

# 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](mailto:rokach@aiscmail.com)** \*\*\*

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).

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

*Below are two answers to a question sent to AISC:*

## **When, during the erection process, do steel column base plates require grouting?**

The AISC Code of Standard Practice in Section 7.6 "Bearing Devices" indicates that "The final location and proper grouting of bearing devices are the responsibility of the owner". In Design Guide 10 it is stated that the timing of grouting is dependent upon the forces in the anchor rods and foundation. Design Guide 10 provides procedures to evaluate anchor rods and foundations for such forces.

Also, Design Guide 10 presents the following fallacy in Section 1.3 "Common Fallacies" paragraph 8:

*"Column bases may be grouted at any convenient time in the construction process." [Italics added.]*

and provides the following statement:

"In fact, until the column bases are grouted the weight of the framework and any loads upon it must be born by the anchor rods and leveling nuts or shims. These elements have a finite strength. The timing of grouting of bases must be coordinated between the erector and the general contractor."

From the above it is apparent that the "owner", is responsible for grouting; however, the timing is dependent on the temporary support of the column bases employed by the erector and thus the timing of grouting must be jointly determined in conjunction with the erector and general contractor.

It is common practice to erect at least a tier of steel, plumb it, and install steel deck before base plates are grouted. This procedure is acceptable only if the anchor rod, base plate condition is evaluated for strength. The strength of bases using leveling nuts, leveling plates and shims are all different, all other things being equal.

**James M. Fisher, Ph.D., P.E.  
Vice President  
Computerized Structural Design, S.C.  
Milwaukee**

## **Another Response:**

The answer to this is found in the AISC Code of Standard Practice dated June 10, 1992 (Code) Section 7.6 Bearing Devices. While the reader should refer to that document for the exact wording, it is summarized and has been traditionally interpreted as follows.

When columns with attached base plates are set on leveling plates, the leveling plates are set and grouted in sufficient time before the column

is erected to allow the grout to cure to full strength. This would also apply to loose base plates.

When columns with attached base plates do not set on leveling plates, the erector sets the column utilizing leveling nuts, leveling screws, wedges, shims or a combination of those devices which will allow the erection of that column and the adjacent columns and beams so that they may be aligned, plumbed and guyed for stability. The adequacy of these temporary erection devices must meet the requirements of Code Section 7.9 Temporary Support of Structural Steel Frames. Once the steel is accepted by the owners inspection agency or representative as being in the proper position and alignment (Code Section 7.11.5), then the column base plates are grouted.

Grouting cannot take place prior to alignment and plumbing because the erector must be able to move and tilt the columns during that process.

Columns are normally aligned and plumbed within an erection or shipping sequence. Individual columns cannot be plumbed and grouted prior to the erection of the adjacent connecting steel or the steel will not fit due to the accumulation of mill, fabrication and erection tolerances allowed by the Code. This is normally not a problem with columns set on pregrouted leveling plates because the Code limits the maximum size of the leveling plate (Code Commentary to Section 7.6).

Since the erector is not responsible for the ade-



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quacy of the temporary support of the structural steel frame for loads other than the frame itself and the effects of weather or seismic forces during the erection process, the bases must be grouted and the grout cured prior to the placement of other superimposed construction loads such as poured concrete floors, precast concrete or masonry. Typically, in buildings where the columns are tiered, the bases of an erection sequence would be grouted prior to the erection of the second tier over that area.

**Barry L. Barger**  
Senior Vice President/Operations  
Southern Iron Works, Inc.  
Springfield, VA

## NEW QUESTIONS

*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 can also be sent via e-mail to [rokach@aiscmail.com](mailto:rokach@aiscmail.com).*

*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.*

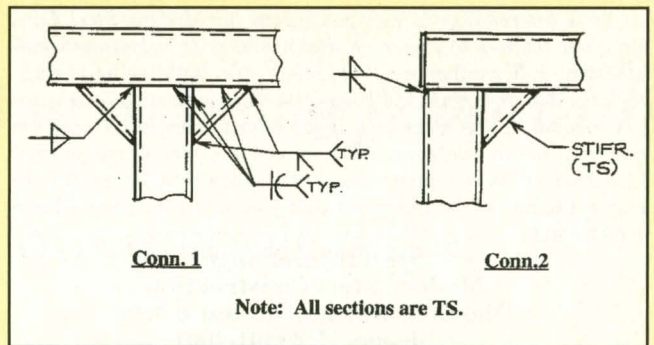
When designing extended end-plate moment connections, if bolts are located on the usual gauge line of the column flange then stiffeners are often required due to column flange bending opposite the tension flange of the beam. Is it a legitimate practice to locate the bolts on a narrower gauge line to 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

Does the term "machine bolt" refer to the type of material (A307, A325) of the bolt or does it pertain to the thread geometry?

Would it be accurate to call out a 3/4" diameter A325 bolt as a machine bolt on a structural drawing?

**Bruce D. Gerosa**  
Brutus Hull Systems—Structural Engineer  
via email



In certain situations, the moment connections shown are used. How do you design the stiffener member for the bending moment(s) in the beam to be: (a) positive and (b) negative?

**Fran M. Lacsina**  
Melrose Metal Products  
Fremont, CA

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