

Long Sway Brace Assemblies

Brace Elements With Multiple Pipe Sizes

© 2013 Kraig Kirschner, AFCON

UL listed sway brace fittings are common to distributor inventory in 1" and 1 1/4" brace pipe size. Larger fitting sizes, when available are special order and more expensive. With the maximum Slenderness Ratio of 300, the maximum length for 1 1/4" brace pipe is 13'-6". So what is a solution 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 assembly, 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 any component listing because it is controlled by the criteria of 2013 NFPA 13 - 9.3.5.2.2.

The following NFPA 13 sections of the 2013 edition provide the applicable guidance.

9.3.5.11.3 "For individual braces, the Slenderness Ratio (l/r) shall not exceed 300 where "l" is the length of the brace and "r" is the least radius of gyration."

9.3.5.11.5 "All parts and fittings of a brace shall lie in a straight line..."

Table 9.3.5.11.8 for Least Radius of Gyration (r), data per pipe size.

A 9.3.5.11 "Sway brace members shall be continuous. Where necessary, splices...designed and constructed to insure that brace integrity is maintained." Therefore, AFCON suggests that you weld these transitions.

The Slenderness Ratio 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 Slenderness Ratio 300 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 at the sway brace fitting attachment to the system pipe which allows field adjustment when required.
- E. Insert a larger pipe section as the middle piece. The length and diameter varies as required to satisfy maximum Slenderness Ratio.

- 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. Slenderness Ratio 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.

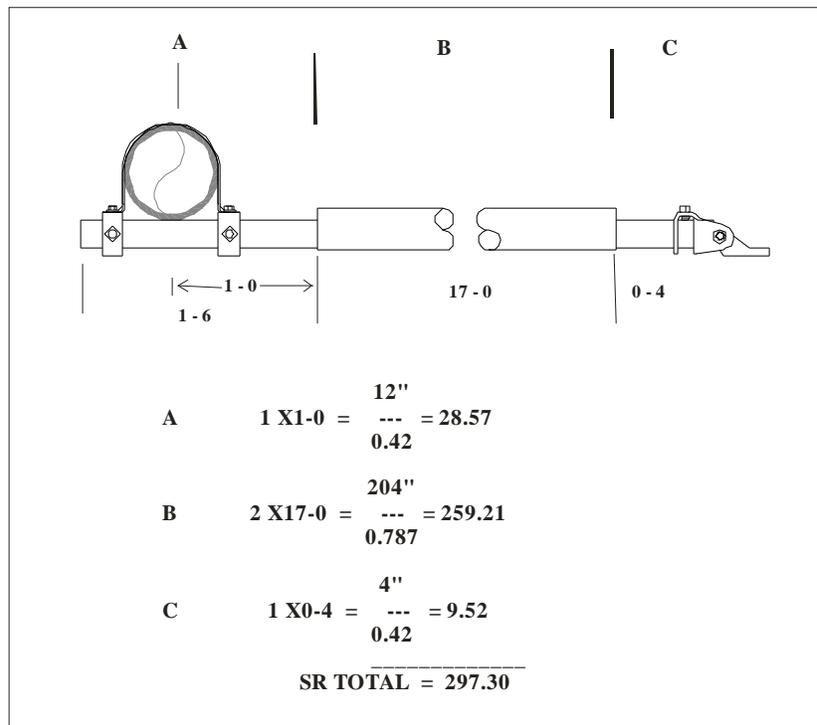


Figure 1. Sample application.



Kraig Kirschner is a third generation fire sprinkler contractor and a journeyman fitter. He is a Principal Member of NFPA 13 - Hanging and Bracing Technical Committee and serves on Standard Technical Panels of UL 203, UL 203A and FM 1950. Kraig is a Life Member of the National Fire Protection Association and was named Person of the Year in 2009 Fire Protection Contractor Magazine. He holds dozens of patents that enhance the installation and application of hangers and sway braces.