

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.

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.

If you have a question or problem that your fellow readers might help you to 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 at:

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More on the re-use of structural drawings for shop drawings (from September 2000):

I run a small structural engineering firm and provide services in at least 10 states. I too have had shop drawings sent for approval to me with my seal present, let alone my title block on the shop drawings. I have explained to the detailers, that since this is their work product and not mine, they need to take my name (and seal) off of their drawings or their work product. Setting aside the issue of liability for the work product, I believe shop drawings are our (as an industry) last opportunity against mistakes. Simply copying the original drawings, either by "Xerox" methods or re-use of electronic files, makes us all lazy. By redrawing the project, the detailer can and often does find errors. By this process, we are all helping each other to give our clients the building they wanted.

Isaac A. Lewin, S.E., P.E.

The response which appeared in the September 2000 issue addressed only the fact that the engineer's drawings are the intellectual property of the engineer. While that is true, there are reasons beyond mere ownership of the design why an engineer might not want detailers to reproduce the design drawings to create shop drawings. For a detailed discussion of the shop drawing process and its benefits to the entire project team—designer, owner, contractor, subcontractors, and suppliers—I recommend Engineers Joint Contract Documents Committee (EJCDC) Document 1910-9-C, *Focus on Shop Drawings*.

The author of EJCDC 1910-9-C, Mr. John R. Clark, writes the following in a pertinent part of that document: "The usual practice of design for construction does not demand perfection in all details so that almost all sets of Drawings and Specifications contain inadvertent oversights and inconsistencies that are to be worked out during construction. These frequently are brought to the Engineer's

attention with the submission of a related Shop Drawing. In this way the Engineer is given an opportunity to adjust his documentation before construction has proceeded too far." As noted by Mr. Clark, while requiring the detailer to "redraw" the engineer's plans and details may take extra time, this process provides one more pair of eyes to look at the design and how the various structural elements are to come together during construction. To develop and prepare his shop fabrication drawings, the detailer must think about how the structure is to be put together in the field. Hopefully, in the exercise of his independent skill and care, the detailer will uncover any inadvertent errors, omissions, or inconsistencies in the engineer's design drawings. The resolution of any such errors, omissions, or inconsistencies at this earlier stage of the project benefits everyone, for this is the time when the resolution of any such errors, omissions, or inconsistencies can be accomplished at the lowest cost (if any) and without delay to the overall completion of the project.

Reproducing the structural engineer of record's design drawings may well result in short-term savings with respect to the time and expense of preparing shop drawings. However, conscientious engineers should weigh these savings against having one more entity participating in the overall quality control process for the project. The loss of this benefit—i.e., the independent "check" of the engineer's design drawings by the steel fabricator—is one reason some engineers object so strenuously to their work being copied.

Richard C. Pennock, P.E.

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via email:

When studs are used in through-deck welding, it is recommended that the top flange be free of paint, scale, rust and debris within acceptable limits. However, we have been involved in pro-

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jects where the EOR has waived the no paint requirement and has allowed complete top flange painting. What are the criterion the EOR might use in making this decision?

If the paint is required as a rust inhibitor, how is the top flange touched up or painted after the deck and studs are installed if the top flange is unpainted to begin with?

I'll assume you're looking at an office building (or other similar commercial building application). If so, there is usually no reason to prime or paint the steel. Once enclosed in the building finish, the steel is in a sealed environment and will not rust any further than it did the day it was closed up. There are exceptions to this, like a building use that involves a beachfront, chemical or other aggressively corrosive exposure, but that is not very common in those types of buildings. So in the perfect world, there wouldn't be a need to keep paint off the top flange because there wouldn't be paint at all.

More commonly, though, the designer's spec still has a shop coat in there, essentially from old habits. It's changing slowly.

The paint will be no match for the welding, but I'd be sure from the stud manufacturer that welding through paint is OK before permitting it. It might also be a fume hazard for workers, depending upon proximity and actual fume generation.

I'm not sure that you could touch up this kind of damage to the paint in any practical way. The deck and steel are in contact, plus you've only got the flutes on either side of the weld for side access. Good thing this paint is not often required anyway.

Charles J. Carter, S.E., P.E.
American Institute of Steel Construction
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Another response on bolts and cranes (May/July 2000):

My comments relate to the replacement of bolts to connect a crane girder to a column cap plate. A325 bolts were considered for replacement in the May issue and tack welding the nuts was considered in the July issue.

If vibration or excessive prying is truly a concern that is resulting in loosening of the bolts, I would suggest that bolting systems used by crane manufacturers be considered. Normally only A307, grade B, bolts are used but there are special tolerances on the bolt diameter and

installation. The bolts are described as "tolerance body" bolts where the bolt holes are actually drilled undersized and reamed during bolt installation so that a light drive fit is required to install the bolts. This prevents any lateral displacement between the steel surfaces and prevents any vibration loosening.

Some crane manufacturers have stated that a friction connection will not maintain alignment and should not be used. Generally, any lateral displacement at a connection results in a sufficient reduction in the tension on the bolts to allow for the nuts to loosen.

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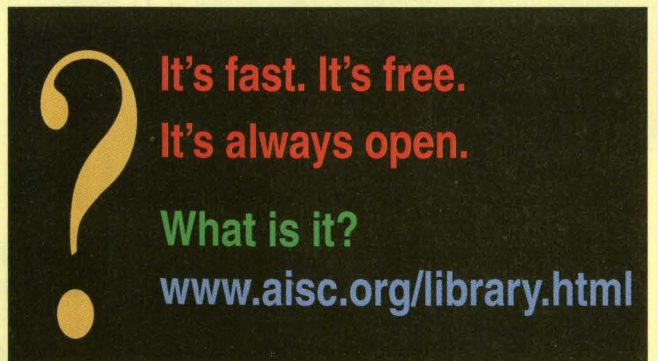
New Questions

A question has arisen in the interpretation of the ultimate capacity of bearing stiffeners under provisions of 1998 AASHTO.

Under Part D "Strength Design Method," Bearing Stiffeners, Article 10.48.7 shall be designed for beams and girders as specified in Articles 10.33.2 and 10.34.6. These articles relate to allowable stress design. There are no apparent provisions for strength design provisions in reducing the factor of safety in the column formula (2.12 in allowable stress design) or increasing the bearing value (0.80 F_y).

Is there some documented guidance as to what factor of safety, etc., should be used.

Patty Schibuola
Moffatt & Nichol Engineers



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It's always open.
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www.aisc.org/library.html