



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

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

March 14, 1997

Refer to: HNG-14/SS-74

Mr. Mark S. Granger
Granger & Associates, Inc.
285 Longfellow Avenue
Worthington, Ohio 43085

Dear Mr. Granger:

This is in response to your February 5 letter to Mr. Seppo I. Sillian requesting Federal Highway Administration's (FHWA) acceptance of the use of your company's "ANYTWO bracer bar connector" (spacer bar) for use in breakaway splices connecting U-channel stub posts and sign posts of different manufacture. Accompanying your letter were drawings of the combinations of stub, spacer bar, and signpost for which you are requesting acceptance. The spacer bar measures 25.4 mm square by 152.4 mm long and is shown in cross-section on the enclosed drawings.

In support of the need for a "universal" spacer bar, the state of Pennsylvania has cited 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 would be 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 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.

Support Post

Anchor Post	M 2#	M 2.5#	M 3#	M 4#	F/C 2#	F/C 2.5#	F/C 3#	F/C 4#
Marion 2#	X				X			
Marion 2.5#		X				X		
Marion 3#			X				X	
Marion 4#				X				X
Frank./Chic. 2#	X				X			
Frank./Chic. 2.5#		X				X		
Frank./Chic. 3#			X				X	
Frank./Chic 4#				X				X

Notes: “X” indicates acceptable combinations. The posts designated “2#, 2.5#, 3#, 4#” have masses of 3.0 kg/m, 3.7 kg/m, 4.5 kg/m and 5.9 kg/m, respectively. “M” and “F/C” refer to Marion Steel Company posts and Franklin Industries or Chicago Heights Steel posts, respectively.

* This combination calls for a supplemental bar 6.35 mm (1/4 inch) thick.

Our acceptance is limited to the breakaway characteristics of the overlap splice using the spacer bar and does not cover the structural adequacy of the supports. Indeed, we believe that using any spacer bar which prevents the U-channel posts from “nesting” with the anchor posts will result in installations that are structurally less capable to support signs. We anticipate that the States will require certification from you that the spacer bar has essentially the same chemistry, mechanical properties, and geometry as those accepted by this letter, and that breakaway U-channel supports using it will meet the FHWA change

in velocity requirements. Presumably you will supply potential users with sufficient information on design and installation requirements to ensure proper performance.

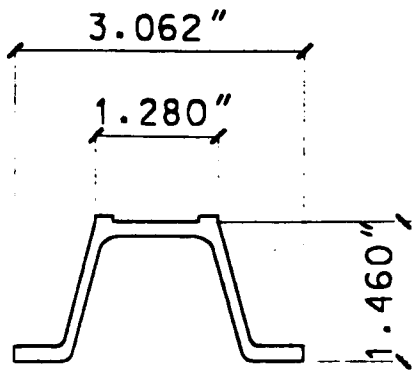
We understand that you are seeking to patent the spacer bar, thus making it a proprietary product. To be used in Federal-aid projects, except exempt, non-NHS projects, proprietary products: (a) must be supplied through complete bidding with equally suitable unpatented items; (b) the highway agency must certify that they are essential for synchronization with existing highway facilities for that no equally suitable alternative 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,

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

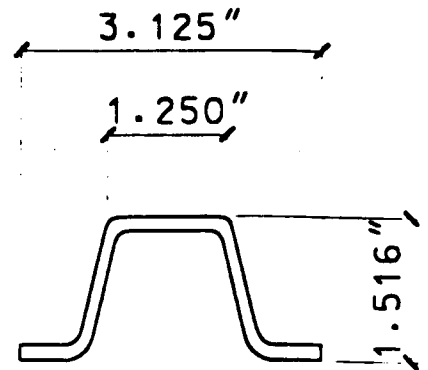
5 Enclosures

Geometric and Safety Design Acceptance Letter SS-74



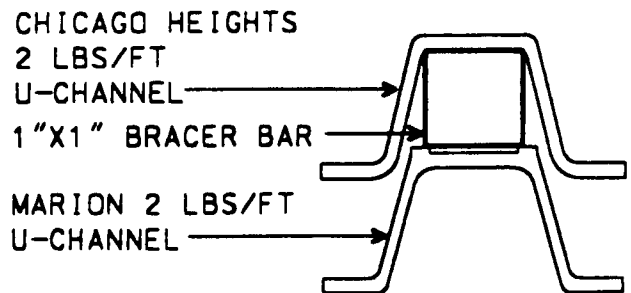
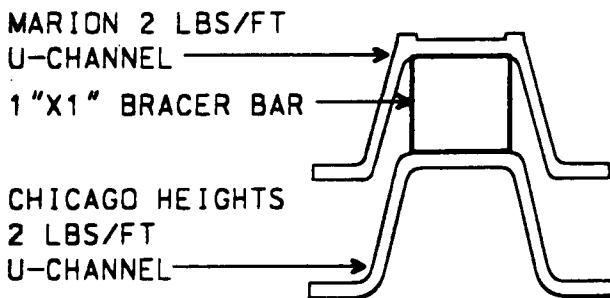
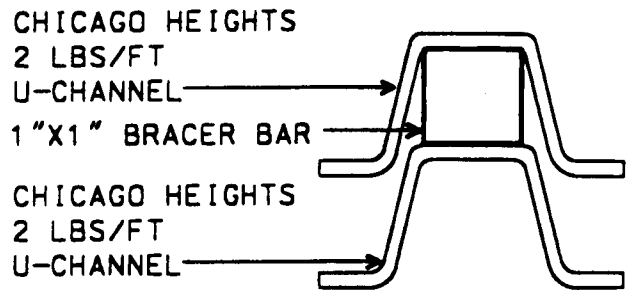
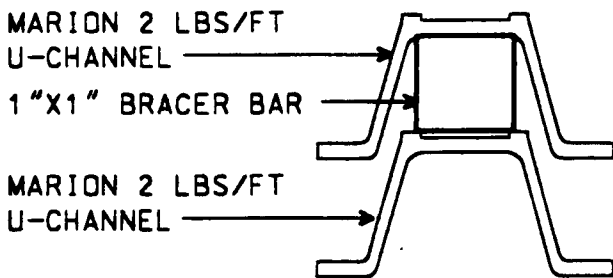
0.669" 0.669"

MARION
2 LBS/FT U-CHANNEL
HALF SCALE



0.625" 0.625"

CHICAGO HEIGHTS
2 LBS/FT U-CHANNEL
HALF SCALE



2 LBS/FT U-CHANNEL COMBINATIONS

ANYTWO™-the bracer bar™ connector

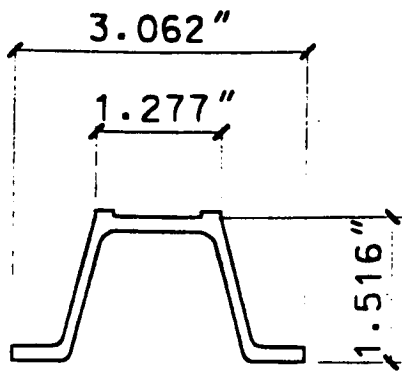
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614-888-0992 • FAX 614-885-7574
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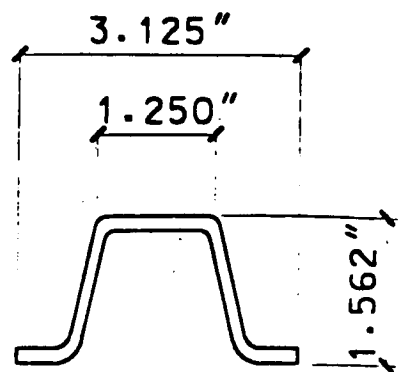
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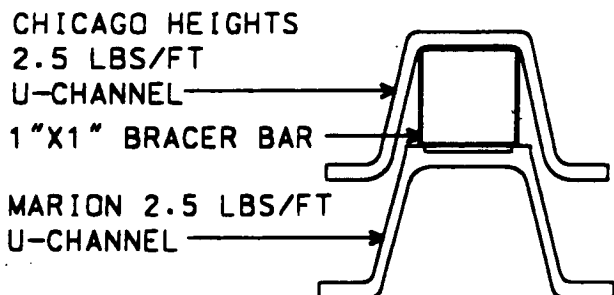
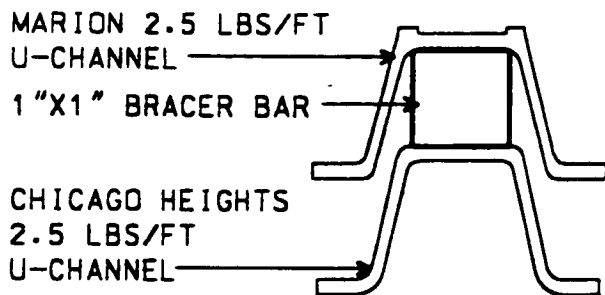
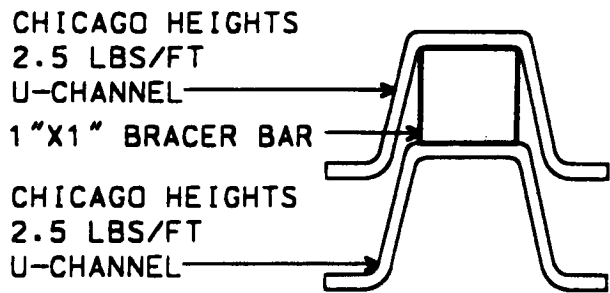
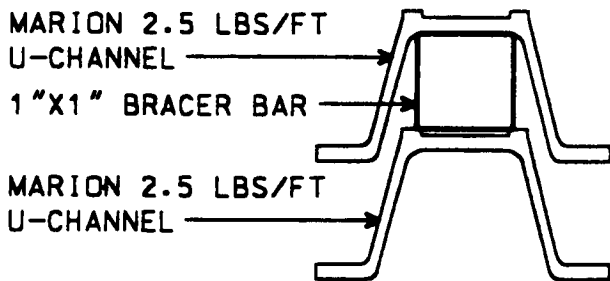
0.669" 0.669"

MARION
2.5 LBS/FT U-CHANNEL
 HALF SCALE



0.625" 0.625"

CHICAGO HEIGHTS
2.5 LBS/FT U-CHANNEL
 HALF SCALE

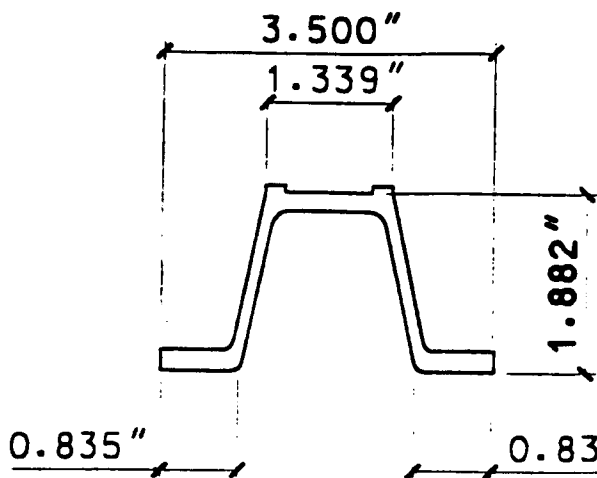


2.5 LBS/FT U-CHANNEL COMBINATIONS

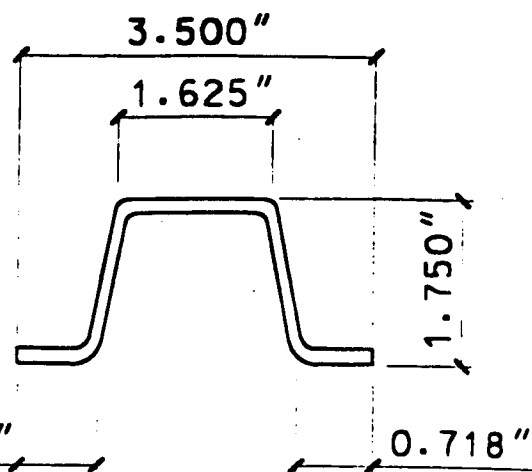
ANYTWO™-the bracer bar™ connector

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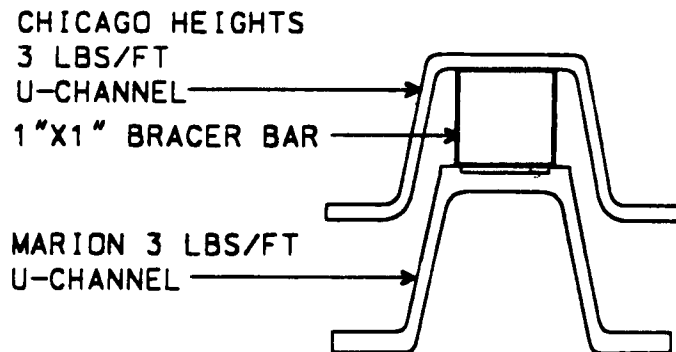
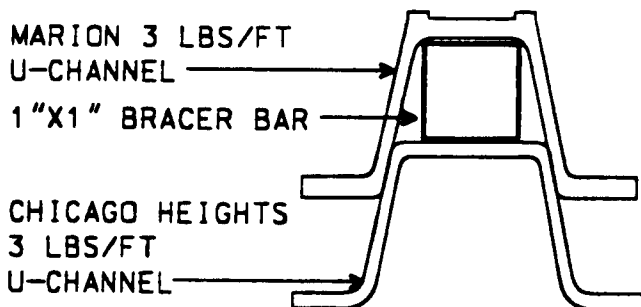
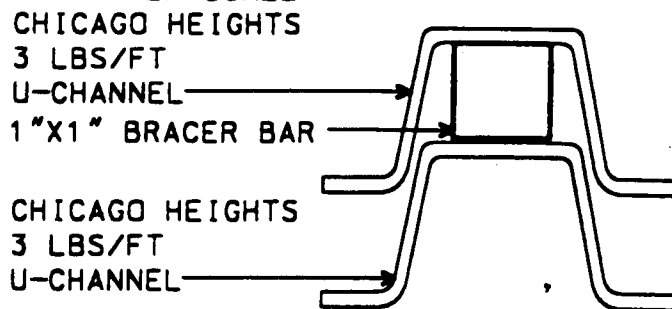
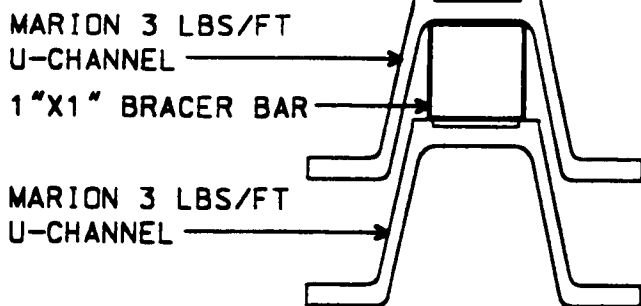
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MARION
3 LBS/FT U-CHANNEL
HALF SCALE



CHICAGO HEIGHTS
3 LBS/FT U-CHANNEL
HALF SCALE

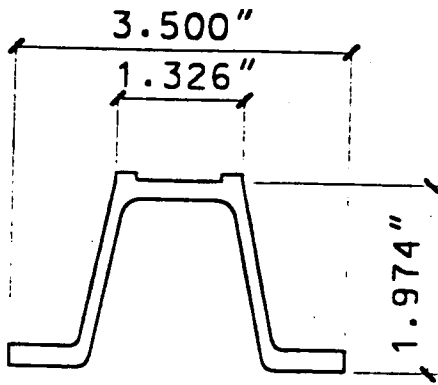


3 LBS/FT U-CHANNEL COMBINATIONS

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0.831"

0.831"

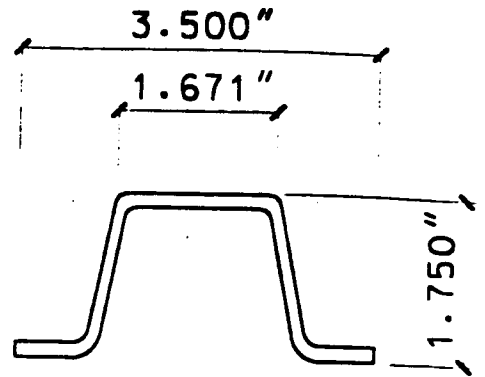
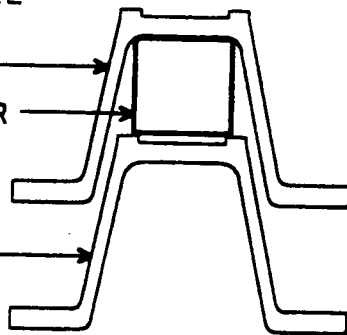
MARION
4 LBS/FT U-CHANNEL

HALF SCALE

MARION 4 LBS/FT
U-CHANNEL

1"X1" BRACER BAR

MARION 4 LBS/FT
U-CHANNEL



0.718"

0.718"

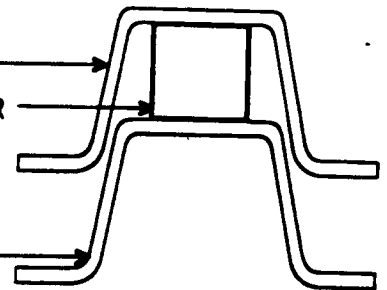
CHICAGO HEIGHTS
4 LBS/FT U-CHANNEL

HALF SCALE

CHICAGO HEIGHTS
4 LBS/FT
U-CHANNEL

1"X1" BRACER BAR

CHICAGO HEIGHTS
4 LBS/FT
U-CHANNEL

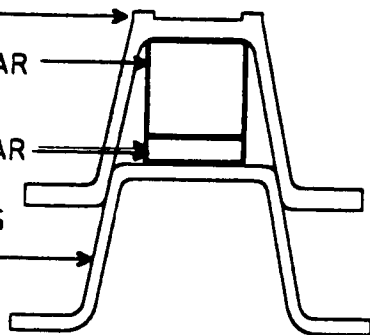


MARION 4 LBS/FT
U-CHANNEL

1"X1" BRACER BAR

1"X1/4"
SUPPLEMENTAL BAR

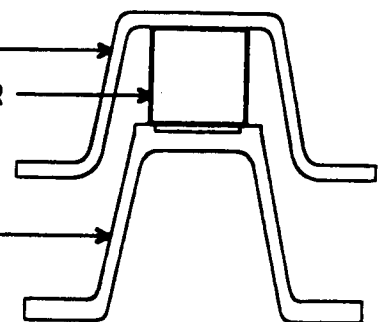
CHICAGO HEIGHTS
4 LBS/FT
U-CHANNEL



CHICAGO HEIGHTS
4 LBS/FT
U-CHANNEL

1"X1" BRACER BAR

MARION 4 LBS/FT
U-CHANNEL



4 LBS/FT U-CHANNEL COMBINATIONS

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