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Preferred Plate Material

I have been told by several fabricators that their preferred material for plates is ASTM A572 Grade 50 rather than ASTM A36 as currently indicated in Table 2-5 of the *Manual*. Has a change occurred since 2010?

Yes. The February 2015 article "Are You Properly Specifying Material?" (available at **www.modernsteel.com**) states: "The preferred material specification for structural plates is in transition. Use of ASTM A36 (F_y = 36 ksi for plate thickness equal to or less than 8 in., F_y = 32 ksi otherwise; F_u = 58 ksi) is as common as use of ASTM A572 Grade 50 (F_y = 50 ksi, F_u = 65 ksi for plate thickness equal to or less than 4 in.)."

The 15th edition of the [illegible], available this summer, will show both A36 and A572 Grade 50 as the preferred plate materials up to 4-in. thickness. Material should be specified based on specific requirements for the project and/or local fabricator preference.

[illegible]

Bolted Wide-Flange Connections in Special Concentrically Braced Frames

Are bolted gusset-to-beam connections and wide-flange members similar to those shown in Figures 3-4 and 3-5 of Design Guide 29: *Vertical Bracing Connections—Analysis and Design* (available at www.aisc.org/dg) permitted in special concentrically braced frames (SCBF)? All the published examples that I have seen involve welded HSS braces. Is there a reason why bolted wide-flange details are almost nonexistent in literature?

Both bolted gusset-to-beam connections and wide-flange members are permitted for SCBFs. Connections similar to those in Design Guide 29 have been used in SCBFs in practice. As an aside, details similar to Figure 3-6 of the Design Guide can also be used in SCBFs to force the brace to buckle in-plane, thereby eliminating the need to consider out-of-plane inelastic buckling. When this is done, care must be exercised relative to the assumptions made about the end-restraint in each direction to ensure that the brace will buckle in the in-plane direction as intended.

In my experience, hollow structural sections (HSS) are by far the most commonly used brace sections in SCBFs. This is likely because the strong- and weak-axis buckling strengths of the HSS are more equal than for a wide-flange section, thereby reducing the difference between the design strength and expected strength of the brace. However, there are conditions such as very high loads where HSS simply cannot be used. In such cases wide-flange members with bolted brace-to-gusset connections are common.

Some engineers incorrectly conclude from the prevalence of HSS braces in SCBFs that HSS are inherently better suited than wide-flange sections to seismic applications. As stated above, there are economic advantages to the use of HSS braces in SCBFs. However, wide-flange sections also have their advantages. NEHRP Seismic Design Technical Brief No. 8: [illegible] states: "Wide-flanges and other open sections do not localize the strain as quickly and as severely as rectangular tubes. Hence, wide-flange braces typically provide approximately 25% larger inelastic story drift than rectangular HSS braces prior to brace fracture if all other factors are equal."

AISC currently makes available over 7,000 pages of design guidance including manuals, design examples and design guides. This does not include the hundreds of pages included in the AISC codes and specifications. Even with the vast amount of information that has been produced and distributed, we cannot address every conceivable condition. The absence of a particular configuration is not meant to convey a prohibition. Bolted, brace-to-gusset connections can be and are used in SCBFs. Wide-flange sections can be and are used as braces in SCBFs. Moreover, just to close the loop, bolted HSS brace-to-gusset connections can be and are used in SCBFs.

Another common and similar misconception is related to the dearth of examples of SCBF connections to column webs, which are also not prohibited. SCBF connections to column webs are addressed in the May 2016 Steel Interchange.

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