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Specification Section J10 Limit States

Section J10 of the 2005 AISC *S ec ca* specifies several parameters to resist local failures. However, after reading descriptions before each limit state, I still find it difficult to determine which limit states apply to a given load. For instance, it is hard to picture what "a pair of compressive single-concentrated forces or the compressive components in a pair of double-concentrated forces, applied at both flanges of a member at the same location" looks like. I would be grateful if you could please provide clarification of the

only for tensile forces, web local yielding applies to both tensile and compressive forces, and the remainder of these limit states apply only to compressive forces. Double concentrated forces, one tensile and one compressive, form a couple on the same side of the loaded member, such as that delivered to column flanges through welded and bolted moment connections.

c i applies only to tension forces, so it need not be checked where only compression will occur such as in seated connections. It applies to both single forces, such as hangers, and double forces, such as moment connections.

c i i applies to both tension and compression forces, and also applies to both single and double forces. It would be checked, for example, at seats, hangers, and moment connections. It is also usually checked at the gusset-to-beam interface of vertical bracing connections.

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steel interchange

Shear on Box Shapes

I am working on the design of box sections in shear. According to Chapter G of the AISC *S ec ca* , the coefficient *K* should be taken equal to 5 for box sections. The commentary indicates that this is because the elements are restrained. Is *K* = 5 appropriate for each axis of a box shape?

Yes. The provisions of AISC 360-05 Section G5 apply to the calculation of both strong and weak axis shear strength. The "h" and "t" values may change depending on the shape and axis under consideration, however = 5 for either case.

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Maximum Fillet Weld Size

Section J2.2b of the AISC *S ec ca* states that the maximum size of a fillet weld permitted along edges for material ¼ in. or more in thickness, shall not be greater than the thickness of the material minus ⅛ in., unless the weld is specifically designated on the drawings to be built out to obtain full throat thickness. Does this mean that the weld size can be larger than the thickness of the thicker part?

No, the maximum fillet weld size limitation in Section J2.2b refers to fillet welds in lap joints. A weld cannot be made to air, as would be required to make the leg bigger than the thicker material. The statement simply reflects that there is a difficulty in making welds on edges equal to the full thickness of the material. The corner tends to melt into the weld, making it seem like the weld size is larger than it actually is. To prevent this, the requirement is to size the weld no larger than ⅛ in. less than the material thickness, or provide special notation to build out the weld to obtain the proper size.

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Bolted Connections for High-Seismic Applications

Is it required to use slip-critical connections for high-seismic applications?

Bolted connections for the lateral force resisting system in high-seismic applications are required to have the faying surfaces prepared as slip critical Class A, but are not specifically required to be designed as slip-critical connections. The subject is addressed in Section 7.2 of the AISC *is ic isi s* as follows:

"All bolts shall be pretensioned high-strength bolts and shall meet the requirements for *s ip-c itic* faying surfaces in accordance with *p ci ic ti* Section J3.8 with a Class A surface."

So, this means the connections are designed for shear bearing values, and the joints are prepared as Class A and the bolts installed as pretensioned. The resulting joints have some slip resistance for moderate earthquakes but will be expected to slip in larger earthquakes (when slip can't realistically be prevented anyway).

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Winter Construction

What is the lowest air temperature in which we can weld? Can we avoid preheating?

Section 5.12.1 of AWS D1.1 addresses minimum ambient temperari qe whots (whn(r)-3(ar)s(ar)ect4fs7eO(whn(r)-o-23ff-23fs7e3(ar)h

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Steel Interchange is a forum to exchange useful and practical professional ideas and information on all phases of steel building and bridge construction. Opinions and suggestions are welcome on any subject covered in this magazine.

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If you have a question or problem that your fellow readers might help you solve, please forward it to us. At the same time, feel free to respond to any of the questions that you have read here. Contact Steel Interchange via AISC's Steel Solutions Center:

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