



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

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

January 29, 1987

Refer to: HNG-14/SS-04

Mr. Albert M. Moreno, Sr.
Chairman of the Board
Minute Man Anchors, Inc.
305 West Walker Street
East Flat Rock, North Carolina 28726

Dear Mr. Moreno:

This is in response to your December 2 and 15, 1986, letters requesting Federal Highway Administration (FHWA) acceptance of the Minute Man breakaway device for use with steel flanged channel sign supports on Federal-aid highway projects. You also enclosed an Enesco, Inc. report of November 1986 containing full-scale crash test information and a VHS film of the crash tests.

The breakaway device consists of two halves. In each half, a short length of U-channel is welded to a 1 1/2-inch diameter cylinder that has a hex-hole through its center. A bolt (shear pin) with a hexagonal cross section body, notched at a distance from the bolt head equal the depth of one of the cylinders, joins the two halves of the device. A bolt through the U-channel, and welded to it, along with a U-bolt that clamps a 3/8-inches wire-rope tether connecting the above and below ground sections on the support, attaches a half of the device to its associated above or below ground portion of the steel flanged channel sign support.

For the tests, two sections of 3 lb./ft., flanged channel steel post were used. The bottom section was 48 inches long and was driven 46 inches into the ground. The top section was 102 1/2 inches long and was attached to the bottom section by the breakaway device.

Two full-scale tests were conducted with a 1,805-pound vehicle; one at 20.0 m.p.h. and the second at 60.4 m.p.h. Reported tests results using a weighted average of accelerometer, film, and speed trap data indicate a change of velocity of 6.2 feet/second and 2.8 feet/second, respectively. These translate to a change of momentum of 348 pounds/seconds and 157 pound/seconds respectively. The reported stub heights were 3.25 inches and 4.0 inches, respectively. On the basis of this data we conclude that the tested system 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 of conditions tested, if proposed by a State. Actually, compliance with the 1985 specification is now an FHWA requirement. However, the FHWA has initiated rulemaking activity to consider adopting this new (1985) AASHTO specification for application on Federal-aid highway projects.

We have also determined that two posts equipped with the tested Minute Man breakaway device may be allowed within an 8-foot vehicle path. It is noted the system was only tested in the S-1 (strong) soil described in the NCHRP 230. If you desire to use this system in soil equivalent to the S-2 (weak) soil described in NCHRP 230, we recommend additional tests be conducted in that soil type.

This acceptance is limited to breakaway characteristics of the system described above and does not cover its structural features. Presumably, Minute Man Anchors, Inc. will supply potential users with sufficient information on structural design and installation requirements to ensure proper support performance. It is noted that the wind load analysis you had prepared indicated that for an 80-m.p.h wind speed the maximum sign size is 3.5 square feet. It appears this may serve under certain conditions as a limiting factor on use of this sign support system

We anticipate that the States will require certification from Minute Man anchors, Inc., that materials furnished have essentially the same chemistry, mechanical properties, and geometry as the materials used in the tests and that the support will meet the requirements of the AASHTO specification.

Per your request, we are returning the original copy of the test results.

Sincerely yours,

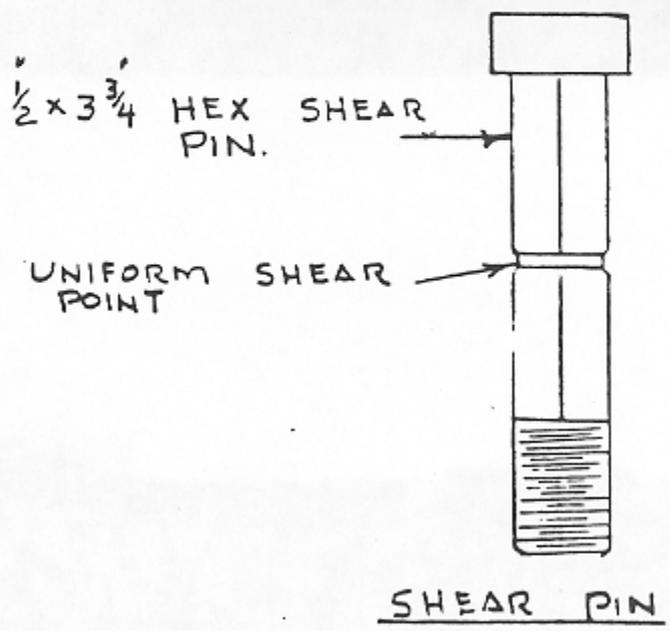
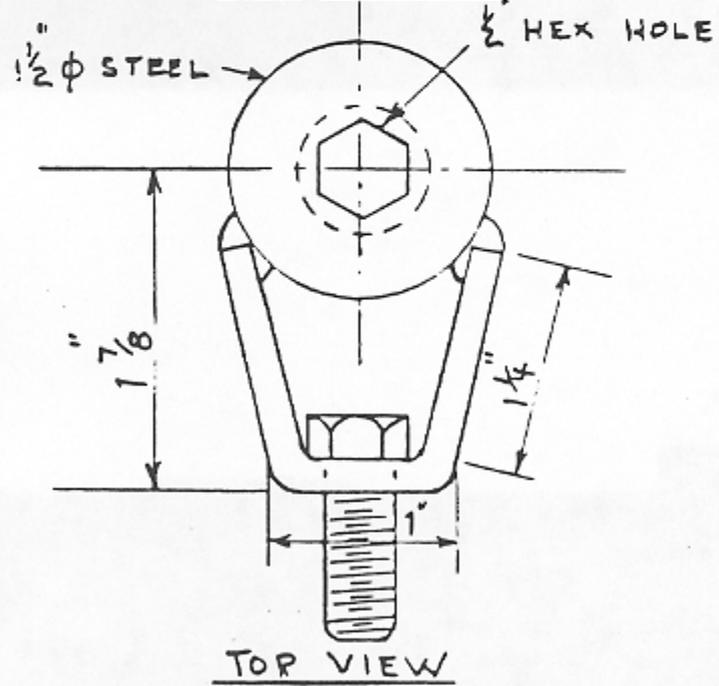
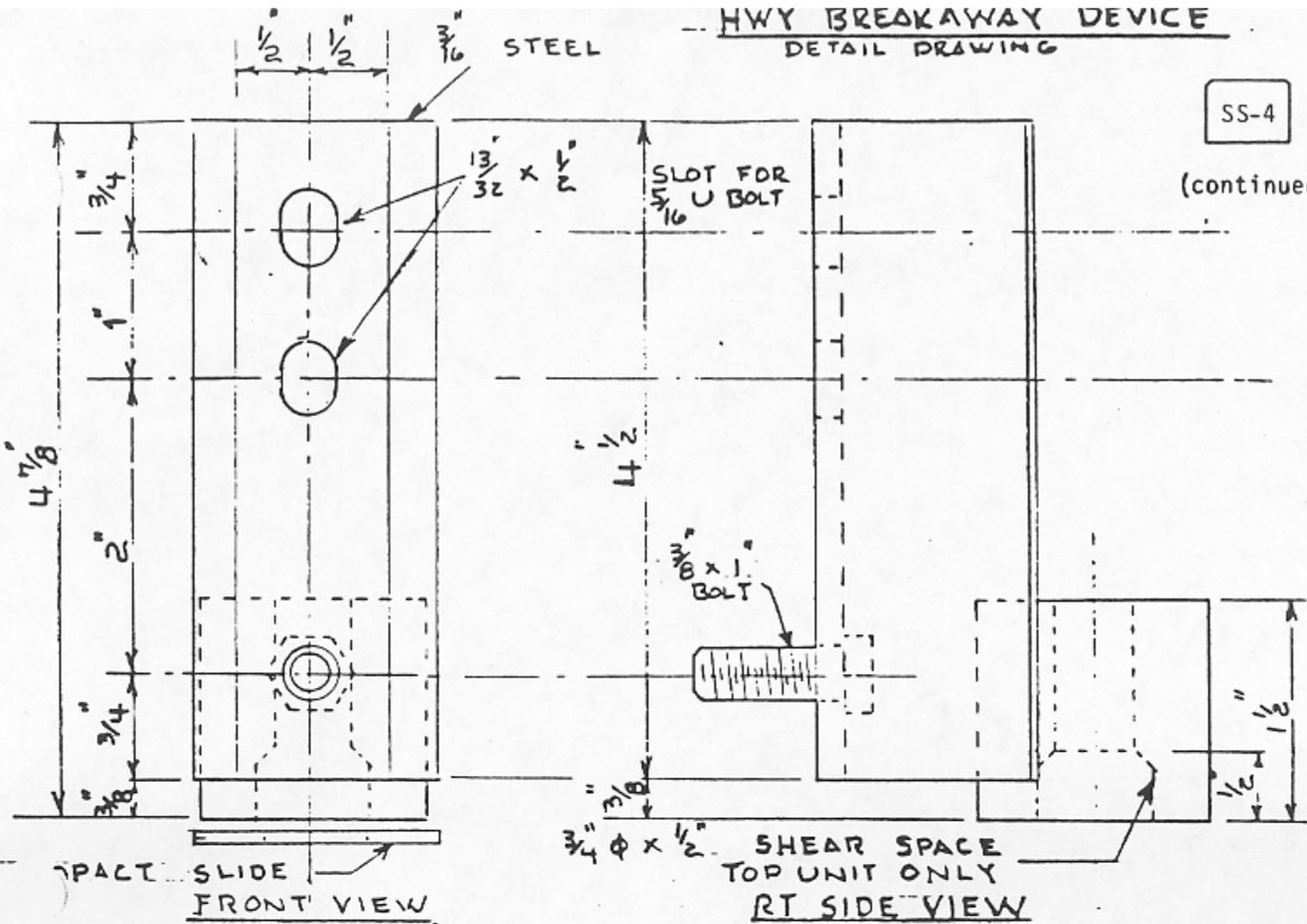
L. A. Staron, Chief
Federal-Aid and Design Division

Enclosure

**HWY BREAKAWAY DEVICE
DETAIL DRAWING**

SS-4

(continued)



MINUTE MAN ANCHORS
 05 W. WALKER ST
 EAST FLAT ROCK NC. 28726
 PAT PENDING
 1-7-87

NOTE:
 BREAKAWAY DEVICE CONSIST OF ONE TOP & ONE BOTTOM UNIT BOLTED TOGETHER WITH SHEAR PIN. $\frac{5}{16}$ " SAFETY CABLE WILL RESTRAIN POST