U.S. Department
Of Transportation
Federal Highway
Administration

400 Seventh St., S.W.
Washington, D.C. 20590

April 20, 1993

Refer to: HNG-14/SS-34

Norval P. Knapp, P.E.
Bridge Design Engineer
Louisiana Department of Transportation and Development
P.O. Box 94245
Baton Rouge, Louisiana 70804-9245

Dear Mr. Knapp:

Thank you for your March 19 letter to James H. Hatton, Jr., requesting Federal Highway Administration's (FHWA) acceptance of the Louisiana multi-directional single steel post small sign support. Your letter was accompanied by a report dated March 1993, on the crash testing that was conducted to assess the breakaway performance of the sign support system. The full-scale tests, conforming to the guidelines contained in National Cooperative Highway Research Program (NCHRP) Report 350 "Recommended Procedures for the Safety Evaluation of Highway Features" were performed by the Texas Transportation Institute. Although the NCHRP Report 350 has not yet been published, most of the roadside safety community recognizes it as the successor to the current acceptance testing guidelines, NCHRP Report 230.

Acceptance requirements for breakaway supports are found in the 1985 American Association of State Highway and Transportation Officials (AASHTO) "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals." These specifications have been adopted, with minor modifications, by the FHWA.

The Louisiana breakaway base is a horizontal, triangular slip base design. It was tested with an 89-mm (3 ½-in) diameter, schedule 40 steel pipe sign post. The three 16-mm (5/8-in) high strength (A325) bolts were torqued to 25.5 N-m (226 in-lb). Three washers were used with each bolt, one each under the head and the nut of the bolt and one between the slip plates. The base post was mounted in a 450-mm (1-foot, 6-inch) diameter concrete foundation. An illustration of the test article and a detailed drawing of the omni-directional slip base are enclosed.

The test results are summarized here:

Test Number	7222-1	7222-2
Vehicle Mass, kg (weight, lbs)	820 (1808)	820 (1808)
NCHRP 230 Soil Type	S-1 (Strong)	S-1 (Strong)
Impact Sped, km/hr (mph)	35.7 (22.2)	105.3 (65.5)
Velocity Change, m/s (fps)	0.8 (2.5)	1.5 (4.9)
Occupant Impact Velocity	(none)	(none)
Stub Height, mm (in)	75 (3.0)	75 (3.0)

The results of these tests meet the change in velocity and stub height requirements adopted by AASHTO and the FHWA.

Therefore, the tested omni-directional steel slip base described above is acceptable for use on Federal-aid highway projects, within the range of conditions tested, if proposed by Louisiana or any other State. We would caution users of this slip base that both the bevel on the inside diameter of the upper slip plate and the washers separating the slip plates are critical to proper breakaway performance. If either feature is missing the upper slip plate may hit the risers on the lower plate before the bolts have been knocked out of their slots. This would case the base to "lock up" and stop the vehicle.

Our acceptance is limited to the breakaway characteristics of the system and does not cover its structural features. Presumably, your plans and specifications will provide sufficient information on structural design and installation requirements to ensure proper performance.

Sincerely yours,

Lawrence A. Staron, Chief
Federal-Aid and Design Division

Enclosures

Geometric and Roadside Design Acceptance Letter Number SS-34

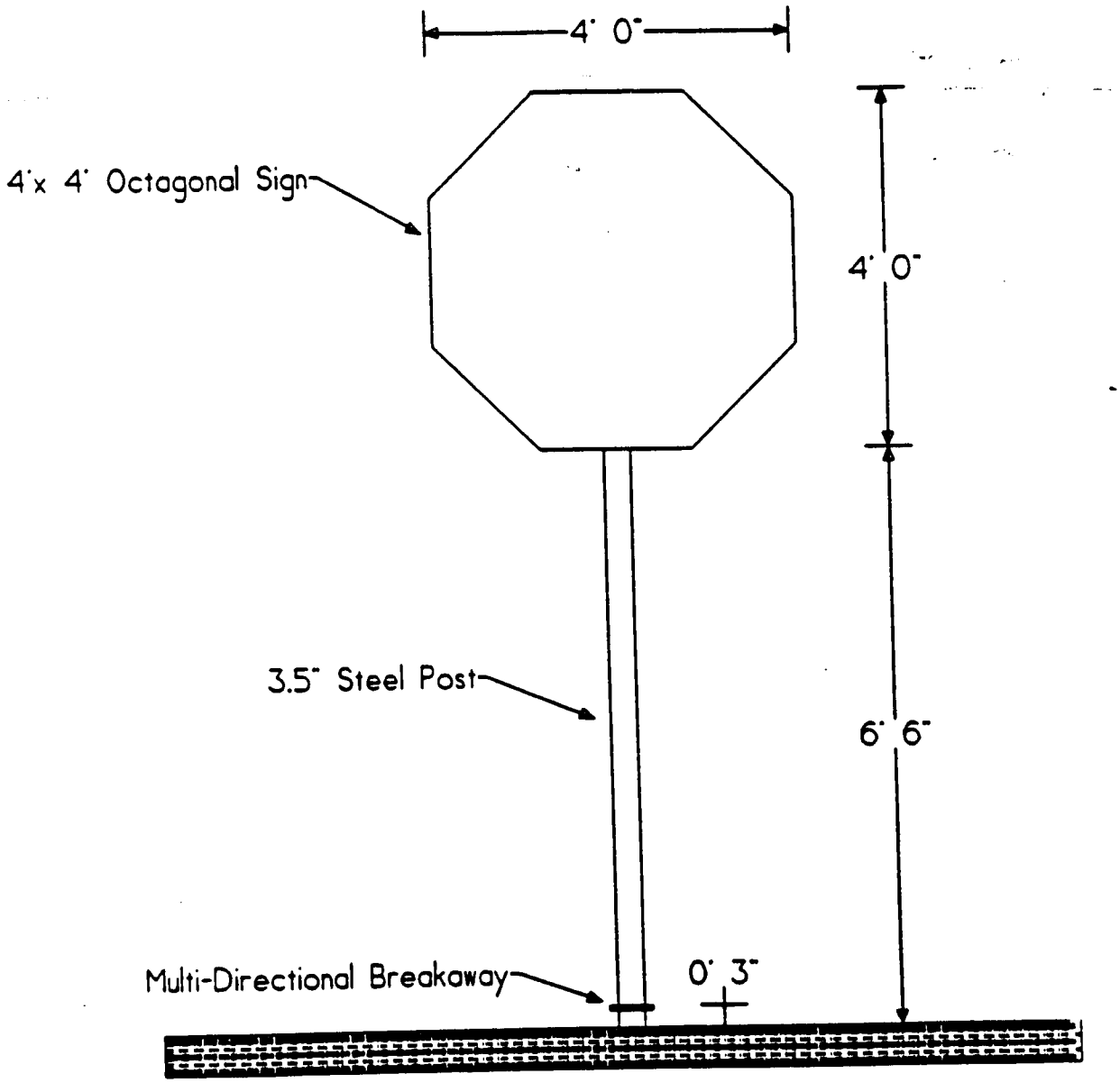
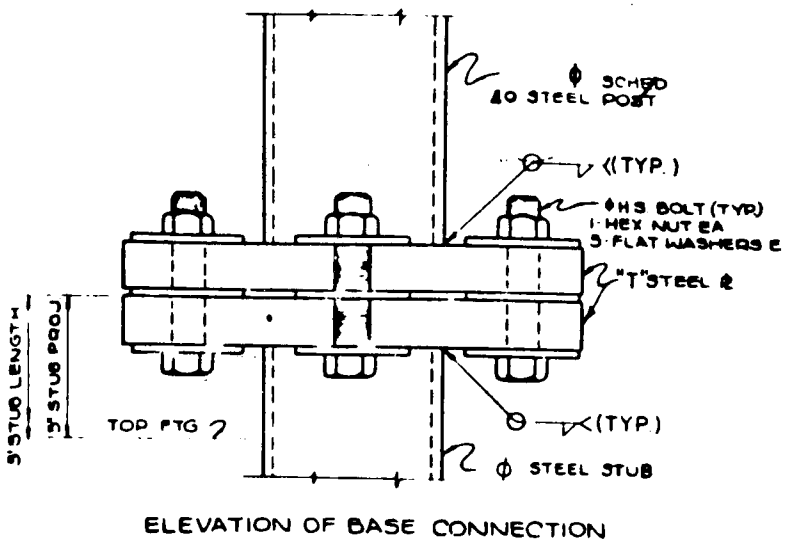
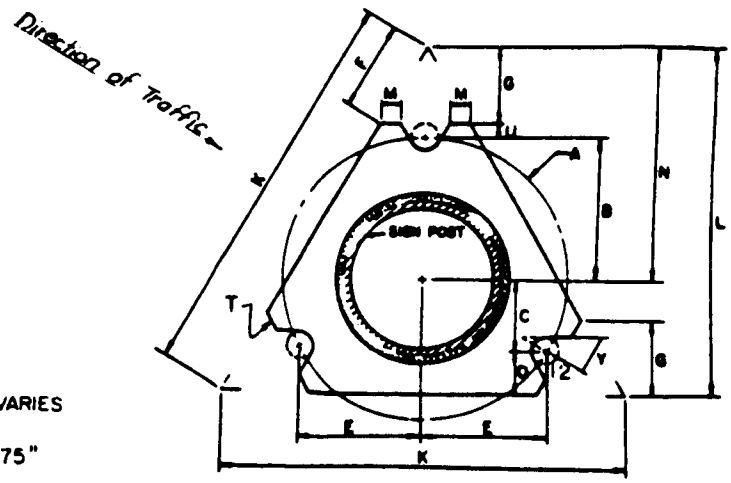
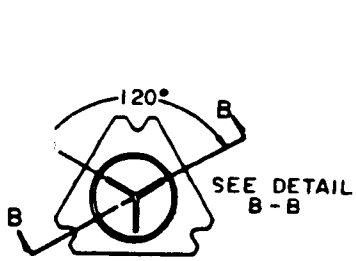


Figure 1. Multi-directional slip base, single steel sign support installation.



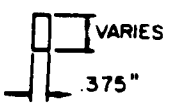
ELEVATION OF BASE CONNECTION





TOP VIEW

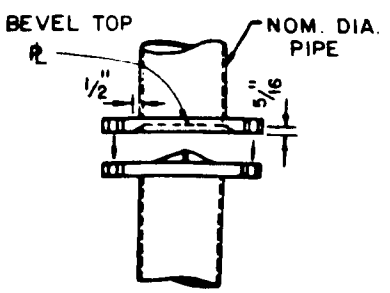
FRONT



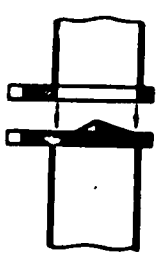
R. SIDE

DETAIL B-B
3 REQ'D

DIMENSIONS NOMINAL PIPE SIZES	BOLT SIZE & TORQUE	WELD SIZE	T	Y	A	B	C	D	E	F	G	K	L	M	U	N
2½" DIA. 3½"	5/8"Φ T=450	3/8"	5/8"	7"	7"	3½"	1¾"	1¼"	3"	2 5/16"	2"	10 3/8"	9"	½"	½"	6"
5" DIA.	¾"Φ T=750	7/16"	7/8"	8 9/16"	9"	4½"	2¼"	1½"	3 7/8"	2 7/8"	2½"	13"	11¼"	3/8"	½"	7½"



FRONT



SECTION B-B

MULTI - DIRECTIONAL BASE
SINGLE STEEL POST ONLY

NOTE:
MULTI-DIRECTIONAL BREAK-AWAY FEATURE IS TO BE USED ONLY AT LOCATIONS WHERE SIGN IS LIKELY TO BE STRUCK FROM MORE THAN ONE COMMON DIRECTION

Figure 2. Details of multi-directional slip base, single steel sign support installation.