



U.S. Department
Of Transportation
**Federal Highway
Administration**

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

January 18, 1994

Refer to: HNG-14/SS-43

Mr. Gerald S. Rice
President
VSAR Systems of Atlanta, Inc.
2351 Hembree Drive, NE.
Marietta, Georgia 30062

Dear Mr. Rice:

Thank you for your November 18, 1993, letter to Mr. William A. Weseman requesting Federal Highway Administration's (FHWA) acceptance of your company's Speed-E-Rect breakaway device for U-channel sign supports. You included a Texas Transportation Institute (TTI) report Crash Testing and Evaluation of Multi-Directional U-Channel Sign Posts dated October 1993, films and video of the testing, and further correspondence from TTI.

The full-scale crash testing was conducted to assess the breakaway performance of the Speed-E-Rect with U-channel small sign supports. The 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 guidelines established in the National Cooperative Highway Research Program (NCHRP) Report 350 were used to conduct and analyze results of the tests.

The device consists of two 203-mm sections of u-shaped channel (cold rolled by VSAR Systems, ASTM A569-B steel) connected by a 102-mm long, 38-mm diameter steel D.O.M. (seamless) pipe (ASTM A513 Type 5, 4.0-mm thick wall) welded into the valley of the u-shape. The ends of the u-shapes are separated by a 25-mm gap. The pipe is weakened in the middle with a 0.9-mm deep v-groove around the circumference and a 9.5-mm diameter hole drilled through both walls. Pendulum testing show that the holes drilled at right angles to the direction on head-on hits, are necessary to ensure fracture when the support is hit on the side. The device is shown in the enclosed drawing number MMBBS.

The full-scale crash tests were conducted using a 900-mm Marion Steel Company 4.5-kg/m U-channel anchor post in standard soil, the Speed-E-Rect assembly (using four 7.94-mm, grade 5 bolts), and a Marion u-channel sign post. The distance to the bottom of the sign panel was 2130 mm. A summary of the crash tests is presented below:

Test Number	404931-4	404931-5
Vehicle Mass	820 kg	820 kg
Impact Speed	34.2 km/h	100.00 km/h
Soil Type	Standard ("strong")	Standard ("strong")
Vehicle Velocity Change	1.3 m/s	1.7 m/s
Occupant Impact Speed	0.9 m/s	0.8 m/s
Stub Height	<100 mm	<100 mm

The results of these tests meet the change-in velocity and stub-height requirements adopted by the FHWA. The Speed-E-Rect is therefore acceptable for use on projects on the National Highway Systems, within the range of conditions tested, if proposed by a State. Because the device was only tested with supports mounted in "standard" soil, supports using this device should not be used in "weak" soil (per NCHRP Report 230 specification) without further testing.

We concur in the assessment by Dean Alberson of TTI that the Speed-E-Rect will work with Franklin Steel U-Channel posts. It must be noted that the device must nest snugly in the valley of the U-channel post. The Speed-E-Rect was designed for use with Marion Steel posts, and a spacer is required when used with Franklin Steel posts. In either case, the bolts are drawn tight to assure that the device nests with the sign support and stub.

Our acceptance is limited to the breakaway characteristics of the couplings and does not cover the structural features. Presumably, you will supply potential users with sufficient information on structural design and installation requirements to ensure proper performance. We anticipate that the States will require certification from VSAR systems that the hardware furnished has essentially the same chemistry, mechanical properties, and geometry as that used in the tests and that it will meet the FHWA change in velocity requirements.

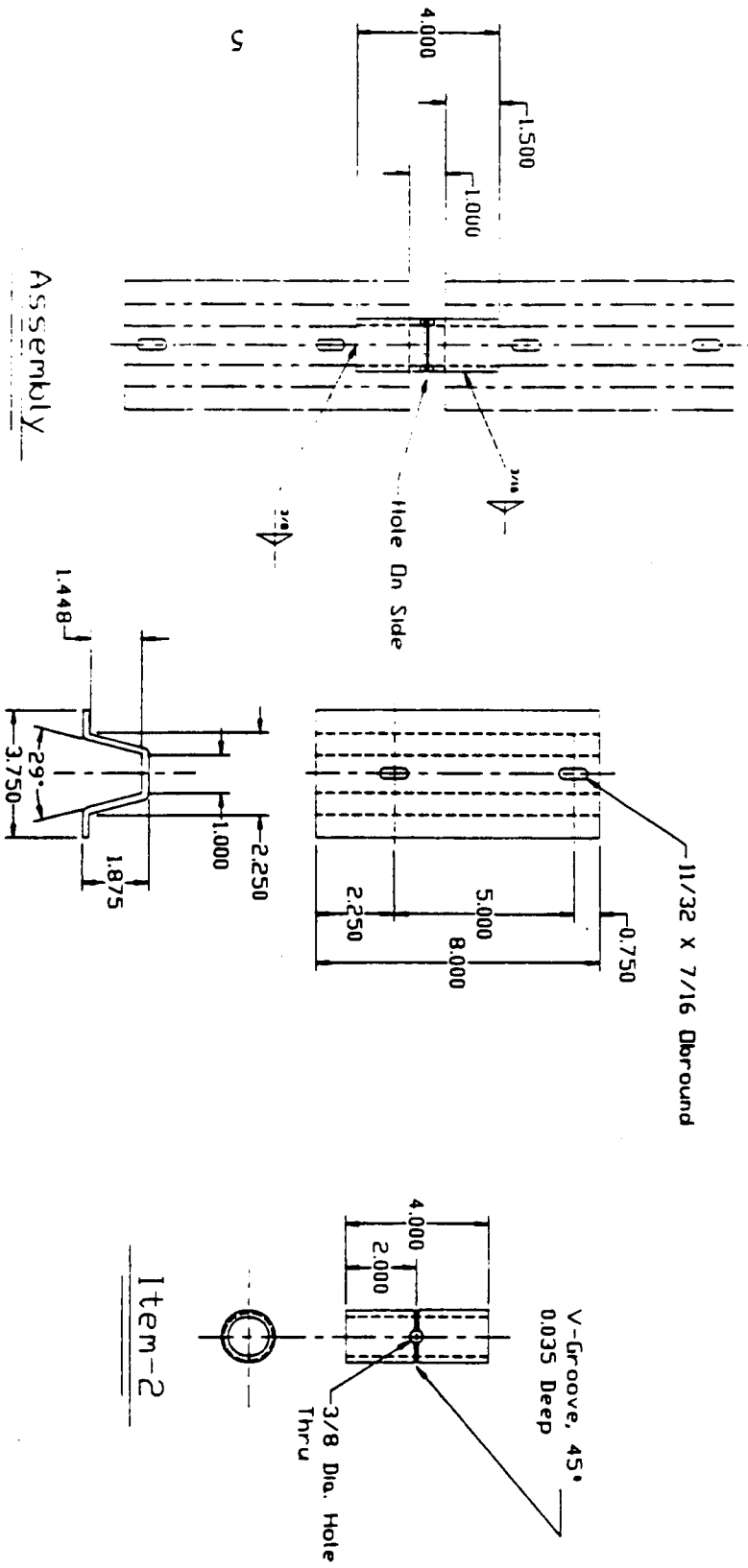
We assume that the Speed-E-Rect breakaway device is proprietary. To be used in Federal-aid projects on the NHS proprietary devices they: (a) must be supplied through competitive bidding with equally suitable unpatented items; (b) the highway agency would must certify that they are essential for synchronization with existing highway facilities or that no equally suitable alternate exists; or (c) they must be used for research or for a distinctive type of construction on relatively short sections of road for experimental purposes. Our regulations concerning proprietary products are contained in Title 23, Code of Federal Regulations, Section 635.411, a copy of which is enclosed.

Sincerely yours,

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

2 Enclosures

Geometric and Roadside Design Acceptance Letter No. SS-43



- ① 6 3/32 x 8.00 x 8.00 (ASTM A569-B)
(2)-Req'd.
- ② 1.500 x 0.156 x 4.00
D.T.M. like (ASTM A513 Type 5)

Note:
1.Finish-Galvanized.
(ASTM A123)

Tie Down Engineering
VSAR Stud
10-14-92
Drawing No. MMBBS

Figure 2. Detail of splice connection.