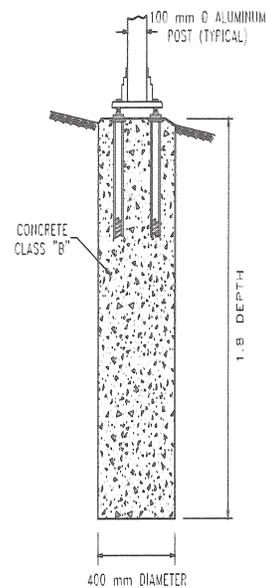
Guidance:

With the increase in traffic volumes and the desire to provide road users regulatory, warning, and guidance information, an order of priority for sign installation should be established.

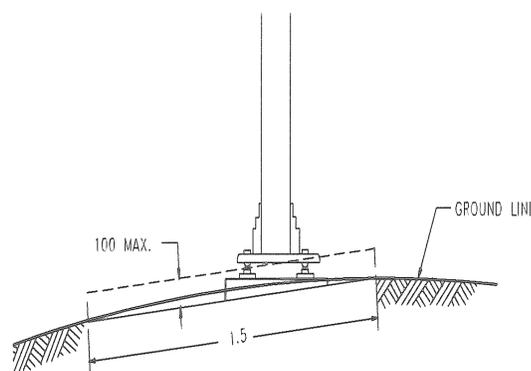
Support:

An order of priority is especially critical where space is limited

BREAKAWAY



FOOTING DETAIL



MAXIMUM BREAKAWAY STUB HEIGHT

BREAKAWAY SUPPORTS PLACED ON ROADSIDE SLOPES SHALL NOT ALLOW IMPACTING VEHICLES TO SNAG ON EITHER THE FOUNDATION OR ANY SUBSTANTIAL REMAINS OF THE SUPPORT. SURROUNDING TERRAIN SHALL BE GRADED TO PERMIT VEHICLES TO PASS OVER ANY NON-BREAKAWAY PORTION OF THE SIGN INSTALLATION WHICH REMAINS IN THE GROUND OR RIGIDLY ATTACHED TO THE FOUNDATION.

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ly 12 inches above ground level.

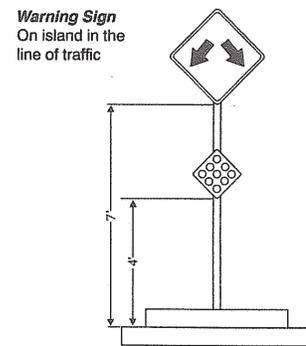
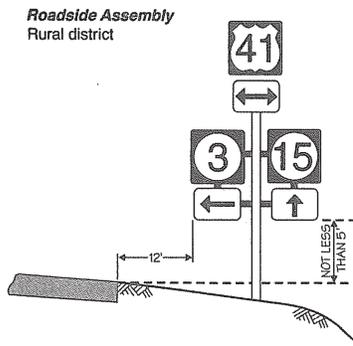
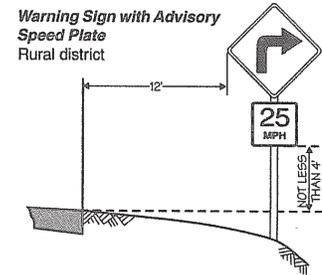
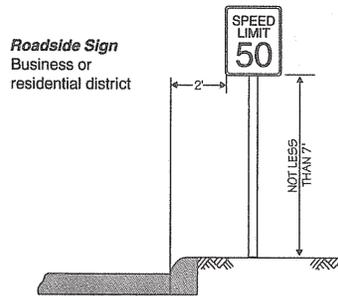
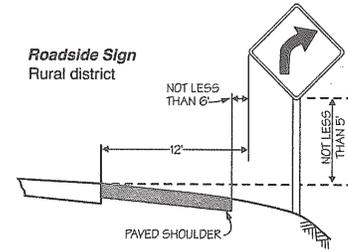
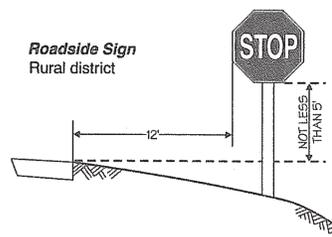
- Place one bolt and cut washer in the fifth hole from the end and tighten the threaded space securely onto the bolt.
- Drive the base post to four inches above ground level.
- Place the remaining bolt and cut washer in the first hole from the end and tighten the threaded spacer securely onto the bolt.
- Dig out approximately two inches from around the back of the base post to allow room for a sign post to be attached.
- Nest the sign post over the protruding base post bolts through the first and fifth holes of the top post.
- Place a lock washer and lock nut on each bolt.
- Tighten the nuts and tamp the earth around the base post firmly.

Source:

“Correct sign installation can increase motorist safety on local roadways”, *Oklahoma LTAP News*, Jan 2005, p. 3-6

Geometric Design of Highways and Streets, AASHTO, 2004, p. 294-5

Traffic Control Devices Handbook, ITE, Washington DC, 2001 p. 60, 65



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for sign installation and there is a demand for several different types of signs. Overloading road users with too much information is not desirable.

Guidance:

Because regulatory and warning information is more critical to the road user than guidance information, regulatory and warning signing whose location is critical should be displayed rather than guide signing in cases where conflicts occur. Information of a less critical nature should be moved to less critical locations or omitted.

Option:

Under some circumstances, such as on curves to the right, signs may be placed on median islands or on the left side of the road. A supplementary sign located on the left of the roadway may be used on a multi-lane road where traffic in the right lane might obstruct the view to the right.

Guidance:

In urban areas where crosswalks exist, signs should not be placed within 1.2 m (4 ft) in advance of the crosswalk.