

HSS

ARTICLE

A HOLLOW STRUCTURAL SECTION TRIBUTE

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In honor of David Letterman's retirement as host of Late Night, we have developed a Top 10 list of topics to consider when designing with Hollow Structural Sections (HSS).

10. As an avid HSS eNews reader, you are well aware of the benefits of HSS in compression. Remember they are a must in corner applications where strength is crucial in both axes. You should also think about using them in applications where bracing of the section is required, like a tall column. Because lateral torsional buckling does not need to be considered for most sections and there is no weak axis, less bracing will be required leading to fewer members, fewer connections and less cost.
9. Large sections are available in the United States. Sections with perimeters up to 88 inches (i.e. HSS22x22) are produced to the ASTM A500 or ASTM A1085 material specifications and perimeters up to 200 inches (HSS50x50) are produced to the A1065 specification. While these sections may not always be stocked in your local service center they are produced and available in the United States.
8. HSS are more than 200 times stronger than open sections of similar weight in resisting torsional loading. Curved members should be specified as HSS.
7. When specifying a member to be curved, it's best to check with a local roller to make sure what you are asking for is feasible. Every roller has different equipment and capabilities so there aren't absolute rules. A note like this on your drawings may be prudent as well: "Wall thickness of rolled HSS members shown on plans is the minimum thickness for structural purposes. Contractor shall increase wall thickness or employ other construction means as required to prevent distortion, warping or oil-canning of the HSS cross section." (Courtesy Dan Mullins, PE, Martin/Martin, Inc.)
6. Think about using HSS in an exterior wall support condition. Below you see a common detail where a metal stud wall or curtainwall needs to be braced back to the structure. These exterior members are typically open sections which require kickers at a regular interval adding members, weight and more connections to the structure. By switching the open section to a closed HSS member, the kickers and their connections can be eliminated and the exterior wall back up structure is stiffer.
5. Have you ever thought about filling the cavity of an HSS with concrete? There are a number of reasons you might do this. Increased compressive strength, increased connection capacity, and fire rating are just a few.
4. Steel is a safer choice when selecting members that may be exposed to a blast pressure. Concrete will spall which may create additional injuries or result in a significant loss of strength. If you fill an HSS column with concrete, you will not only increase the strength of the member, but the steel can also act as a preserver to shield the concrete section inside from the blast load. Because of ASTM A1085's Charpy V-notch requirement, it provides a superior material toughness that ASTM A500 does not.
3. When looking at the whole cost of a fabricated member, the cost of material can be a very small percentage. It will always be more economical to increase the wall thickness of an HSS member (if necessary) and specify a shear tab connection to the face of the column rather than a through plate.
2. ASTM A500 round sections are just as available (if not more) than ASTM A53 material when specified in standard pipe sizes (i.e. HSS6.625x0.28). The A53 specification is intended for mechanical, pressurized applications. In fact, A53 pipe that fails these tests are labeled "Structural Grade". This added testing also increases the cost of the member. Specify A500 or A1085 for your round sections.
1. Are you one of the many structural engineers who has ASTM A500 Grade B specified in your General Notes? Did you know that domestically produced material is dual grade? This means producers don't roll both Grade B and Grade C. They roll one grade, Grade B/C. You are paying for Grade C, so why aren't you using that in your structures for a more economical design? (By the way, Grade C has a minimum yield strength of 50 ksi for rectangular sections and 46 ksi for round sections. Or specify ASTM A1085 where the minimum yield for all sections is 50 ksi.)
A note from the author: What did I miss? Submit your favorite HSS tips or questions on our [website](#).

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