

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**

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

In what instances, if any, and under what criteria can the attachment of grating with mechanical fasteners be used to provide lateral bracing to the compression flange of the members supporting the grating in applications such as walkways and catwalks?

Our company manufactures industrial grade fiberglass grating for walkways and catwalks supported by all medias, i.e. steel, aluminum, stainless steel, timber, and fiberglass beams. Weight reduction is very critical for this type of application, and eliminating cross beams is quite common.

Although design criteria for this type of application is limited, two parameters used for design are:

1. The type of mechanical fasteners used - must be capable to resist cross movement and/or twisting of the compression flange. When tightened, the clamping action should produce the proper friction between grating and beam.

2. Use L_c = maximum unbraced length of the compression flange or 2'-0" maximum to determine fastener spacing.

These two general rules seem to satisfy both the fastening requirements for the grating and lateral support for the compression flange.

Richard L. Cole, P.E.

**Aligned Fiber Composites
Chatfield, MN**

Serviceability is a particular concern for crane systems in industrial buildings but is not clearly covered in the standard code literature. What are deflection limits for crane runway systems?

The references given in a previous Steel Interchange column are mainly concerned with cranes and hoisting equipment. If someone is interested in industry standard references for allowable crane runway deflections, the follow-

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 Wordperfect 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 principals to a particular structure.

Information on ordering AISC publications mentioned in this article can be obtained by calling AISC at 312/670-2400 ext. 433.

ing are more appropriate:

•Fisher and Buettner, *Industrial Buildings - Roofs to Column Anchorage*, Design Guide 7, AISC, 1993.

•*Guide for the Design and Construction of Mill Buildings*, Technical Report No. 13, Association of Iron and Steel Engineers, Pittsburgh, PA, 1979.

•Merritt, F. S., *Structural Steel Designers Handbook*, McGraw-Hill Book Co., New York, 1972.

•Gaylord, E. H. Jr. and C. N. Gaylord, *Structural Engineering Handbook*, 2nd Edition, McGraw-Hill Book Co., New York, 1972.

Gary J. Davis, P.E.

**Phoenix Engineering Services
South Milwaukee, WI**

Specifications currently exist which require minimum pretensioning loads for slip critical connections. There is, however, no guidance regarding minimum pre-loading of anchor bolts which occur at column bases. While in most situations this issue is academic since the anchor bolt nut and thread projection are below the plane of the concrete slab on grade and are eventually embedded in concrete at the slab isolation joint, there are instances where the nut and thread projection remain exposed. Is tightening the nut to "snug tight" and tack welding the nut to the bolt thread the only solution in preventing the nut from backing off?

Snug tightening and tack welding the nuts is not the only solution to prevent the nuts from backing off. We have specified A449 high strength anchor bolts (tensile strength = 105 to 120 ksi) instead of the ordinary A36 anchor bolts when the structure is subject to fatigue loading.

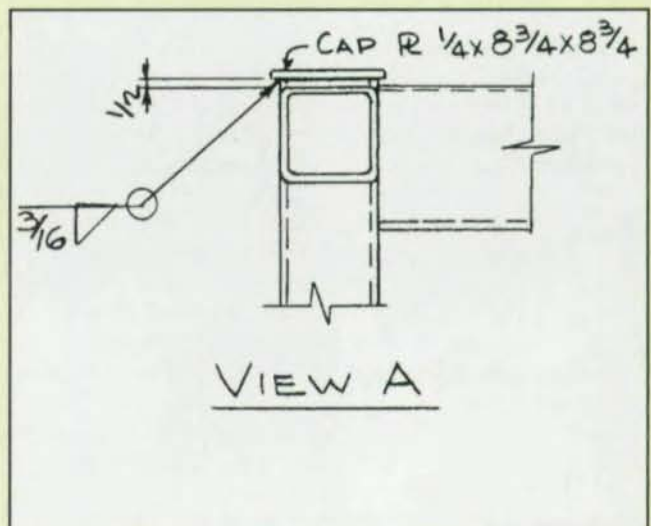
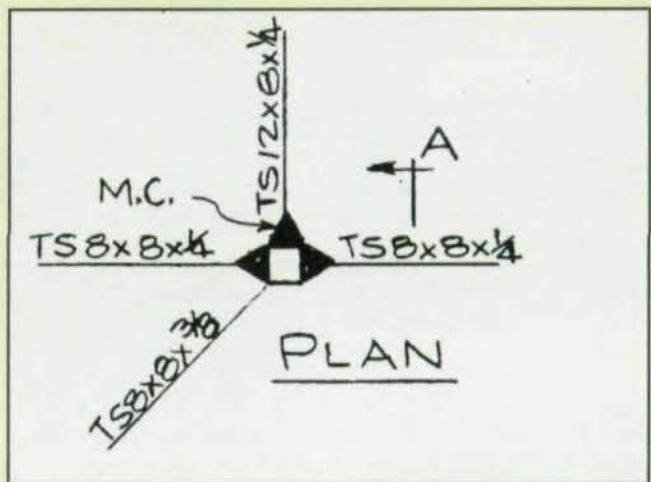
We pretension the bolt to develop 70 percent of the specified minimum tensile strength of the bolt. The bolt is greased with bondbreaker all the way to

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its end to permit stretching of the bolt while tensioning. The tension is developed into the footing by an adequately designed heavy plate at the bottom of the bolt. To further prevent the nut from loosening (which is not likely to occur for a properly pretensioned bolt), a lock nut or Pal nut can be added to secure the nut after pretensioning.

We used the A449 anchor bolts for a 160' tall steel tubular tower that supports a 600 kW wind turbine unit. The tower was designed to meet the UBC and Eurocode 3 Fatigue Provisions. Eurocode 3, Chapter 9, Fatigue, specifies an extremely low stress range for an ordinary anchor bolt without preloading (the lowest stress range category in the Eurocode). The use of high strength anchor bolts with preloading is apparently the common practice in Europe when the fatigue strength is critical in the structural design.

David L. Koo, C.E.
Warren A Minner & Associates
 Bakersfield, CA



New Questions

Listed below are questions that we would like the readers to answer or discuss.

If you have an answer or suggestion please send it to the Steel Interchange Editor, Modern Steel Construction, One East Wacker Dr., Suite 3100, Chicago, IL 60601-2001.

Questions and responses will be printed in future editions of Steel Interchange. Also, if you have a question or problem that readers might help solve, send these to the Steel Interchange Editor.

In the partial plan shown (top & middle), each of the tube beams is to be moment connected to the tube column by welding. All steel is exposed to view of pedestrian traffic, but is protected from the elements. What is an economical procedure for making the joints?

William Dyker
 Naperville, IL

How is the L5 x 3 1/2 x 1/2 angle shown in the figure (bottom right) designed? The angle is used as a rail guide for a roll-up door and is bolted to other steel members 12" on center.

Glenn Whritenour
 Bechtel Savannah River, Inc.
 Augusta, GA

