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

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.

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

When making a wide flange section out of three plates, can you weld on only one side of the web?

A solution to the problem requires a tee joint. This partial penetration joint is prequalified by the American Welding Society. One criteria for its use is that the web plate be greater than ¼" thick. Preparation of the web plate requires a single 45 bevel. The effective throat thickness is determined by the depth of the bevel minus ".

Ray Schork
Bayer-Becker Engineers
Fairfield, OH

Another response:

Yes. The weld between web and flanges can be on only one side and need only be large enough to transfer the horizontal shearing stress between the web and the flanges under static loads. In some cases, if the web of this built-up section is thin enough that the full penetration can be achieved with a fillet applied on only one side. Especially, this can be commonly found at main framing members of a pre-engineered steel building on which the majority of main frames comprise three-plate (built-up) sections.

However, if the built-up members are subject to dynamic loads, the notch which is sometimes produced by welding on one side only may lead to fatigue problems. In such a case, fatigue stresses should be checked according to the procedures defined in the AISC Manual and other applicable codes.

Kunming Gwo, P.E.
HCI Steel Building Systems, Inc.
Arlington, WA

Another response:

The weld between the flange and web of a fabricated wide flange section that is a flexural or compression member should be determined by the computed shear between the flange and web. If the computed shear can be carried by a weld on one side of the joint there is no reason to arbitrarily weld both sides. Millions of welded members in rigid frames with one-side welds are performing well all over the world and have been for over fifty years. As with any production process, tolerances and quality of workmanship must be monitored. The angle between the flange and web should not be allowed to deviate significantly from 90 degrees, for instance.

There are cases where one-side welding is not appropriate, for example, crane beams and beams that are going to be hot-dip galvanized. Beams with high tension loads perpendicular to the flange (i.e. underhung crane attachments and moment connections to the flange) should be reinforced with a second weld in the affected area.

Donald L. Johnson P. E.
Principal Engineering Consultant
Butler Manufacturing, Research
Grandview, Missouri

What is the most efficient and cost-effective way to connect a steel wide flange girder to a concrete column?

Assuming moment does not have to be transferred through the connection, the simplest and most efficient connection would probably involve the installation of a plate, with appropriately sized anchors to transfer shear, flush with the face of the column. The plate would be secured to the inside face of the column formwork to prevent its dislocation during concrete placement. After the formwork for the column has been

stripped, either a shear tab, seat angle or double angle could be welded to the face of the steel plate so as to produce a "standard" simple connection.

This concept is frequently used in precast concrete construction and design information for the embedded plate can be found in the PCI Design Handbook or in various ACI publications.

Stuart K. Jacobson
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New Questions

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

If you have any questions, please send them to: Steel Interchange, c/o 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.

Are there any limitations on the span to depth ratio of beams required by AISC Specification for Structural Steel Buildings?

The Manual of Steel Construction includes many items that are used along with structural steel frames, this is very convenient for structural engineers. However, some of the tables do not provide all of the information needed by engineers. One of the tables that AISC includes covers the dimesioning of cotter pins. What is the strength of cotter pins listed in the Manual of Steel Construction? Where can these items be obtained?

The AISC Code of Standard Practice in Section 2.1 lists items that are classified as "strutural steel" while Section 2.2 lists those items not classified as "structural steel". The rules is the AISC Specification and Code of Standard Practice apply to sturctural steel members. One of the items classified as "not structural steel" is stairs, catwalks,handrail and toeplates, what criteria is used to design these members?

In a partially cover-plated column, as shown below, how would you analyze the column for governing l/r ratio to calculate F_a?

Vijay P. Khasat, P.E.
Clinton, OH

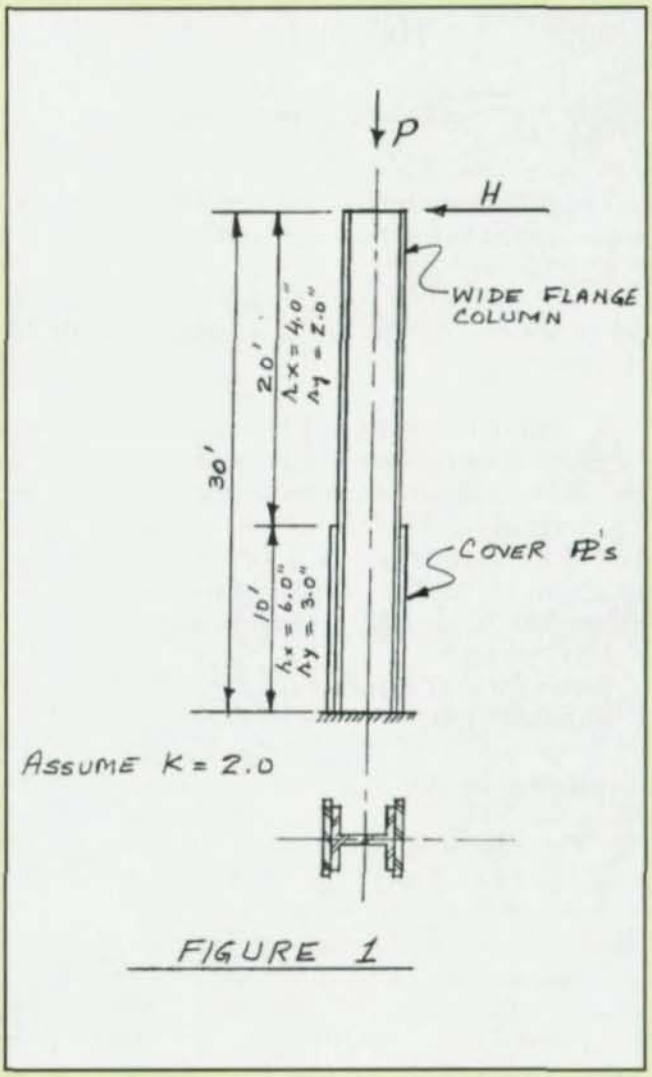

FIGURE 1