

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
One East Wacker Dr., Suite 3100
Chicago, IL 60601-2001**

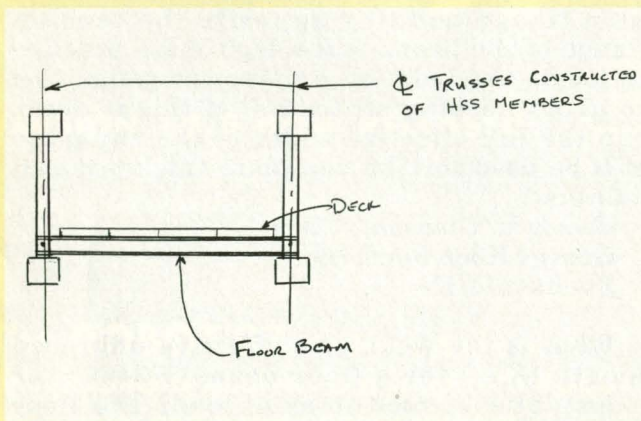
**** Questions and answers can now be e-mailed to: rokach@aiscmail.com ****

The following responses from previous Steel Interchange columns have been received:

(From October 1998)

For a through truss pedestrian walkway constructed of HSS members, what guidelines do AISC recommend to ensure lateral stability of the top chord?

**C. Michael Holtz
GSIInternational
Assumption, IL**



The critical feature of the through-truss walkway, or "pony truss" is that the top chord lateral bracing provided by elastic restraint from the web and floor beam members. A very good discussion of this may be found in the *SSRC Guide to Stability Design Criteria for Metal Structures*, 5th Edition, Theodore V. Galambos (editor). We have designed pedestrian bridges using these type of trusses for many years and have found that Holt's method outlined in the *SSRC Guide* provides reasonable and safe design values.

**Craig S. Funston, P.E., S.E.
Principal
Geiger Engineers
Bellingham, WA**

Answers and/or questions should be typewritten and double-spaced. Submittals that have been prepared by word-processing are appreciated on computer diskette (either as a Word file or in ASCII format).

The opinions expressed in *Steel Interchange* do not necessarily represent an official position of the American Institute of Steel Construction, Inc. and have not been reviewed. It is recognized that the design of structures is within the scope and expertise of a competent licensed structural engineer, architect or other licensed professional for the application of principles to a particular structure.

Information on ordering AISC publications mentioned in this article can be obtained by calling AISC at 800/644-2400.

(From October 1998)

Can we design a steel or metal building as an "enclosed" for wind load applications when one sidewall is open for full size doors? When the doors are open, it will make the building "partially enclosed". However, when closed, will make it an "enclosed" structure. What should be the right approach?

A building with full-size doors in one wall must be designed for wind loads under both conditions—doors open (as a partially enclosed building) and doors closed (as an enclosed building). One way to mitigate the implications of this is to specify in the contract documents that the doors are always to be closed when measured wind velocities exceed a certain value, say 50 miles per hour. The result is usually that the enclosed case will control the design, and the partially enclosed case need no longer be considered. Of course, when this approach is used, the building owner must be educated about the importance of following the restriction against having the doors open at higher wind speeds.

**Jon A. Schmidt, P.E.
Burns & McDonnell
Kansas City, MO**

Another answer:

The design of individual members, such as girts, on the leeward side of a structure should be considered because the negative pressure will place the unbraced flange in compression.

**David T. Ricker, P.E.
Consulting Engineer
Payson, AZ**

(From February 1996)

One of the primary concerns in flexural design is the use of lateral bracing to control lateral-torsional buckling. What constitutes lateral bracing? Does the bracing member need to be a particular stiffness compared to the member being braced? Does it need to be a particular stiffness compared to the member being braced? Does it need to brace the compression flange, or will it serve its purpose if it braces the web? If the load is applied uniformly by a plate resting across the top flange of the beam, does the plate laterally brace the beam? What if the plate is welded to the beam?

The paper, "Fundamentals of Beam Bracing," by J.A. Yura, states: "...design rules based on strength considerations only, such as a 2% rule, can result in inadequate bracing systems. Both strength and stiffness of the brace system must be checked." In the fourth edition of "Steel Structures: Design and Behavior" by C.G. Salmon and J. E. Johnson, a five step procedure is given (on page 548) for the design of lateral bracing. On page 481 of "Steel Structures: Design and Behavior," the figure (Figure 9.2.1) shows seven types of definite lateral support. Such lateral support is attached to the compression flange and to the web—lateral support of the compression flange being most common.

Good references on this subject are:

- "Is Your Structure Suitably Braced?" by the Structural Stability Research Council (which includes "Fundamentals of Beam Bracing" by J.A. Yura);
- "Steel Structures: Design and Behavior," 4th Edition, by C.G. Salmon and J.E. Johnson (see section 9.13—Lateral Bracing Design); and
- "Structural Steel Design: LRFD Approach, 2nd Edition, by J.C. Smith (see chapter 7—Bracing Requirements).

Timothy M. Young
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Cumberland, VA

New Questions

My question is regarding the shear friction design method used to transfer column shear forces to foundation systems. AISC Design Guide #1 (Column Base Plates) gives friction coefficients for use in determining frictional shear resistance. The friction coefficients are based on ACI 349-85. The design guide states that these friction coefficients are for limit state conditions and that a factor of safety of 2.0 should be used with these coefficients for ASD. In comparison, AISC Design Guide #7 (Industrial Buildings) also outlines the shear friction design method but makes no mention of the factor of safety nor is one used in the design example. Please clarify if a factor of safety on the friction coefficient for ASD is required or not.

William B. Kussro, P.E.
Giffels Associates, Inc.
Southfield, MI

When stiffening extended end-plate moment connections, if bolts are located on the usual gauge line of the column flange then stiffeners are often required due to column flange bending opposite the tension flange of the beam. Is it a legitimate practice to locate the bolts on a narrower gauge line to avoid needing stiffeners? If this is done, can the full effective width of the end-plate still be used for the end-plate thickness calculation?

James M. Gleason, P.E.
George Koch Sons, Inc.
Evansville, IN

What is the weak axis effective unbraced length ($K_y L_y$) for a floor beam (W24x55 for example) subjected to axial load? The floor beam is loaded in compression along the neutral axis and is loaded in bending about the major axis via floor deck connected to the top flange. The beam has no perpendicular members framing into it.

Karl Menches, P.E.
Greenville, SC

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