

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 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
1 East Wacker Dr.
Suite 3100
Chicago, IL 60601

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. 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 312/670-2400 ext. 433.

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

When would you justify the additional cost of high bond epoxy paint and coating for an exterior steel frame exposed to weather and water?

Epoxy coating, often topcoated with urethane finishes and always over a high degree of surface preparation are indicated under the following situations or combinations thereof.

- 1.) When Appearance is very important, as in architectural metal, decorative metal supports or substructures, which are exposed to atmospheric weathering.
- 2.) Long term durability, where failure due to corrosion might be catastrophic.
- 3.) Long term durability, where repainting or repair of coatings would be difficult or impossible due to site conditions.
- 4.) Exposure to corrosive atmospheres such as industrial sites where galvanizing or lesser coatings would be subject to attack.

Walter C. White
White Industrial Painters, Inc.
Trinity TX

What procedures should be followed when assessing steel that has been exposed to a fire?

The Question is really one of economics. If the steel can be straightened for less money than fabricating a new piece, then that should be done. The heat of a fire will not usually harm the steel. A good discussion of this is published in the Proceedings to the 1960 AISC National Engineering Conference, *Structural Steel After a Fire*, by F. H. Dill.

When would you justify the additional cost of high bond epoxy paint and coating on a column if there is standing water at the base of a column?

No problem! Many good coatings are available to line water tanks, and coated drilling rigs stand in the water offshore for many years. The best solution is to drain the standing water, if possible, but coatings will last for years.

Walter C. White
White Industrial Painters, Inc.
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How has the recent allowance of snug-tight high-strength bolting for certain types of shear/bearing connections affected your projects?

Snug-tight bolts, permitted in certain bearing-type connections, are not being used as often as they might be. One reason is that it is less expensive to install a "twist-off" bolt which, of course, provides pretension. Also, many engineers are still not aware of the enabling specification provision. Inspectors also need more education. Finally, some companies with a vested interest in tension indicating devices have been very effective in persuading engineers that it is important to accurately pretension all bolts, even though such pretension may not be important in the structural performance of the connection.

Robert O. Disque
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How do you decide when to use doubler plates and when to increase the size of the column?

With reference to the above question, we would like to share our experience as we recently evaluated three alternatives for a column. They were:

- 1.) A built-up section customized to closely match the column requirements with minimum steel.
- 2.) An undersized rolled section that required doubler plates to meet the column requirements.
- 3.) A rolled section, although oversized, that would meet the column requirements without any additional plates.

The analysis was essentially based on the following economic comparison. The costs for the three options were based on the cost of the steel as it arrived at the fabricator, then considering fabrication costs prior to the common work for the connections.

Number 3 weighs the most, and at this point has a cost for the steel based on the column height, and needed no fabrication work prior to that for the connection.

Number 2 weighs less, but needs to have the doubler plates attached. The lower cost of the steel alone for Number 2 compared to Number 3 is then analyzed as "buying" fabricating time to bring it up to the required section for the column. Dividing the amount of the monetary difference by the fabricator's charge per hour gives the time available to do the fabricating work. If the doubler plates can't be installed in the time that has been bought, then the oversized rolled section (No. 3) is more economical.

In our case the labor intensive fabricating operation was too costly for the fabricating time bought.

Also, in our case, Number 1 was not considered further as the fabrication involved would be even more time consuming, and therefore more costly, despite the fact that it was the lowest weight and the cost of the steel alone was the lowest of the three alternatives.

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New Questions

Listed below are some 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. 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.

1. Regarding beam to column simple shear connections, is there a general "rule-of-thumb" as to when the different types of connections are more advantageous? For example, would a stiffened seated bolted type connection be the more prudent type versus a double angle welded framed connection when a beam or girder is connected to a column web? Beam to column design loads as well as fabricator costs would obviously play major roles in answering this question. However, it has been my experience that situations occur in which four or five different types of simple shear connections would suffice.

Also, can beam to column seated and stiffened connections be considered wind connections or partially restrained?

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2. Are washers required in connections with slotted holes because of strength requirements or are there additional reasons?

3. Are there any design requirements that an engineer can follow when designing lateral bracing?