

Long Sway Brace Assemblies

Brace Elements With Multiple Pipe Sizes

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UL listed sway braces are common to distributor inventory in 1" and 1 1/4" brace pipe size. Larger sizes when available are special order and more expensive. With the maximum slenderness ratio (SR) of 300, the maximum length for 1 1/4" brace pipe is 13'-6". So what do you do for those rare occasions when you need longer lengths? AFCON advises contractors regularly in the following strategy for long brace pipe lengths that exceed the allowance for 1 1/4" pipe. Many contractors are not comfortable solving this circumstance. This article intends to provide direction for these rare situations, when they do arise, and AFCON suggests that the attached sample becomes part of your sway bracing engineering strategy.

Starting with a listed sway brace, you simply modify the brace pipe by inserting a larger diameter section of pipe in order to achieve the desired length. The pipe brace portion of the sway brace can be modified without violating its listing because it is controlled by the criteria of NFPA 13 6-4. The following three NFPA 13 sections provide the applicable guidance.

1. NFPA 13 1999 6-4.5.8 "For individual braces, the slenderness ratio shall not exceed 300 (the SR in NFPA 13 is expressed as l/r) where "l" is the length of the brace and "r" is the least radius of gyration... All parts and fittings of a brace shall lie in a straight line..."
2. NFPA-13 1999 Table 6-4.5.8 for least radius, data per pipe size.
3. NFPA-13 1999 A 6-4.5.8 "Sway brace members shall be continuous. Where necessary, splices... should be designed and constructed to insure that brace integrity is maintained." Therefore AFCON suggests that you weld these transitions.

The SR for the total length of the modified brace is determined by adding together the ratios of all the individual sections. The combined ratio is still limited to a maximum of 300. The following steps show the process for increasing the allowed length of a sway brace. Figure 1 provides an example application.

- A. We used 300 SR in this example, but it could be 200 or less.
- B. Use 1" sway brace and attachment ends since these are the most common to contractor inventory.
- C. Assume 1"x 0'-4" starter piece at the attachment end to the building.
- D. Assume 1"x 1'-6" starter piece of 1 inch pipe at the sway brace attachment to the fire sprinkler pipe (this allows field adjustment as required).
- E. Insert a larger pipe section as the middle piece. The length and diameter varies as required to satisfy maximum SR.

- F. Weld size transitions – threading not allowed due to possible fracture at root diameter.
- G. Size transitions need not be centered but must lie in a straight line.
- H. AFCON suggests an up offset at the size transition because this eliminates dimensional interference at the attachment end pivot.
- I. SR calculations are based on an end to centerline measurement of lengths in the example provided.

The example's combined slenderness ratio of 297.3 is acceptable for installations using a maximum ratio of 300.

If you have any questions, please feel free to call AFCON to discuss any aspect of this article.

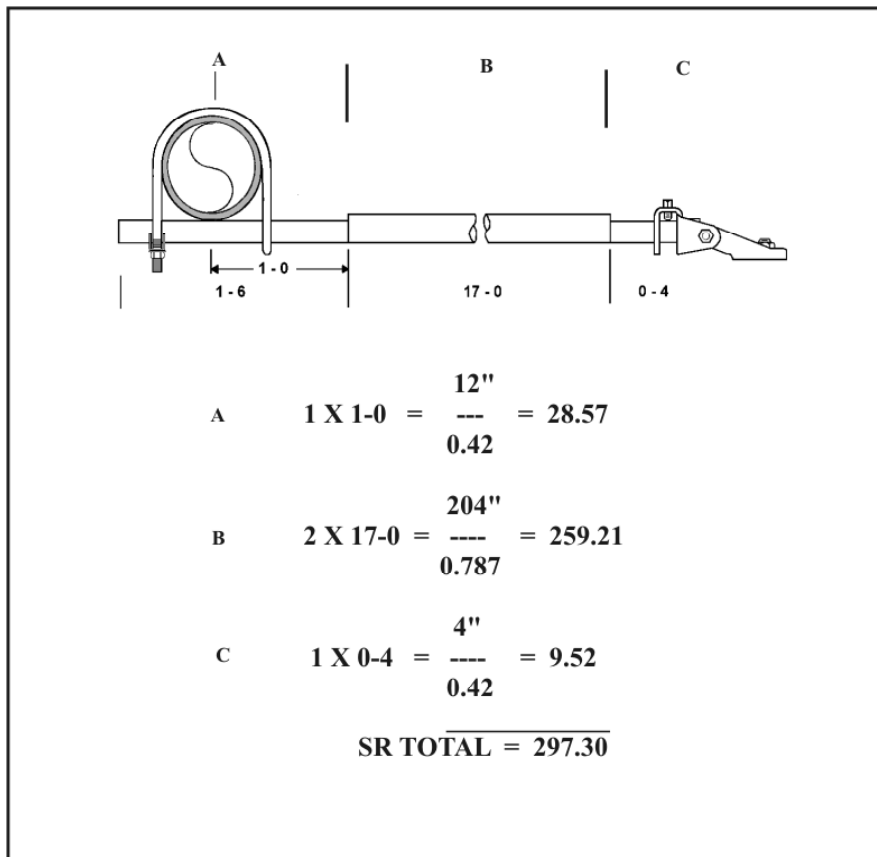


Figure 1. Sample application.