



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

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

June 19, 1990

Refer to: HNG-14/SS-18

Mr. Albert M. Moreno, Jr.
President
Minute Man Breakaway, Inc.
Number One Moreno Place
East Flat Rock, North Carolina 28726

Dear Mr. Moreno:

Thank you for your April 4 letter to Mr. L. A. Staron requesting Federal Highway Administration (FHWA) acceptance of your company's MMB-1HD breakaway couplings when used in dual post installations. Our December 29, 1989, letter accepted the MMB-1HD for use with single posts or where posts were placed further than 7 feet apart. Your latest letter transmitted a copy of the Southwest Research Institute (SwRI) report (Project No. 6-3116-502) dated April 1990, containing the results of a pendulum test on these couplings in a dual 3 pound-per-foot signpost installation in strong soil. The test was conducted to assess the compliance of the couplings with FHWA breakaway requirements, which cite Section 7 of the 1985 American Association of State Highway and Transportation Officials' (AASHTO) Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals.

The test used an instrumented 1,800 pound pendulum fitted with a 10 stage crushable nose, which simulates a 1979 Volkswagen Rabbit. The test article had two 3-foot 6-inch long high carbon steel flanged channel base posts weighting 3 pound-per-foot each, driven 3 feet 3 inches into the National Cooperative Highway Research Program (NCHRP) Report 230 S-1 (strong) soil. The MMB-1HD breakaway couplings were mounted on these base posts. Attached to the couplings were two 9-foot 3-inch mild steel sign posts (also 3 pound-per-foot flanged channel "U" posts) supporting an aluminum traffic sign. The posts were spaced 18 inches on center. The impact speed was 29.3 feet-per-second (20 mph) and the change in velocity was 13.4 feet-per-second. One of the base posts translated and pulled up slightly, but the 3.5-inch stub height was still below the 4-inch maximum permitted. Calculations your provided show that the change in velocity for a 60 mph impact would be approximately 5.8 feet-per-second.

These results show that the actual test and the calculated change in velocity of the tested couplings meet the change in velocity and stub-height requirements adopted by the

FHWA. Thus a dual 3 pound-per-foot flanged channel sign support installed in a soil comparable to the NCHRP Report 230 strong soil, using MMB-1HD couplings is acceptable for use on Federal-aid highway projects, if proposed by a State. This acceptance is limited to breakaway characteristics of the couplings and does not cover the structural features of the support. Presumably, you will supply potential users with sufficient information on structural design and installation requirements to ensure proper performance.

It is noted that the tested dual support installation was mounted in the NCHRP Report 230 "strong" soil. To date, the FHWA has accepted, for restricted use, breakaway supports that have only been qualified through testing in one of the NCHRP soils. We are now administering a study, "Small and Large Sign Supports", in which supports will be tested in both "strong" and "weak" soils. This pooled-fund study, with 27 participating States, is likely to reveal performance problems with different soils. In this study, testing will be discontinued on any support system that fails in one of the soils and the system will be judged unacceptable until it is modified and found acceptable in both soils. Furthermore, this office will, from now on, only evaluate the breakaway acceptability of sign support system where there is assurance that they will meet our breakaway requirements in both "strong" and "weak" soils. Thus, it seems likely that near the end of the pooled-fund study (last testing scheduled for late 1992), the FHWA will begin to require that all new breakaway systems installed on Federal-aid highway projects be qualified as breakaway in both soils. Therefore, we suggest that you qualify your dual support system in "weak" soil in order to ensure its acceptability in the future.

We anticipate that the States will require certification from Minuteman Breakaway, Inc., that the couplings and shear pins furnished have essentially the same chemistry, mechanical properties, and geometry as those used in the test, and that they will meet the FHWA change in velocity requirements.

Since your company's breakaway couplings are proprietary items, to be used in a Federal-aid highway project they: (a) must be supplied through competitive bidding with equally suitable unpatented items; (b) the State highway agency 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,

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

