

IF YOU'VE EVER ASKED YOURSELF "WHY?" about something related to structural steel design or construction, *Modern Steel Construction's* monthly Steel Interchange column is for you! Send your questions or comments to [solutions@aisc.org](mailto:solutions@aisc.org).

## Width-Thickness Limits for S-Shape with Cap-Channel

I am designing a monorail beam, which is an S-shape with a cap channel. I'm having trouble determining the limiting width-thickness ratios for strong-axis bending per Table B4.1 of the AISC 13th Edition *Manual*. For strong-axis bending I am checking three components:

- channel web between two fillet welds per Table B4.1 Case 12
- channel web between channel top flange and fillet weld as stiffened elements per Table B4.1 Case 12
- S-shape beam flange as unstiffened element per Table B4.1 Case 2

Am I doing this correctly?

## Countersunk Bolts

I am trying to find the preferred material specification for countersunk high-strength bolts. Building codes are virtually silent on the subject of countersunk bolts for structural applications, yet there are occasions where, because of interference, a regular hex-head A325 or A490 bolt will not work and a countersunk bolt is needed. Is this addressed anywhere in the AISC *Steel Construction Manual*?

*Specification*

*Manual*

*Steel Construction*

*Kurt Gustafson, S.E., P.E.*

## Prequalified and Qualified High-Seismic Moment Connections

Table 2-2 of FEMA 350 allows bolted flange plate (BFP) moment connections as prequalified moment connections for OMF and SMF in high-seismic applications. ANSI/AISC 358 makes no mention of this type of connection. Is the use of BFP moment connections still permissible in high-seismic applications?

*Seismic Provisions*

*b*

*F<sub>y</sub>*

*Brad Davis, Ph.D., S.E.*

## Column Buckling

I am reviewing an existing built-up column. The section is singly symmetric (symmetrical about the weak axis). The column is subject to combined axial force and flexure about the strong axis. Does the web element for uniform loading fall under Table B4.1, Case 14 of the 2005 AISC *Specification*? While checking the limit states of flexural-torsional and torsional buckling, I am using Equation E4-5 for singly symmetric members. Is this the correct equation when the axis of symmetry is the weak axis?

*Amanuel Gebremeskel, P.E.*

# steel interchange

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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: