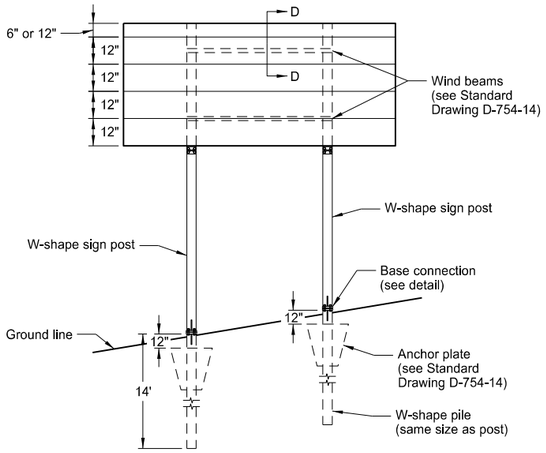
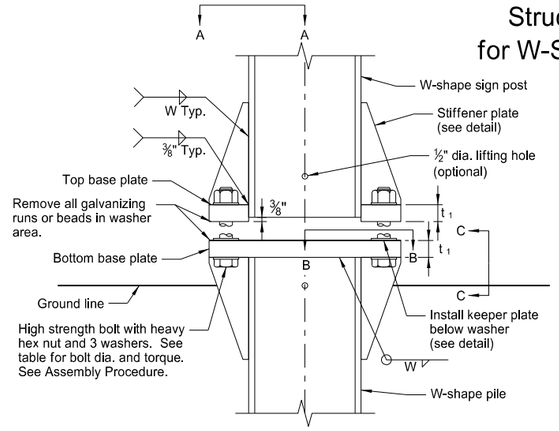
# Breakaway System Structural Details for W-Shape Supports

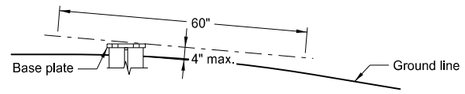
D-754-13




Typical Panel Mounting on W-shape Sign Posts




Base Connection Detail




Section C-C
Stub Height Requirements

Maximum projection of base plate limits are defined as a line 4" parallel to any chord, which is perpendicular to, or aligned radially to, the center line of the highway and has the chord's end points on the ground surface on opposite sides of the stub post.

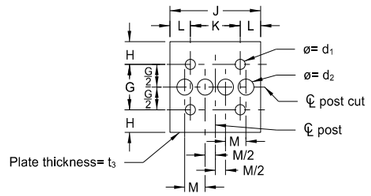
Notes:

Use structural steel conforming to Section 894.03 B.6 of the Standard Specifications and high strength bolts conforming to ASTM A325.

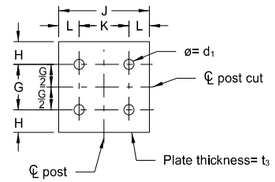
Refer to Sign Summary sheet for specific data on individual sign installation.

Install perforated fuse plate on side of post facing traffic.

Saw cut posts. Shear or flame cut plates using a mechanically guided cutting torch in accordance with Section 754.04 D.4.b of the Standard Specifications. Prepare edge in accordance with Section 754.04 D.4.c of the Standard Specifications.



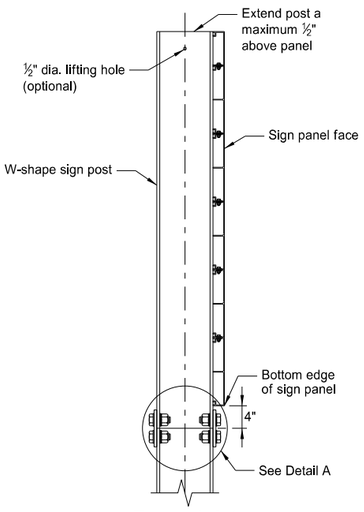

Perforated Fuse Plate



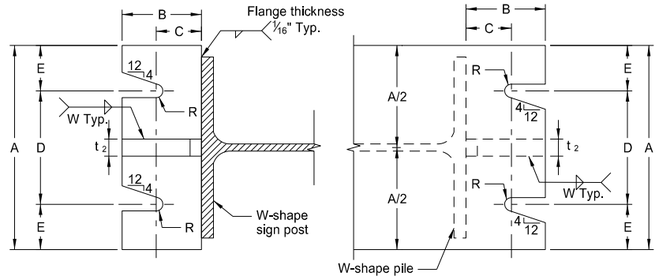

Hinge Plate

Assembly Procedure:

1. Assemble base plates with bolts and one flat washer between top base plate and keeper plate.
2. Shim as required to plumb post.
3. Tighten all base connection bolts the maximum possible with 12" to 15" wrench to bed washers and shims and clean bolt threads.
4. Loosen each bolt in turn and retighten in systematic order to the prescribed torque (see table).
5. Assemble perforated fuse and hinge plates to post with bolts and one flat washer and lock washer under nut.

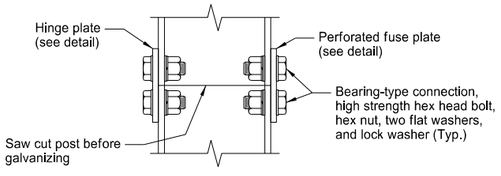



Fuse Joint
(Side View)

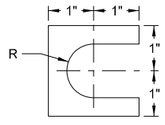



Section A-A Section B-B

Sections shown for installations on right shoulder. Reverse plate slot bevels for installations on left shoulder.

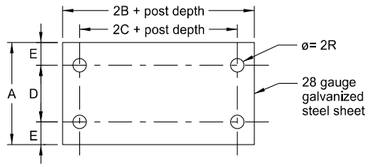



Detail A

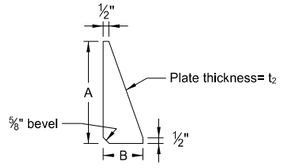



Shim Detail

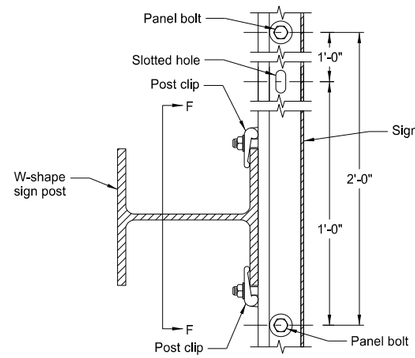
Furnish 2 each .012"± thick and 2 each .032"± thick shims per post. Shims shall be fabricated from brass shim stock or strip conforming to ASTM B36.



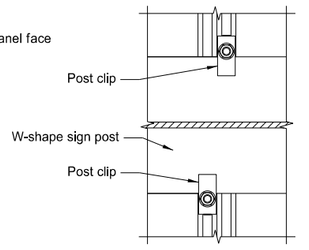

Keeper Plate




Stiffener Plate

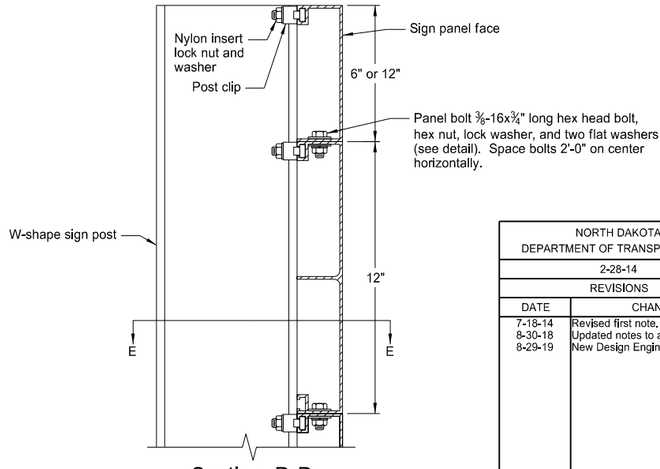



Section E-E

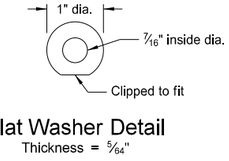



Section F-F

Install post clips on both sides of each post at each panel joint indicated.




Section D-D




Flat Washer Detail
Thickness = 5/64"

| W-Shape Post and Pile Size | Base Connection Dimensions | | | | | | | | | | Fuse and Hinge Plate Dimensions | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Bolt Size and Torque | A | B | C | D | E | $t_1$ | $t_2$ | W | R | G | H | J | K | L | M | $d_1$ | $d_2$ | $t_3$ | Bolt dia. |
| W4x13 | ¾" ø x 3½" Torque = 600 in-lb | 6" | 2½" | 1½" | 3½" | 1¼" | 1" | ½" | ¼" | 13/32" | 2" | 1¼" | 4" | 2¼" | ⅞" | 1" | 11/16" | ¾" | ⅜" | ⅝" |
| W5x16 | ¾" ø x 3½" Torque = 600 in-lb | 6" | 2½" | 1½" | 3½" | 1¼" | 1" | ½" | ¼" | 13/32" | 2½" | 1¼" | 5" | 2¾" | 1⅛" | 1⅛" | 13/16" | ⅞" | ⅜" | ¾" |
| W6x20 | ⅞" ø x 4¼" Torque = 800 in-lb | 8" | 3" | 1¾" | 4" | 2" | 1¼" | ½" | ¼" | 15/32" | 2½" | 1¼" | 6" | 3½" | 1¼" | 1⅜" | 13/16" | 1⅛" | ⅜" | ¾" |
| W8x24 | ⅞" ø x 4¼" Torque = 800 in-lb | 8" | 3" | 1¾" | 4" | 2" | 1¼" | ½" | ¼" | 15/32" | 2½" | 1½" | 6½" | 3½" | 1½" | 1½" | 15/16" | 1¼" | ½" | ⅞" |
| W8x28 | 1" ø x 5" Torque = 1000 in-lb | 8" | 3" | 2" | 4" | 2" | 1½" | ¾" | 5/16" | 17/32" | 2½" | 1½" | 6½" | 3½" | 1½" | 1⅝" | 1⅛" | 1⅛" | ½" | 1" |
| W8x31 | 1⅛" ø x 5" Torque = 1200 in-lb | 9" | 3½" | 2" | 5" | 2" | 1½" | ¾" | 5/16" | 19/32" | 3" | 1¾" | 8" | 5½" | 1¼" | 2" | 1⅛" | 1½" | ½" | 1" |
| W10x39 | 1⅛" ø x 5" Torque = 1200 in-lb | 9" | 3½" | 2" | 5" | 2" | 1½" | ¾" | 5/16" | 19/32" | 3" | 1¾" | 8" | 5½" | 1¼" | 1⅞" | 1⅜" | 1⅜" | ½" | 1⅛" |

| NORTH DAKOTA DEPARTMENT OF TRANSPORTATION | |
|---|---|
| 2-28-14 | |
| REVISIONS | |
| DATE | CHANGE |
| 7-18-14 | Revised first note. |
| 8-30-18 | Updated notes to active voice. |
| 8-29-19 | New Design Engineer PE Stamp. |

This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 8/29/19 and the original document is stored at the North Dakota Department of Transportation