STEEL INTERCHANGE

Steel Interchange is an open forum for *Modern Steel Construction* readers 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. If you have a question or problem that your fellow readers might help you to solve, please forward it to *Modern Steel Construction*. At the same time, feel free to respond to any of the questions that you have read here. Please send them to:

Steel Interchange
Modern Steel Construction
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Chicago, IL 60601-2001

Answers and/or questions should be clearly presented. E-mail submittals and/or e-mail attachments are welcome.

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*** * * * Questions and answers can now be e-mailed to: grubb@aiscmail.com * * * ***

Question from July 1999:

Stair stringers are typically constructed from channels. Frequently, the stair stringers must be mitered to accommodate landings and connections to floor levels. The flange forces cause a prying action on the web of the channel in the mitered joint. Stiffener plates between the flanges are often required to resist these prying forces. Is there some point where the web of the channel can resist these prying forces thereby eliminating the need for a stiffener plate?

Allan T. Goffe
M. R. Richards Engineering
Eugene, OR

MC 10 and MC 12 are the typical materials used for stair stringer construction. The length of the stringer and weight of channel per linear foot affects the amount of prying action and deflection of the web when a miter cut is used. Utilizing an analysis program, I have found that less prying action takes place when using pan type stairs than when using precast concrete. The analysis program shows the majority of weight from the stair system is concentric to the web of the channel. Applying pedestrian weight to the stringer moves the pressure point to the flange. Applying a stronger angle clip for precast treads or increasing the angle size and weld requirement for pan-type stairs lessens the prying action at the miter.

We utilize a center clip at the top of the stringer for a double bolted connection. A 1/4" angle on the web side is used for a welded connection to steel landings and floors. Using the L3x3x1/4 center clip reduces prying action at the top connection. After the stringer is attached at both ends and the treads are in place, the analysis showed no prying action.

Danny l. Frisbee
Engineer / Project Manager
Tarheel Independent Contractors Inc.

While reviewing shop drawings for a project, we noticed that the detailer provided slotted holes (short slots) in both of the outstanding legs of the double angle connections. The bolts are 3/4" ASTM A325. Is this ok?

For ASTM A325 bolts, the RCSC *LRFD Specification for Structural Joints Using ASTM A325 or A490 Bolts* (1994) permits the use of short slotted holes in all plies of joints designed for bearing if the load is perpendicular to the direction of the short slot. If the load is not perpendicular to the short slot, slip critical connections are required. Also, if the short slot occurs in an outer ply of a connection, an ASTM F436 washer must be used over the slot.

Keith A. Grubb, P.E.
American Institute of Steel Construction
Chicago, IL

Does the erection clearance required for "knifed" double angle connections affect the connection's ability to perform as slip critical?

It has and continues to be normal practice to detail framed beam connections with an erection clearance between the angles when the supported beam is to be erected by knifing its web between the angles. The typical recommended erection clearance is 1/8". It is normal practice to pull the plies into firm contact as the bolts are installed. Given this, and as long as the plies of the connecon can be pulled together when the bolts are installed, the use of such an erection clearance would be suitable for slip-critical connections Other erection clearances can be used as long as the plies can be pulled up.

Charles J. Carter, P.E.
American Institute of Steel Construction
Chicago, IL

A reader writes:

This is neither a question nor an answer, but perhaps it will be of interest to the readers of Steel Interchange.

Over the last four or five years, I have been plagued with midnight skulkers who bash the heck out of my mailbox in the wee hours of the morning with baseball bats for sport, usually after finishing off their last sixpack. I was a "body and fender man" for four years, constantly repairing the mailbox.

Finally, out of sheer frustration, I built the mailbox out of a hollow structural section, anchored securely in a large concrete footing. So far, the skulkers have only managed to knock some paint off, while the neighbors are still fixing and replacing, and muttering incantations of blue words.

Harry Van Dexter, Architect
Mullica Hill, NJ

See Mr. Van Dexter's sketch below for more information on his unique (and effective) vandal-proof mailbox. We thought we'd seen everything...

Ed.

New Question

ASCE 7-95 section 2.4.3, part (b) states that the effect of two or more transient loads may be reduced provided that the allowable stress is not also increased. AISC's ASD Manual, 9th Ed., section A5.2 allows a 1/3 stress increase provided that the loads are not "calculated on the basis of reduction factors applied to design loads in combinations," and gives ANSI A58.1, which was updated as ASCE 7, as an example. My questions are:

a) Is it acceptable to use the load combinations specified in ASCE 7, but not to reduce them and use a 1/3 stress increase when designing steel members?

b) may the 1/3 stress increase be used when designing for a Dead + Wind combination?

David MacGregor