STI and HSS Year In Review

by Kim Olson, PE, Structural Engineer for FORSE Consulting and Technical Consultants to the Steel Tube Institute

As 2017 comes to a close, I wanted to take this opportunity to summarize a few of the important resources that we have developed this year in case you may have missed one.

In your inbox you received a monthly eNews with a technical article in each. Some of the notable articles can be found here:

March – Heat Treating HSS
April – How the Changes to AISC 360-16 Affect HSS Connection Design
June – Connection HSS Members with Through Bolts
November – Axially Loaded HSS Column to Base Plate Connections

We presented six live webinars this year. STI professional members can access these recordings at any time here. If you are not yet a professional member, you can learn about all the benefits, including access to past webinars here.

There were also quite a few interesting questions posed to us through the website’s contact us page here. Here are a few I thought you might be interested in:

Q: I am attempting to determine if AISC 360-10 Chapter K applies to HSS-to-HSS connections when the HSS centerlines do not align (i.e. the branch member is flush with one side of the chord).
A: This type of connection half resembles a matched-width connection (where $\beta = 1.0$) and half resembles a stepped connection with $\beta \approx 0.5$. The former produces a high connection strength and the latter produces a much lower connection strength. The true behavior is likely
somewhere in between the two strengths. Thus, what I have done in the past for such offset connections (although there is no research basis) is to determine the connection strength as the average of these two extremes. i.e. offset connection strength = (connection strength for centered branch with $\beta=1.0$ + connection strength for centered branch with equal step on both sides of branch)/2. The matched-width HSS connection will be governed by sidewall failure limit states, and the stepped HSS connection will be governed by the chord plastification limit state.

Q: Pertaining to composite HSS columns, are there any recommendations or resources regarding checking the HSS wall for pressure due to wet concrete during construction?
A: Although we haven’t heard of any problems due to hydrostatic pressure on the HSS walls from the concrete, it could very well be an issue for a very tall column with a relatively thin wall.

Q: Pertaining to composite HSS columns, are there any recommendations for what kind of concrete mix that should be used?
A: To prevent the concrete core from shrinking away from the HSS walls, it is advisable to use an expansive, or non-shrink, concrete or grout.

I always welcome any feedback you have. As we enter 2018, I’m particularly interested to hear if you have article or webinar topic requests. If you have a topic you would like us to further explore, any pictures of notable projects or HSS elements, or any feedback at all, please email me directly at kim@forseconsulting.com. Wishing you a great start to the new year!