



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

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

August 31, 1989

Refer to: HNG-14/SS-13

Mr. Mark S. Granger
Sign Post Sales Manager
Marion Steel Company
912 Cheney Avenue
Marion, Ohio 43302

Dear Mr. Granger:

This is in response to your letter of August 8 to Mr. James Hatton requesting Federal Highway Administration (FHWA) acceptance of your company's Rib-Bak sign posts in sizes from 2 to 4 pound-per-foot when used with a lap splice connection. You referenced a study done by the Texas Transportation Institute for the State of Arizona (Arizona Research Study HPR-PL-1-31 (202), "Small Sign Support Analysis"). The report contained dimensions and installation details, which are repeated here in the enclosure.

The full-scale crash-testing phase of the study included four tests of triple post supports using 1,800 pound cars. The results of those four tests are as follows:

Test No.	Size of Posts in Installation	Impact Speed	Vehicle Change in Velocity	Occupant Impact Speed	Occupant Ridedown Accel.
7024-24	4 lbs/ft	20.6 mph	28.0 fps	21.9 fps	2.7 g
7024-25	4 lbs/ft	62.6 mph	13.2 fps	13.2 fps	0.6 g
7024-26	3 lbs/ft	21.7 mph	12.6 fps	12.5 fps	0.5 g
7024-27	3 lbs/ft	61.6 mph	9.1 fps	No contact	No contact

Test 7024-24 did not meet the FHWA requirements for breakaway supports. An analysis of the energy expended during that test, however, allows us to accept the use of two 4 pound-per-foot posts within a 7-foot span. Tests of the 3 pound-per-foot posts did meet breakaway requirements for change in velocity; therefore triple post installations of sizes from 2 to 3 pounds-per-foot are acceptable.

It is noted that the sign supports were only tested in the "strong" soil described in the NCHRP 230. If you desire to offer this hardware to States for use in soil equivalent to

the “weak” soil described in the NCHRP 230, we recommend additional tests be conducted in that soil type.

In Summary, your company’s Rib-Back posts in “strong” soil using a stub/sign post where the stub is 4 inches high or less are acceptable for use on Federal-aid highway projects, if requested by a State, in the configurations shown in the matrix below. Installations using one or two posts, or those using lighter weight posts than those tested will result in less severe accelerations and velocity changes. Therefore, we are extending out acceptance to cover installations down to a single 2 pound-per-foot post.

Post Size	Acceptable Single	Applications Dual	Triple
2 lbs.	Yes	Yes	Yes
2 ½ lbs.	Yes	Yes	Yes
2 ¾ lbs.	Yes	Yes	Yes
3 lbs.	Yes	Yes	Yes
4 lbs.	Yes	Yes	No

This acceptance is limited to breakaway characteristics of the system and does not cover 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 Marion Steel company 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.

Sincerely yours,

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

Enclosure

Federal Highway Administration
HNG-14:Nartimovich:gm:8-23-89:61331
Copies to:
HED-1 HNG-1 HNG-10 HNG-14 Reader, 3212
Reader, 3128 Reader, 3206 File, 3128
M. Hargrave, HSR-20 H. Taylor, HHS-12
RAs w/enclosure

Enclosure

Marion Steel RIB-BAK Sign Supports

The following information is taken from the Texas Transportation Institute study "Small Sign Support Analysis" conducted under the Arizona DOT Research Project HPR-PL-1-31(202) or has been obtained directly from Marion Steel Co.

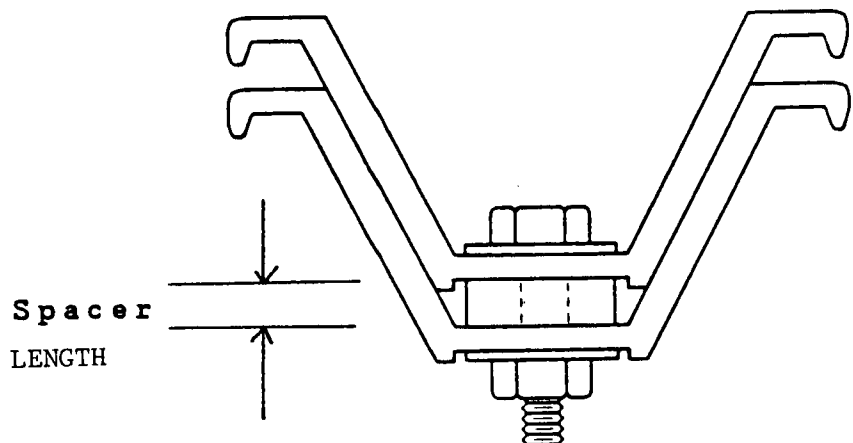
Material specification:

Posts and stubs: 80 ksi yield stress, generally conforming to ASTM A499 (Rerolled Rail Steel) but made from new billets.

Bolts: Grade 9, 5/16" diameter.

Washers: Grade 9.

Splice dimensions: Nested splice five to six inches in length, fastened with two bolts four inches apart, with washers and spacer, as shown below:



The spacer is inserted between the sections to prevent the post and stub from being distorted as the splice bolts are tightened. Spacer length of 1/16 inch less than the distance between the posts when laid in the nested configuration was used. Spacer lengths are as follows:

Post size (# / ft)	Spacer length (inches)
2	3/8
2 1/2	5/16
2 3/4	1/4
3	5/8
4	1/2

Test installation: 8 foot wide by 7 foot high 5/8 inch plywood sign panel mounted on 3 posts spaced a 3 ft - 7 inch on center. Bottom of sign mounting was 5 ft. from the ground. Stub post, as tested was 42 inches long driven 36 inches into strong soil. **For use on Federal-aid highway projects, the stub should be driven to leave only a 4-inch stub height above ground.**