U.S. Department
Of Transportation
Federal Highway
Administration

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

February 24, 1997

Refer to: HNG-14

Thomas E. Bryer, P.E.
Director, Bureau of Highway Safety and
Traffic Engineering
Pennsylvania Department of Transportation
P.O. Box 2047
Harrisburg, Pennsylvania 17105-2047

Dear Mr. Bryer

This is in reply to your letter of December 24, 1996, to Mr. Gerald L. Eller, which requested Federal Highway Administration's acceptance of a "universal" spacer bar to be used when splicing U-channel signposts to U-channel stubs. Your letter was accompanied by samples of two sizes of signposts from two different manufacturers, plus samples of the proposed 28.58 mm (1-1/8 in) thick spacer bar. It is similar in concept to the designs used for Marion Steel's Lap Splice system, Franklin Industries' Base-Bolted System, and Chicago Heights Steel's Bracer Bar System.

In support of the need for a universal spacer bar, you cite the difficulty in administering competitive bid contracts for breakaway U-channel signposts that arise from the shapes rolled by Franklin Industries and Chicago Heights Steel not being interchangeable with those manufactured by Marion Steel when using the crash-tested spacer bar splices. In addition, they point out that sign crews cannot be expected to be aware of all the acceptable breakaway splices, much less keep inventories of all the proper hardware they are likely to encounter. Thus it is likely that field installations will be made with combinations that have not been specifically found acceptable and whose crashworthiness may be questionable.

We agree that the task of identifying crashworthy support configurations is somewhat demanding and that spacer hardware that would permit using posts interchangeably would be useful. We examined your drawings in light of previous testing and our acceptance letters on the subject of lapped U-post designs, and concluded that the breakaway performance of splices using two 5/16-inch (7.94 mm) grade 9 splice bolts will primarily be influenced by the following four factors:

1. The spacing of the splice bolts;

2. The ability of the sign post to transmit the impact forces to the splice bolts;
3. The resistance of the stub post to moving during a crash;
4. The use of a threaded spacer to constrain the shaft of the bolt. (This concentrates the load at the ends of the bolts.)

On the basis of our review of past experience with U-channel supports we find that your company's spacer bar will be acceptable for use on the National Highway System (NHS), in combinations shown in the table below, subject to these conditions:

1. The bolt holes in the spacer bar spaced at 102 mm on center and are tapped to received the 5/16 inch (7.94 mm) splice bolts;
2. The sign support post is placed behind the stub (in the direction of traffic);
3. The "universal" spacer bar may be used wherever the proprietary spacers were found to be crashworthy, subject to the same limitations on post spacing, soil type, or the minimum requirement for soil plates in weak soils as specified for the use of the proprietary spacers.

Sign Post

Anchor Post	Marion 2.5#	Marion 4#	Frank./Chic. 2.5#	Frank./Chic. 4#
Marion 2.5#	X		X	
Marion 4#	X	X	X	X
Frank./Chic 2.5#	X		X	
Frank./Chic 4#	X	X	X	X

Note: The posts designated "2.5#" and "4#" have masses of 3.72 kg/m and 5.9 kg/m respectively.

Our acceptance is limited to the breakaway characteristics of the lap splice using the "universal" spacer bar and does not cover the structural adequacy of the supports. Indeed, we believe that using the "universal" spacer to prevent the U-channel posts from "nesting" with the anchor posts will result in installations that are structurally less capable to support signs. We presume you will develop the necessary specifications to ensure proper design and installation.

Please note that some of the manufacturers have told us of their intent to seek a patent on their spacer bar design. To date we are unaware if any have been successful in doing so.

Sincerely yours,

Dwight A. Horne
Chief, Federal-Aid and Design
Division

Geometric and Safety Design Acceptance Letter SS-73