Correspondence

Dear Editor:

Regarding Jeffrey S. Nawrocki's article, "How Fabricators Can Combat Metal Buildings," in the May 1997 issue, I would like to correct one of the statements made. The article implies that welding flanges to webs on one side only is a "structural deficiency" and violates the "intent" of the AISC Specifications.

First, I do not believe such "intent" exists and, second, I am confident single-sided welding is not a structural deficiency. During the past 25 years, I have tested between 150 and 200 metal building manufacturer fabricated connections, rigid frame knee areas and complete bays. All of the beam or column members used in the tests were built-up sections with flange-to-web welds on one side of the web only. All of the tests were conducted to failure, and can state unequivocally that one-sided welding did not reduce the ultimate strength of the test specimens with but one exception. The exception is tests of end-plate connections under seismic loading. In these tests, repeated local buckling caused fracture of the flange-to-web weld near the end-plate. As a result, for this situation only, welding on both sides of the web for at least a distance equal to the depth of the beam from the face of the end-plate is recommended. This recommendation is contained in our 1997 NSCC paper on seismic loading of moment end-plates.

Thomas M. Murray, P.E., Ph.D.
Montague-Betts Professor of Structural Steel Design
Virginia Tech

Nestor Iwankiw, P.E., **AISC Vice President of Engineering and Research responds:** The AISC Specification for Structural Steel Buildings does not prohibit the use of one-side welds to connect the web and flange elements of built-up I-shaped members. However, as illustrated in AISC LRFD Manual of Steel Construction Figure 8-33 and discussed in the accompanying text (page 8-114 Notch Development), a one-side welded joint may be unacceptable, or require additional considerations, if there is a tendency for the joint to open on the unwelded side. A similar concern is explicitly defined in LRFD Specification Section J2.2b for lap joints with transverse welds.

Laboratory testing and in-service building performance provide evidence that built-up I-shaped beams and beam-columns with one-sided welds connecting flange and thin web elements (generally less than ¼" thick) do achieve their anticipated design strength under monotonic static loading. Under other conditions, however, such a welded joint may be subject to rotations that would tend to open the joint and result in either premature failure due to notch effects or reduced strength. For example, the most recent study by Professor Murray has confirmed that two-sided welds are necessary for beam ends at end plate moment connections under seismic loads (and maybe under other similar conditions wherein inelastic straining or buckling can occur). Application of concentrated loads to built-up members with one-sided welds may also lead to strength reductions from localized eccentricities and/or imperfections. Additionally, when fatigue is a design consideration, a two-sided welded joint would offer a better fatigue life.

Given the above, the responsibility for the design of built-up I-shaped members and the selection of appropriate welded joint details continues to reside with the Engineer of Record. This decision should be based upon a full knowledge of the individual project requirements and conditions, applicable specifications and building code requirements.

Dear Editor:

Your article, "Renovation Expands Seattle Supersonic's Home Court" by Brian McIntyre (September 1997 MSC), was an interesting account of a renovation project. However, the article missed important points about flaws in the original design that resulted in a lack of stiffness, and might have caused the leaks mentioned in the article. The flaws are important lessons for the design community and could be avoided through better consultation between architect and engineer at the inception of design.

The original cable roof of the arena had a very shallow curvature (a sag-to-span ratio of about 1:25—far less curvature than the 1:10 typical for roofs as well as for suspension bridges, such as the Golden Gate Bridge or the nineteenth century Roebling Bridge). The shallow curvature resulted in about 250% greater cable forces. Reversing the high- and low-points along the roof edges would have resulted in much better curvature for the saddle-shaped roof. This would also have lowered the main abutments supporting the four mid-roof trusses as a further benefit.

The original roof net cables were oriented in the least effective direction, parallel to the generating lines (parallel to roof edges) with no initial curvature and stiffness. Cables in direction of the principle curvature deflect six times less under load. This was determined by model tests I conducted and published in 1968, and confirmed later by computer analysis (both at the University of California-Berkeley). This fact should be made available to your readers for the benefit of future projects.

G.G. Schierle, Ph.D., FAIA
Professor of Architecture
University of Southern California, Los Angeles
(via email)

Dear Editor:

I'm writing to correct the article on the Baltimore Convention Center featured in your September 1997 issue.

Leslie E. Robertson Associates, R.L.L.P. (LERA) was not the only structural engineer for this project. It should be noted that John V. Christiansen provided the Schematic Design (which design was later revised by LERA to meet budgetary limitations). LERA accomplished the revised Schematic and all subsequent phases of this work.

Saw-Teen See
Managing Partner
Leslie E. Robertson Associates

New Steel Detailing Forum

Steel detailers and fabricators can find a fount of valuable information on a new "Steel-Link" web site located at **http://steel-link.com**. While at the site, visitors can sign up to be included in a free "steel detail email discussion forum." The forum is essentially a running dialog between members of the steel detailing community on a wide range of issues, including soft-

ware and help wanted openings.

A typical recent posting stated: "I am doing a job with moment connections and it came up to maybe use the 'End Plate Moment Connection' as described in the AISC book (ASD, 9th Edition) page 4-116. It says the End Plate Connection is for 'Static Loading Only.' What is Static Loading?

AISC's Director of Manuals, Charlie Carter, responded: "From AISC's A Guide to Engineering and Quality Criteria for Steel Structures, static loading is "...characteristically slowly applied and removed, as would be typical in building, sign and tower structures; dead, live, wind and similar loads are generally considered to be static." Conversely, cyclic load is defined therein as "...applied and/or removed at a rate that cannot be considered to be static and requires consideration of fatigue, as would be typical in bridge structures and crane runways." There is also dynamic loading, such as that due to impact.

"The aforementioned book (AISC Pub. No. S323) is available from AISC for $20. Call 800/644-2400."

AASHTO-NSBA Collaboration

Representatives from 12 state Departments of Transportation, six steel bridge fabricators, the FHWA at all levels, and other steel bridge industry groups met on September 8-9 in Cincinnati to set the course for the newly formed AASHTO-NSBA Steel Bridge Collaboration.

The primary goal of this effort is to produce national standards relative to all aspects of steel bridge fabrication, inspection and erection to be adopted by AASHTO and replace the many widely varied requirements that fabricators have to deal with today.

Based on the needs considered most important, the following task groups were formed by a consensus at the meeting:

- Shop drawings and details (Walter Gatti, Tensor Engineering, Chairman)
- National code for fabrication and construction (Fred Beckman, NSBA-Retired, Chairman)
- Regional groups for input and implementation (Lou Triandafilou, FHWA, Chairman)
- Quality issues, QC/QA (Paul McDad, Texas DOT, Chairman)
- A database for repair options (Kim Roddis, University of Kansas, Chairman)
- Transportation issues (Tamer Ahmed, FHWA, Chairman)
- Research needs (Krishna Verma, FHWA, Chairman)
- Coatings (Eric Kline, KTA-Tator, Chairman)

Each of these task groups is comprised of volunteer members from the group present at the meeting. Additional items were identified that need attention and task groups; these will be formed as volunteers become available. If you would like to participate in any of these groups or would like further information, contact: Bill McEleney, NSBA Regional Director, Construction Services at 401/943-5660 (email **mceleney@aiscmai.com**).

There was agreement at the meeting that there is a need for national bridge standards, despite the recognized difficulty in determining what they should be and in having them adopted. Representatives from the public agencies present acknowledge that standardization will result in higher quality and value and that it is ultimately in their benefit to have a vital, competitive steel bridge industry.

The mission of The National Steel Bridge Alliance (NSBA), which was formed in 1995, is to enhance the art and science of the design and construction of steel bridges. Its activities include organizing meetings, conferences and national symposia, conducting the Prize Bridge Awards competition, supporting research, developing design aids, and providing assistance to bridge owners and designers. The NSBA membership includes representatives from all aspects of the steel bridge industry.

Notice Of Public Review & Meetings

A number of changes to the AISC Load and Resistance Factor Design Specification for Structural Steel Buildings (December 1, 1993) have been approved by the AISC Committee on Specifications. Public review of these proposed revisions will extend until December 10, 1997. To obtain a copy of the proposed revisions, please send a check for $5 (to cover postage and handling) payable to AISC (send the check to: AISC, One East Wacker Dr., Suite 3100, Chicago, IL 60601-2001, attn: Abraham J. Rokach, Secretary, Committee on Specifications). To be considered, review comments must be received by AISC no later than December 10, 1997.

The annual meeting of the AISC Specifications Committee will be in Chicago on Friday, November 21, 1997. Several Task Committees of the Specification Committee also will meet in Chicago on the preceding two days. For further information, contact Abe Rokach at 312/670-5416.

Bob Freeland Named New AISC Chairman

Bob Freeland

Bob Freeland, formerly the American Institute of Steel Construction Inc.'s First Vice Chairman, has been elected the new Chairman of AISC's Board of Directors. Freeland, who also is Chairman of Havens Steel Co., a global steel fabrication and steel construction firm headquartered in Kansas City, MO, began his two-year term in September.

Freeland has served on the AISC Board of Directors for more than a decade and previously was the Institute's Treasurer. Known for preci-

sion and results-oriented planning, Freeland stated that he hopes to further expand structural steel's market share in the building and bridge industry during his tenure. "I think that anything we do for our members or out in the industry has to have, as its main purpose, the goal of expanding steel's market share," he explained.

Recently, Freeland headed up AISC's strategic planning committee. "I take a lot of pride in the development of our strategic plan. It has all of the necessary ingredients to strengthen the steel construction market," he said. Freeland stressed that he hopes to expand the industry-wide unification efforts begun under his predecessor. These efforts include the creation of additional joint strategies and activities between fabricators, detailers, erectors, engineers, designers and contractors. "All of the segments of our industry believe we at AISC can make a difference. It's up to us not to disappoint them," he stated.

"I also hope that AISC will continue its software development efforts to make it easier to design in steel—and to make it easier for designers, fabricators, educators and others to obtain and utilize the most advanced information for building steel structures," he said.

Other important activities that Freeland hopes to foster at AISC, all of which are included in the Institute's Long Range Strategic Plan, include: expansion of university relations and activities; a strengthened and expanded AISC certification program; expansion of the National Steel Construction Conference; development of strategies to minimize the impact of adverse governmental regulations on the steel design and construction industry; continued development of innovative steel design methods and materials; and providing new training opportunities to meet a growing need for additional qualified personnel in the steel construction industry.

"We're the source of information on steel structures," he added. "We should be able to get that information to our members and others quickly and easily, including market breakthroughs in research and technology. AISC is working on new types of training programs to put strength into our product and bring it to market more quickly."

Another area of interest to Freeland is the internationalization of steel standards and specifications. During the past few years he has spent a lot of time in Asia and Europe, in part establishing Havens-owned joint venture fabricating plants in China and Russia. According to Freeland, AISC has the opportunity to assume a very active leadership role in the future creation of a global steel specification. "America has the most efficient designs and basic material costs which, if brought to the global market correctly, could increase steel's use in construction for U.S. companies world-wide," he explained.

Freeland has more than four decades of experience in the fabricated structural steel industry, all with Havens. He started working part-time for the fabricator in 1955 while still in high school, leaving only to obtain an engineering degree at the Missouri School of Mines and Metallurgy at Rolla before returning to Havens full-time in 1960.

AISC Announces New Erector Certification Program

Beginning in November, the American Institute of Steel Construction, Inc., will start auditing steel erection firms as a first step towards certification. The certification program is designed to demonstrate that a company has the experience, manpower, equipment and procedures to erect steel-framed structures. It is expected that the first firm will earn its certification by the end of the year and that more than 50 erectors will apply for certification by the end of 1998.

The program was developed in conjunction with the National Erectors Association (NEA) and the Steel Erectors Association of America (SEAA). It is similar to AISC's well-known and highly respected Quality Certification program for steel fabricators, which many engineers, contractors and state agencies use as a form of pre-qualification. Currently, nearly 400 fabricators are certified.

"The Erector Certification Program will offer a system-based evaluation using annual randomly selected site visits and a review of quality systems," explained Tom Schlafly, AISC's Director of Certification and Fabrication Operations. "While auditors will observe erectors working on a site, it is not an inspection. The auditor looks for evidence that the company has the ability to perform the work, rather than ensuring performance on a specific project."

There are two levels of certification, Certified Steel Erector and Certified Advanced Steel Erector. Both levels are designed to ensure that erectors meet the following measures:

- Written erection stability plan
- Formal safety plan
- Program in-place to promote project planning
- Formal program to monitor compliance with welding and bolting procedures
- Written substance abuse plan and policy

In addition, the Advanced certification includes:

- Experience in retrofit and maintenance
- Experience with complex projects such as working over water and railroad tracks
- Experience with large-scale erection projects
- Experience and equipment for rivet removal
- Written procedure for jacking and use of falsework

"AISC was the logical administrator for the program because no one erector association represents the entire industry," according to Fred Haas, a well-known erection industry consultant who has helped to guide the formation of the Erector Certification Program. "Also, I believe that it is critical that fabrication and erection go hand-in-hand." One emphasis of the program is encouragement of coordination between designers, general contractors, fabricators and erectors.

"The mission of the Erector Certification Program is to provide a consistent measure of confidence in the organization and systems used by erectors," explained Haas. "Many erectors do fine work, but we have also seen a need for some improved methods in the industry. The standard we are writing will be achievable by any company with the desire to obtain it, but will also include some requirements that are not now met by many erectors. Litigation is increasing in all parts of society. One way we can pre-

vent an increase in litigation in the steel industry is to emphasize sound erection practices," Haas concluded.

The entire construction industry should realize benefits from the program, added Robert G. Abramson, CEO of Interstate Iron Works in Whitehouse, NJ, and Chairman of AISC's Committee on Certification, Fabricating Operations and Safety. "As a fabricator, it gives me the ability to pre-screen the erectors I use on projects to help alleviate any potential problems. Contractors, owners and designers also will be able to use the program for prescreening. In addition, it should help fabricators and erectors work more closely together—and earlier on a project—to plan connections, bracing, scheduling and equipment needs."

Cold-Formed Steel Design Manual

The 1996 Edition of the AISI Cold-Formed Steel Design Manual has been published and may be purchased from USA Fulfillment/AISI, Box 4237, Chestertown, MD 21690 (ph: 800/277-3850; fax: 410/810-0910). This new publication includes eight chapters on the design of cold-formed steel structural members and connections. The new (1996) Specification is included as Part V of the Manual. The contents of the Design Manual are summarized in CCFSS Technical Bulletin, Vol. 6, No. 2, August 1997.

New Offices For Steel Deck Institute

Robert Paul, P.E., of Epic Metals Corp. has been named the new president of the Steel Deck Institute (SDI). Also, Steven A. Roehrig, P.E., has been named the new Managing Director. Prior to starting his own consulting firm, Roehrig worked for Roll Form Products, a steel deck manufacturer, and served on several SDI committees.

SDI's new address is: Steel Deck Institute, P.O. Box 25, River Grove, IL 60021-0025 (ph: 847/462-1930; fax: 847/462-1940).

Composite Deck Design Handbook

A new publication, "Composite Deck Design Handbook" by R.B. Heagler, L.D. Luttrell and W.S. Easterling, has been published by the Steel Deck Institute. The text includes the latest research results from West Virginia University and Virginia Polytechnic Institute and State University. The design method is primarily LRFD with ASD shown as an alternate. Copies of the new handbook can be purchased from: SDI, P.O. Box 25, River Grove, IL 60021-0025 (ph: 847/462-1930; fax: 847/462-1940).

More Schools Add Steel Sculpture Teaching Aid

During the past few years, a full-scale model showing a wide variety of steel connections has been installed on a large number of university campuses. "The steel sculpture is a teaching aid for civil engineering students to learn more about steel connections," explained Fromy Rosenberg, AISC's Assistant Director of Education.

Added Professor Duane Ellifritt of the University of Florida: "Students who have never been around construction sites to see steel being erected have a difficult time visualizing the three dimensional character of the connections." The sculptures are modeled after the sculpture featured in AISC's "Connecting Steel Members—A Teaching Guide."

Typically, a consortium of local fabricators pays the cost of fabricating the sculpture. For example, one of the most recent sculptures was installed at the University of Idaho in Moscow, ID. Four AISC Active-Member fabricators teamed up to provide the material and fabrication: K&T Steel Corp., Twin Falls, ID; Metals Fabrication Company, Inc., Spokane, WA; Red Iron Corp., Spokane, WA; and Western Steel Manufacturing Co., Boise, ID.

Schools that have sculptures include: Washington University; University of Florida; Gonzaga University; Purdue University-North Central; Georgia Institute of

Technology; University of Texas-San Antonio; University of Wyoming; Illinois Institute of Technology; Florida A&M/Florida State University; Montana State University; University of Wisconsin-Milwaukee; East Tennessee State University; Florida Institute of Technology; University of Alabama-Tuscaloosa; University of South Alabama; University of Alabama-Birmingham; Southern Polytechnic State University; Texas A&M University; Wentworth Institute of Technology; Stevens Institute of Technology; Clemson University; Ohio State University; University of Missouri-Rolla; Ohio Northern University; University of Idaha-Moscow; Louisiana Tech University; University of Wisconsin-Madison; University of Wisconsin-Platteville; University of Mississippi; Augusta Technical Institute; Alabama A&M University; University of Alabama-Huntsville; Auburn University; and Louisiana State University.

For more information on Steel Sculpture Teaching Aids or other AISC university programs, contact Fromy Rosenberg at 312/670-5408.

News Briefs....

HSS Seminars

In response to the growing popularity and use of hollow structural sections, AISC will offer an HSS seminar in 13 cities next year. The seminar, offered in association with the Steel Tube Institute and the American Iron & Steel Institute, will review and cover all aspects of HSS design and connections, including both simple and moment connections.

The seminar, to be offered in 13 cities, will run all afternoon and into the evening. Sessions include:

- Materials and Specifications;
- Welding & Bolting;
- Shear Connections;
- Moment Connections;
- Tension & Compression Connections, Column Splices, Base and Cap Plates;
- Truss Connections and Examples;
- Constructability.

Cost of the seminar, including dinner, is $175 for non-AISC members ($135 for each additional attendee from the same firm) and $140 for AISC members ($100 for additional attendees from the same firm).

The seminar will include extensive hand-out material, but will not include the new HSS Connections Manual, which can be purchased beginning in January for $72. The seminar starts at 1:00 p.m. in each city and runs through 9:00 p.m. It has a continuing education value of 6.0 Professional Development Hours or .6 CEUs.

All *Modern Steel Construction* subscribers will automatically receive a detailed program mailing.

1998 HSS Seminar Schedule

February 3	Charlotte
February 4	Atlanta
March 18	Philadelphia
March 19	Houston
April 28	Cincinnati
April 29	Chicago
May 19	Boston
May 20	New York
June 2	Denver
June 3	Kansas City
June 16	Los Angeles
June 17	San Francisco
June 18	Seattle

AISC Serviceability Seminar

Both engineers and architects are giving AISC's new 49-city Seminar Series, "Designing Steel for Serviceability," rave reviews. Some have even gone so far as to call it "AISC's best seminar yet."

The powerful sessions cover five important topics: frame layout options & strength design; roof ponding; floor elevation & levelness; control of lateral drift; and control of floor vibrations.

The seminar series has a CEU value of 0.55 (5.5 PDH). Registration is $120 ($90 for AISC members). The registration fee includes a wide range of handouts.

Please note that all MSC subscribers will automatically receive a registration form six weeks prior to the seminar scheduled in their area.

For more information, call 630/369-3772, fax 630/369-3773 or point your favorite web browser to: http://www.aisc.org

Seminar Schedule

1997

Nov. 5	Portland, OR
Nov. 6	Seattle
Nov. 12	New Orleans
Nov. 13	Houston
Nov. 18	Meriden, CT
Nov. 19	New York City
Nov. 25	Atlanta
Dec. 2	Memphis
Dec. 4	Nashville
Dec. 11	Salt Lake City

1998

Jan. 14	Los Angeles
Jan. 15	Los Angeles-East
Jan. 21	Columbus, OH
Jan. 22	Cleveland
Jan. 27	Jacksonville
Jan. 29	Tampa
Feb. 4	Boston
Feb. 5	Portland, ME
Feb. 11	Albuquerque
Feb. 12	Phoenix
Feb. 18	Pittsburgh
March 3	Kansas City
March 5	Denver