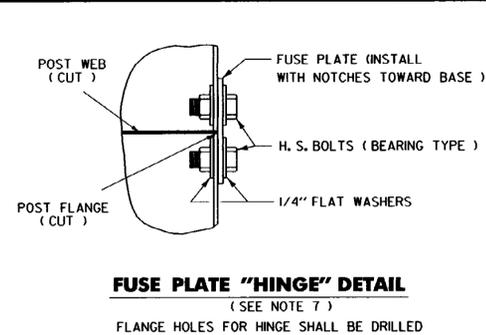


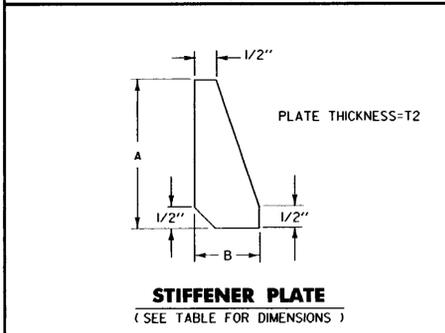
SLIP BASE DETAIL (ELEVATION)



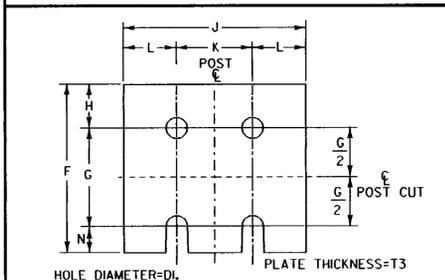
FUSE PLATE "HINGE" DETAIL (SEE NOTE 7)
FLANGE HOLES FOR HINGE SHALL BE DRILLED

POST SIZE	BOLT SIZE	BASE CONNECTION DATA TABLE										FUSE PLATE DATA TABLE							FOUNDATION DATA						
		A	B	C	D	E	T1	T2	W	R	F	G	H	J	K	L	N	DI	T3	BOLT DIA.	BASE DIA.	BASE DEPTH	MIN. STUB LENGTH	STUB PROJ.	VOLUME OF SINGLE BASE
W6X9																									
W6X12	5/8" Ø x 3 1/2"	5"	2"	1 1/4"	2 3/4"	1 1/8"	3/4"	1/2"	1/4"	1/2"	3 3/8"	2"	1 1/8"	4"	2 1/4"	7/8"	1/2"	3/8"	1/4"	1/2"	24"	6'-0"	3'-0"	2 1/2"	0.70 C.Y.
W6X15																									
W8X18																									
W8X21																									
W10X22	3/4" Ø x 4 1/2"	6"	2 1/4"	1 3/8"	3 1/2"	1 1/4"	1"	3/4"	5/8"	1/2"	5 1/4"	3"	1 1/2"	5 3/4"	2 3/4"	1 1/2"	3/4"	1/2"	1/2"	30"	6'-6"	3'-0"	2 1/2"	1.2 C.Y.	
W10X26																									
W12X30																									

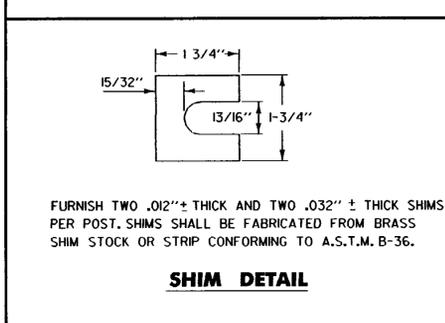
• 5/8" BOLTS SHALL HAVE A MINIMUM THREAD LENGTH OF 2 INCHES
 ** 3/4" BOLTS SHALL HAVE A MINIMUM THREAD LENGTH OF 2 1/4 INCHES THESE BOLTS SHALL BE FURNISHED WITH TWO NUTS FOR EACH BOLT.



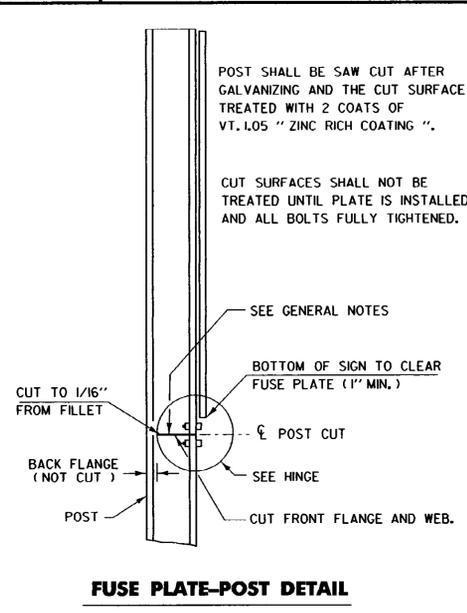
STIFFENER PLATE (SEE TABLE FOR DIMENSIONS)



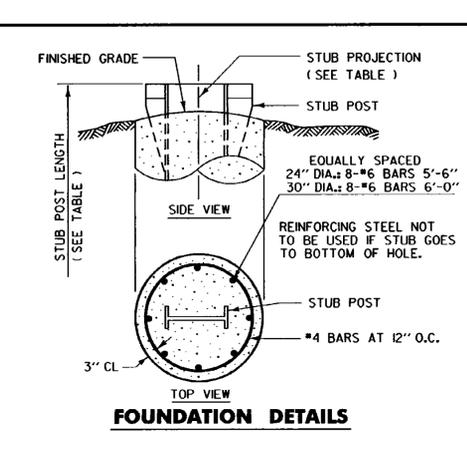
FUSE PLATE (SEE TABLE FOR DIMENSIONS)



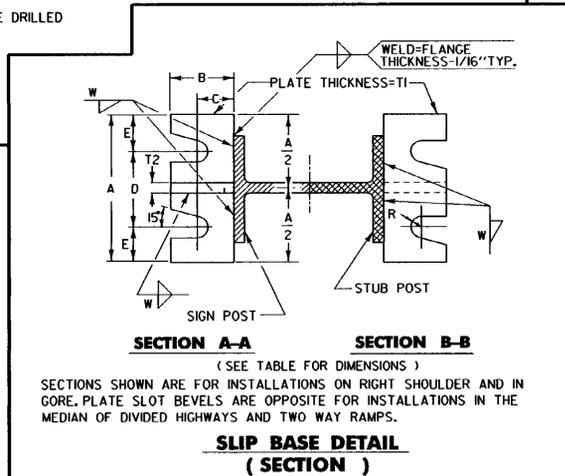
SHIM DETAIL



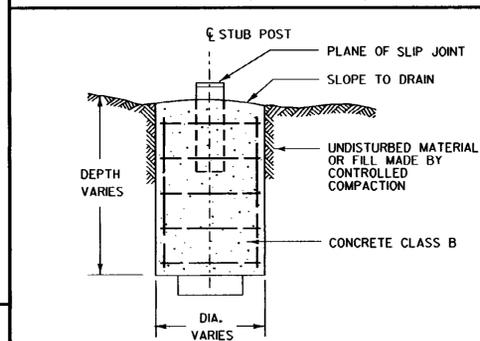
FUSE PLATE-POST DETAIL



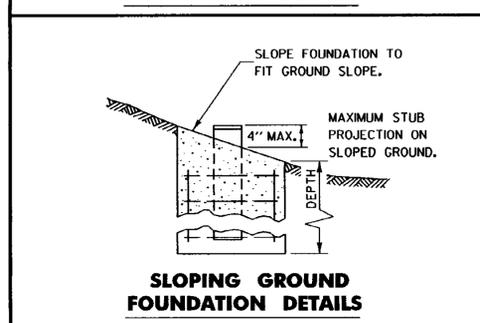
FOUNDATION DETAILS



SLIP BASE DETAIL (SECTION)



FLAT GROUND FOUNDATION DETAILS



SLOPING GROUND FOUNDATION DETAILS

1. MAKE SURE ALL BOLTS ARE FROM THE SAME STOCK.
2. TRY NUTS ON BOLT THREADS MAKING SURE THEY TURN EASILY.
3. PLACE (3) BOLTS IN 'SKIDMORE - WILHELM' DEVICE. TORQUE TO PROPER TENSION IN DEVICE. CALIBRATE TORQUE WRENCH BY CHECKING ON THESE THREE BOLTS WHEN UNDER PROPER TENSION IN DEVICE.
4. USE THE AVERAGE OF THE THREE TORQUES ON SIMILAR BOLTS IN THE REAL SUPPORT.
5. ASSEMBLE POSTS TO STUB WITH BOLTS AND WITH THREE 1/4" FLAT WASHERS. (ONE EACH: UNDER HEAD OF BOLT, BETWEEN PLATES, AND UNDER NUT.)
6. SHIM AS REQUIRED TO PLUMB POST.
7. TIGHTEN ALL BOLTS THE MAXIMUM POSSIBLE WITH A 12" TO 15" WRENCH TO BED WASHERS AND SHIMS AND TO CLEAN BOLT THREADS, THEN LOOSEN EACH BOLT IN TURN AND RETIGHTEN IN A SYSTEMATIC ORDER TO THE PRESCRIBED TENSION.
8. THE BASE PLATE BOLTS WILL BE TORQUED TO PRESCRIBED BOLT TENSION SHOWN BELOW. AFTER THE INITIAL TORQUING USE A SECOND NUT TO INSURE THAT THE FIRST NUT WILL NOT BACK OFF. THE CONTRACTOR WITH THE AGENCY INSPECTOR WILL RETURN TO THE SIGN TWO MORE TIMES AT INTERVALS OF 30 DAYS FOR THE PURPOSE OF CHECKING AND RE-ESTABLISHING THE PRESCRIBED TORQUE. THE SECOND NUT SHALL REMAIN AS A LOCK NUT.
9. THE 'SKIDMORE - WILHELM' DEVICE IS AVAILABLE THROUGH THE V.A.O.T. CONSTRUCTION DIVISION.

PROCEDURE FOR ASSEMBLY OF BASE CONNECTION

POST SPACING

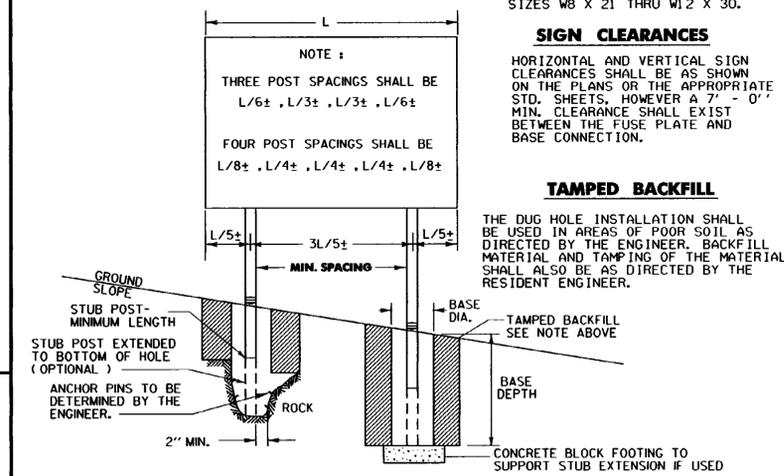
3' - 2' MINIMUM FOR POST SIZES W6 X 9 THRU W8 X 18
 7' - 0' MINIMUM FOR POST SIZES W8 X 21 THRU W12 X 30.

SIGN CLEARANCES

HORIZONTAL AND VERTICAL SIGN CLEARANCES SHALL BE AS SHOWN ON THE PLANS OR THE APPROPRIATE STANDARD SHEETS. HOWEVER A 7' - 0' MIN. CLEARANCE SHALL EXIST BETWEEN THE FUSE PLATE AND BASE CONNECTION.

TAMPED BACKFILL

THE DUG HOLE INSTALLATION SHALL BE USED IN AREAS OF POOR SOIL AS DIRECTED BY THE ENGINEER. BACKFILL MATERIAL AND TAMPING OF THE MATERIAL SHALL ALSO BE AS DIRECTED BY THE RESIDENT ENGINEER.



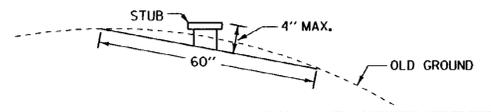
CONSTRUCTION METHOD

HOLES FOR POST FOOTINGS MAY BE AUGERED OR DUG. THE HOLES MAY BE LEFT WITH EARTH SIDES. IF THE MATERIAL IS FIRM AND ALL DISTURBED SOIL AROUND THE CIRCUMFERENCE OF THE AUGERED HOLE IS REMOVED. IF NOT, A SUITABLE FORM APPROVED BY THE ENGINEER SHALL BE USED. CORRUGATED METAL CULVERT PIPE OR PAPER FORMS MANUFACTURED FOR USE AS CONCRETE COLUMN FORMS WILL BE ACCEPTABLE. IF THE STUB IS EXTENDED TO THE BOTTOM OF THE HOLE, A CONCRETE BLOCK FOOTING SHALL BE UTILIZED TO SUPPORT THE POST AND THE POST SHALL BE HELD SECURELY IN PLACE AT THE BOTTOM. THIS MAY BE DONE BY EMBEDDING THE POST AND CONCRETE BLOCK FOOTING IN WET CONCRETE AND ALLOWING TO SET WITH THE POST SECURED IN POSITION, PLUMBED AND PROPERLY BRACED. THE REMAINING FOOTING MAY BE POURED. THE TIME BETWEEN POURS FOR THE CURING OF THE CONCRETE SHALL BE AS DETERMINED BY THE ENGINEER. NO PART OF THE FORM SHALL SHOW ABOVE THE GROUND LINE WHEN THE WORK IS COMPLETED.

GENERAL NOTES

1. DESIGN CONFORMS WITH AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES, AND TRAFFIC SIGNALS.
2. MATERIAL AND FABRICATION SHALL CONFORM TO THE REQUIREMENTS OF THE STATE OF VERMONT AGENCY OF TRANSPORTATION STANDARD SHEETS AND SPECIFICATIONS.
3. THE POST CUT SHALL BE A SAW CUT ONLY. ALL OTHER CUTS EXCLUDING POST CUTS MAY BE FLAME CUT PROVIDED ALL EDGES ARE GROUND SMOOTH. METAL PROJECTING BEYOND THE PLATE FACE WILL NOT BE PERMITTED. ALL POST HOLES SHALL BE DRILLED.
4. ALL SAW CUTS SHALL BE PAINTED WITH AN APPROVED COATING.
5. EXTREME CARE SHOULD BE TAKEN TO KEEP THE SLIP JOINT FREE OF ANY FOREIGN MATERIAL, EITHER BY WRAPPING THE JOINT OR THOROUGH CLEANING IMMEDIATELY AFTER POURING OF CONCRETE.
6. ALL FUSE PLATE BOLTS SHALL BE TIGHTENED BY THE FABRICATOR TO THE PRESCRIBED BOLT TENSION. THE CONTRACTOR WILL BE HELD RESPONSIBLE TO CHECK AND CERTIFY THAT THE REQUIRED TENSIONS ARE OBTAINED.
7. THE TOTAL WEIGHT OF TWO (2) POSTS WITH 3' - 2' SPACING OR A SINGLE POST OF A TWO (2) POSTS INSTALLATION WITH 7' - 0' SPACING SHALL NOT EXCEED 600 POUNDS BELOW THE FUSE PLATE.
8. THE AMOUNT OF TORQUE NECESSARY TO ACHIEVE THE PROPER BOLT TENSION FOR BOTH THE 'FUSE PLATE' AND THE 'SLIP BASE' SHALL BE DETERMINED BY USE OF A SUITABLE TORQUE WRENCH CALIBRATED IN A 'SKIDMORE-WILHELM' DEVICE. THE PROCEDURE FOR CALIBRATING THE WRENCH IS OUTLINED IN THE 'PROCEDURE FOR ASSEMBLY OF BASE CONNECTION' ON THIS SHEET.
9. DUE TO THE VARIABILITY OF THE GALVANIZATION ON THE BOLTS, NUTS, AND WASHERS, ETC., NO FORMULA OR TABLES SHALL BE USED TO CALCULATE THE REQUIRED CONVERSION FROM BOLT TENSION TO APPLIED TORQUE, UNLESS APPROVED BY TRAFFIC AND SAFETY DIVISION.
10. THE INSPECTION OF THE 'FUSE PLATE BOLTS' SHALL BE AS OUTLINED IN THE MOST RECENT EDITION OF AASHTO 'STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES', SECTION 11.5.6 'CONNECTIONS USING HIGH STRENGTH BOLTS'.
11. INSPECTION OF THE 'SLIP BASE BOLTS' SHALL BE AS FOLLOWS: USING A TORQUE WRENCH WHICH HAS BEEN CALIBRATED IN THE 'SKIDMORE-WILHELM' DEVICE WITH THREE BOLTS OF THE SAME GRADE, SIZE AND CONDITION AS THOSE UNDER INSPECTION. THE INSPECTOR SHALL SET THE WRENCH FOR MAXIMUM SETTING SHOWN BELOW FOR 'SLIP BASE BOLTS' AND TEST ALL 'SLIP BASE BOLTS' IN EACH ASSEMBLY.
 - A) IF THE BOLT BEING TESTED TURNS MORE THAN 5 UPON APPLICATION OF THE WRENCH SET TO THE MAXIMUM, THE INSPECTOR SHALL SET THE WRENCH TO THE MINIMUM AND RETEST THE BOLT. IF THE BOLT TURNS LESS THAN 5 UPON APPLICATION OF THE WRENCH SET TO MINIMUM, IT SHALL BE CONSIDERED ACCEPTABLE. IF THE BOLT TURNS MORE THAN 5 UPON APPLICATION OF THE WRENCH SET TO MINIMUM, IT SHALL BE TIGHTENED AT LEAST TO THE MINIMUM.
 - B) IF THE BOLT BEING TESTED TURNS LESS THAN 5 UPON APPLICATION OF THE WRENCH SET TO MAXIMUM, IT SHALL BE LOOSENED AND RETIGHTENED SO THAT IT FALLS WITHIN THE RANGE SPECIFIED AND REINSPECTED AS OUTLINED ABOVE.
12. SLIP BASE BOLT TENSIONS

BOLT SIZE	MIN. BOLT TENSION	MAX. BOLT TENSION
5/8" DIA.	1740 LBS.	2660 LBS.
3/4" DIA.	2400 LBS.	3660 LBS.
13. ALL DIMENSIONS REFERRING TO STUB HEIGHT IN THE VARIOUS TABLES AND FOUNDATION DETAILS SHALL BE ADJUSTED AS REQUIRED TO RESULT IN A TOTAL STUB HEIGHT WHICH IS NOT MORE THAN FOUR INCHES ABOVE A 60-INCH CHORD ALIGNED RADIALLY TO THE CENTERLINE OF THE HIGHWAY AND CONNECTING ANY POINT, WITHIN THE LENGTH OF THE CHORD, ON THE GROUND SURFACE ON ONE SIDE OF THE SUPPORT TO A POINT ON THE GROUND SURFACE ON THE OTHER SIDE.



OTHER STDS. REQUIRED:

REVISIONS AND CORRECTIONS

- SEPT. 10, 1987 - DATE OF ORIGINAL ISSUE
- MAR. 21, 1988 - FHWA COMMENTS
- JUNE 21, 1989 - FHWA - CHANGE TO 7' FUSE PLATE CLEARANCE
- OCT. 21, 1992 - REVISED NOTES AND POST SPACING REQUIREMENTS
- AUG. 18, 1995 - REVISED GENERAL NOTE 4

APPROVED FOR THIS PROJECT AND/OR DESIGN IMPLEMENTATION. FHWA FINAL APPROVAL PENDING.

APPROVED

Gordon B. MacArthur
DIRECTOR OF ENGINEERING

 David O. Ross
TRAFFIC AND SAFETY ENGINEER

W-SHAPED STEEL SIGN POST

/traf/std/stdel6l.dgn : stdel6l



STANDARD E-161