STEEL TUBE INSTITUTE

HSS

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HSS – SAVING YOU MONEY

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There is nothing that gets my blood pressure up faster than an engineer telling me they don't specify HSS because it is too expensive. That is like saying you still use a pencil and straight edge for your drawings because a computer is too expensive. It is all about **how** you use the capabilities and the efficiencies an item brings that makes the investment worth the cost.

Unfortunately, HSS does have a historical perception to overcome regarding expense. While that may have been true previously, that is certainly no longer the case and has not been for a while now. It is important to make a clear distinction of how we are comparing the costs of HSS, most often in comparison with wide flange (WF) members.

Before we begin our comparison, it is important to note that WF members remain superior to HSS in some applications. An HSS will never be as efficient as WF for bending in the major axis. We at STI always encourage engineers to use the best steel solution for their project's specific needs. That being said, HSS is often not considered in applications where it does shine in relation to its steel cousin due to this misconception regarding cost.

If simply comparing a WF section per pound to an HSS section per pound, a WF will usually be less expensive, although at press time even this is not true. But that comparison is not taking into account the capabilities and efficiencies HSS brings to the investment – much like saying a pencil is a better investment than a computer simply because it costs less. An HSS section is much more efficient per pound for axial loading applications due to its shape as well as its weak axis having much less of an impact than its open section cousin.

A more equitable comparison of a WF section and an HSS section is to compare capabilities, not cost per pound. In these situations, HSS is often less expensive. For example, an HSS8x8x3/8, A500 Grade C column with an unbraced length of 16 feet has a compressive capacity, ϕP_n of 353 kips. An A992 W14x53 with the same unbraced length has a compressive capacity of 338 kips. While the price per pound of these pieces are similar, the HSS section weighs 40% less and will therefore be about 40% less expensive in today's market. And as a bonus, engineers can earn brownie points with their architects by using a column with a smaller footprint.

The introduction of ASTM A1085 into the marketplace furthers the opportunities to save money on members. This newer material incorporates additional features that will lead to an even higher level of performance. When compared to ASTM A500, more steel is required to produce A1085 due to the tighter wall tolerances. Additionally, more testing is required to ensure the Charpy V-Notch requirements are met. That additional material cost, of course, comes with a premium. The additional capacity achieved by an A1085 member, however, more than overcomes that cost. For example, an HSS6x6x3/8, A500 Grade B column with an unbraced length of 14 feet has a compressive capacity, ϕP_n of 218 kips. The same column, specified as A1085 has a compressive capacity of 244 kips. That is a 12 percent increase. While only one of STI's member producers has shared their pricing for A1085 publicly, I can assure you it is less than a 12 percent premium. This increase in efficiency of the members means you can specify lower weight members which leads to savings on erection as well.

In addition to the cost of steel, HSS can also provide cost savings over WF in the finishing department. Having 33 to 50 percent less surface area means HSS require less paint (and less touch up and maintenance), less fireproofing material and less labor.

HSS remains underutilized in the US construction market, largely due to some of these misconceptions. STI seeks to inform engineers and other specifiers on the benefits of HSS and has lots of resources on our website. We also encourage you to become a Professional Member to learn even more about how HSS can decrease your project's costs. To learn more about the benefits of becoming a Professional Member, click here.

May 2016