U.S. Department
Of Transportation
Federal Highway
Administration

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

March 31, 1989

Refer to: HNG-14/SS-08

Mr. Ellwood Irish
Chief Engineer
Unistrut Corporation
Eisenhower Plaza – Suite 600
777 East Eisenhower Parkway
Ann Arbor, Michigan 48108

Dear Mr. Irish:

This is in response to your February 17 letter to Mr. James H. Hatton requesting Federal Highway Administration (FHWA) acceptance of single and dual support installations of your company's Telespar Highway Sign Posts. You enclosed copies of the report Full-Scale Mini-compact Vehicle Tests on Telespar Sign Supports in Strong and Weak Soil and Addendum dated August 1987, and September 1988, respectively.

The support system consists of perforated square steel tube sign supports inserted into and bolted to larger tubes driven to within approximately 1 ½ inches of the ground surface. Tube sizes and gauges vary depending on sign loading requirements.

Five vehicle crash tests were conducted on 2 ½-inch, 10-gauge square tubes (24H12) by the University of Nebraska (UNL) on single posts. Two additional tests were conducted by UNL on dual posts made of 2-inch, 12-gauge square tubes (20F12).

The test results are summarized below:

Test No.	Post Part No.	Support Number	Car Weight lbs.	Type Soil	Embedment Depth Inches	Car Speed M.P.H.	Change in Speed F.P.S.
1	24H12	Single	1840	Strong	34	20.2	12.8
2	24H12	Single	1840	Strong	34	62.2	11.7
3	24H12	Single	1840	Weak	54	20.2	12.5
4	24H12	Single	1840	Weak	54	60.6	5.1
5	20F12	Dual	1840	Weak	54	20.1	14.8
6	20F12	Dual	1840	Strong	34	20.1	14.0
*	24H12	Single	1800	Weak	34	20.8	12.5

*This test resulted in the base post being pulled from the soil. For the subsequent retest, test number 3, the embedment length was increased to 54 inches. (Per March 20 correspondence from Dr. Edward R. Post, UNL.)

Testing conformed to the recommendations of NCHRP Report 230. All tests met the velocity change criteria of the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, 1985. However, test number 2, in which the sign and post caused significant damage to the test vehicle's roof, requires an additional assessment. The NCHRP Report 230 does not define an unacceptable level of occupant compartment intrusion. We have judged the results of test number 2 as marginal, but not sufficient to deny acceptance of the system.

The steel used in the tested posts was ASTM Specification A446, Grade A, Designation G-90, which you use for fabricating galvanized posts. Your "Permagreen" finish posts are fabricated from ASTM Specification A570, Grade 33 steel. Which we conclude will have breakaway characteristics comparable to the tested materials.

Based on the above information, we conclude that the tested system, as well as the system using A570 steel, meets the breakaway requirements of both the 1975 and the 1985 editions of the American Association of State Highway and Transportation Officials (AASHTO) "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals." Therefore, the system is acceptable for use on Federal-aid highway projects within the range shown below for both strong and weak soils, if proposed by a State.

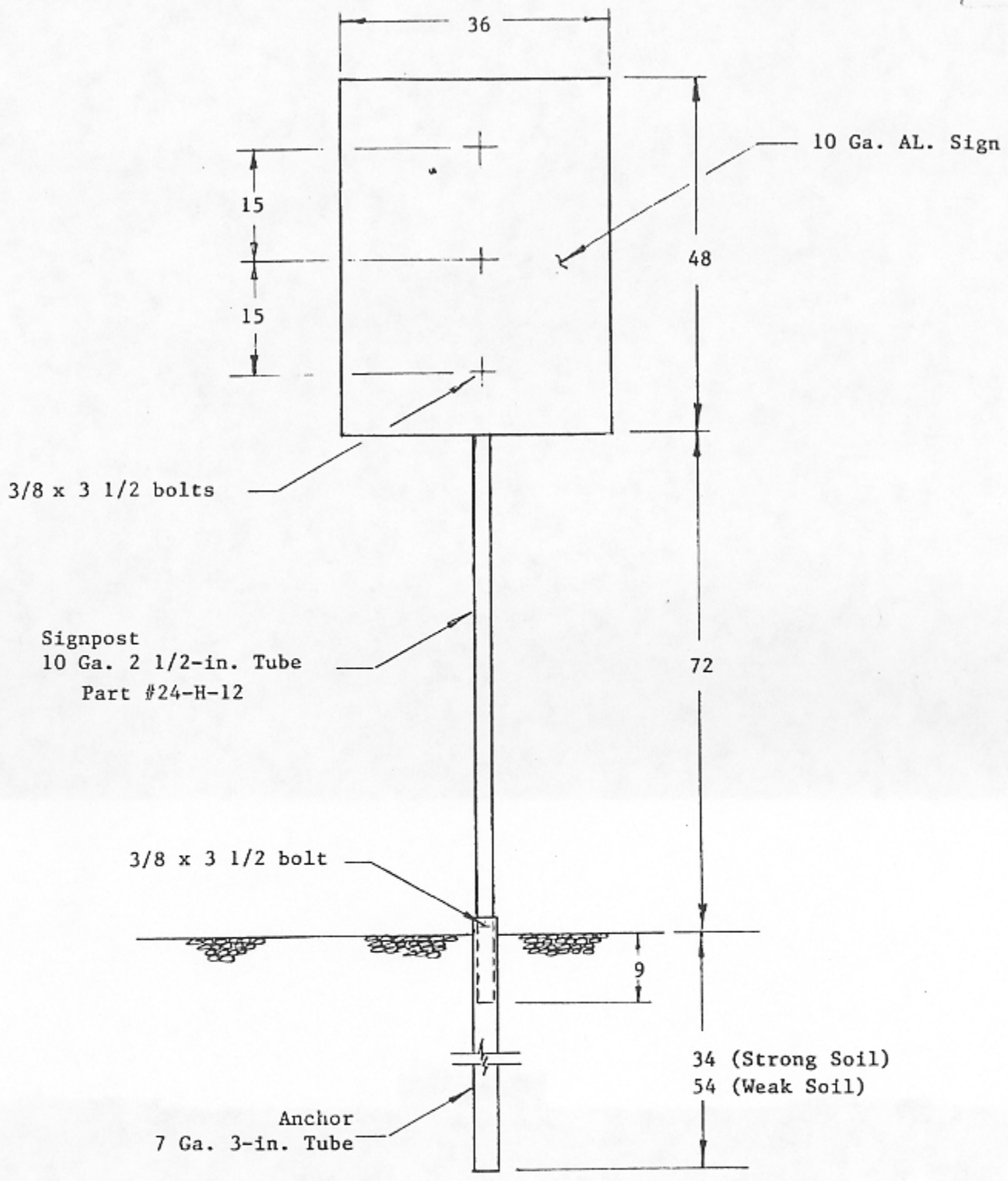
Post No.	Size Inches	Gauge	Number Permitted Within 7-foot Path
24H12	2 ½	10	1
21H12	2 3/16	10	1
24F12	2 ½	12	1
22F12	2 ¼	12	1
20F12	2	12	2
16F12	1 ¾	12	2
14F12	1 ½	12	2

This acceptance is limited to breakaway characteristics of the system described above and does not cover its structural features. Presumably, Unistrut Corporation will supply potential users with sufficient information on structural design and installation requirements to ensure proper support performance.

We anticipate that the States will require certification from Unistrut Corporation that materials furnished have chemistries, mechanical properties, and geometries consistent with materials used in the tests and that the supports made from the materials will meet the breakaway requirements of the AASHTO specifications.

Sincerely yours,

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



SCALE: 1.0 in. = 20.0 in.

Figure 5

SIGNPOST INSTALLATION DETAILS