Bolting Sway Braces to the Top Chord of Steel Joists

Use a Listed Sway Brace Adapter

AFCON

Through the years many sway brace connections to open web steel joists have been accomplished by bolting through the gap at the top chord of a joist, which exists between it's parallel angle iron elements. Some contractors have used a **fender washer assembly** consisting of a 1/2" threaded stud assembled with two fender washers and nuts to provide engagement, see **Figure 1**. This practice became common in the fire sprinkler industry because joist manufacturers discourage welding to or drilling through the top chord elements, due to concern about reduced load capacity. Despite the use of the fender washer assembly being common practice, it is not structurally adequate nor does it meet the requirements of NFPA-13 for sway bracing. Please consider the following text.

2010 NFPA 13 dictates bore-fit for bolts per section 9.3.5.9.5 "Holes for through-bolts and similar listed attachments shall be 1/16" greater than the diameter of the bolt." The top chord gap is not a hole or bore. It is a slot that has a minimum 3/4" width and an indeterminate length. As such, the subject through bolt **ALWAYS** violates 9.3.5.9.5 along the top chord.

Further, 2010 NFPA 13 dictates the use of listed sway brace components per section 9.3.5.10.2.1 "Bracing fittings and connections used … shall be listed". The fender washer assembly is NOT listed. It in fact failed UL sway brace test criteria performed in AFCON's laboratory.

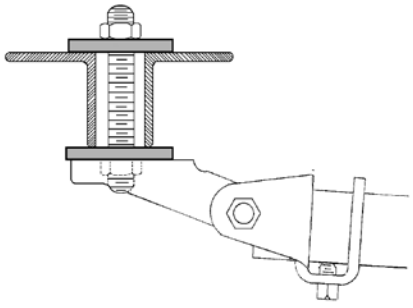

Figure 1
Incorrect Joist Connector

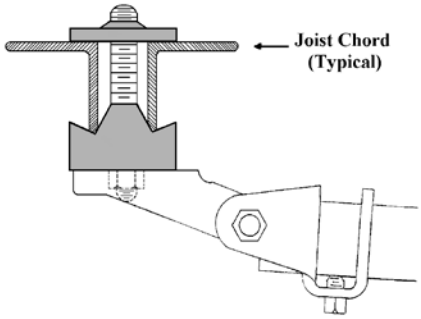

Figure 2
AFCON 085

In conclusion, the **fender washer assembly** does NOT meet fastener bore criteria or the sway brace listing criteria. If you are using it, I advise you to cease because it's only a matter of time before AHJ's perceive this deficiency. Do it correctly using listed product or drill/weld as approved by the joist manufacturer. AFCON 085 is a listed per UL 203A as a direct replacement for the fender washer assembly, see **Figure 2**. The geometry of this adapter, though similar to the fender washer assembly regarding bore hole, is different and was driven by the demands associated with it passing the UL 203A test criteria for listing. Its' listing verifies that it is not only structurally adequate but also capable of withstanding the dynamic forces created by an earthquake. Also please note, that AFCON and other manufacturers have other types of listed sway brace adapters to provide connections at different orientations. We hope this text is useful in providing a correct solution to your installation strategy.

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.