

IN MEMORIAM

Fred Haas, Engineering and Erection Expert, Dies



Steel industry consultant Fred Haas passed away on July 26 following a fall in his home.

A structural engineer, Haas was a past president and

honorary member of the Associated Steel Erectors. He was also active with AISC and the Structural Engineers Association of Illinois and received the AISC Special Achievement Award in 2001 for his work

in developing the AISC Erector Certification program.

A longtime resident of Burr Ridge, Ill., Haas was a graduate of Purdue University and served with the U.S. Army Corps of Engineers in the South Pacific Theater during World War II. A long and successful career in the Chicago construction industry followed, including positions at Mississippi Valley Steel, Vogt and Conant, American Bridge Company, Wendnagel and Company and Danny's Construction.

Fred is succeeded by his wife, Diana, and two daughters, Karen and Megan.

PODCASTS

New Steel Profiles Podcast Features Rafael Sabelli



Need inspiration for your work day? Delve into fascinating conversations with leading experts in the structural steel industry with AISC's Steel Profiles podcast series. The latest

episode features an interview with Rafael Sabelli, S.E., principal and director of seismic design at Walter P Moore.

Tune in to hear about his path from philosophy student to seismic expert, what type of seismic force resisting system he would like to be and the best joke (and the worst!) he's ever delivered to a lecture audience.

You can play or download this episode and all past episodes of Steel Profiles at www.aisc.org/podcasts or on iTunes (www.iTunes.com). In iTunes, simply search "Steel Profiles" to access all episodes. You can also subscribe to the series for free, and each new episode will automatically be downloaded for you.

BRIDGES

Steel is the Green Material for Road Bridges, Says Report

A new independent study reveals that steel is more than twice as sustainable as other materials when used to construct bridges, according to a recent article published in the *Steel International Times*.

The study, carried out by a Dutch government organization, analyzed road and bicycle bridges. It found that steel

performs best in road bridges because of its low environmental footprint, which is due to its relatively low weight as well as its excellent recycling properties, such as its ability to be "up-cycled" into a higher-quality steel.

Visit www.steeltimesint.com to read the article.

People and Firms

- **Jerry Hajjar**, P.E., Ph.D., Department of Civil and Environmental Engineering Chair at Northeastern University in Boston, has



been named the CDM Smith Professor in Civil Engineering, an endowed position that is recognized as the highest honor the university bestows on its faculty. Hajjar was selected for his outstanding scholarship and national leadership in the field of civil engineering, having made numerous contributions. Hajjar received AISC's T.R. Higgins Award in 2005 and the Special Achievement Award in 2004. He also has served on several AISC Specifications Task Committees.

- **The Steel Bridge Task Force** of the Steel Market Development Institute (SMDI), a business unit of the American Iron and Steel Institute (AISI), and the AASHTO (American Association of State and Highway Transportation Officials) Technical Committee for Structural Steel Design have named Hussam Mahmoud, Ph.D., assistant professor in the Department of Civil and Environmental Engineering and Director of the Structural Laboratory at Colorado State University in Fort Collins, Colo., as the recipient of the 2014 Robert J. Dexter Memorial Lecture. Mahmoud's presentation at the most recent SMDI Steel Bridge Task Force meeting, this past August in Denver, was titled "A Probabilistic Approach for Fitness-for-Purpose Assessment of Welded Details."

PROJECTS

Raising the Roof

How do you expand an industrial building's volume without using more land? Simple. Raise the roof.

AISC Member fabricator and erector Industrial Services Enterprises (ISE) in Randolph, N.J., has used this system on buildings for decades to increase ceiling heights for warehouses, mezzanines, high-bay equipment and other uses. The process involves lifting the entire existing roof intact (including all utilities) and re-supporting the roof on the existing framework of the building using all structural steel elements, which is more economical and faster than building a new structure.

In Jamesburg, N.J., ISE's patented E-Z Riser roof-raising system lifted the roof of a 440,000-sq.-ft warehouse by 21 ft to create a 45-ft clear-height building. All of the design, engineering, steel fabrication and erection was done in-house. The roof was raised in four sections with ISE's hydraulic lifting process, then

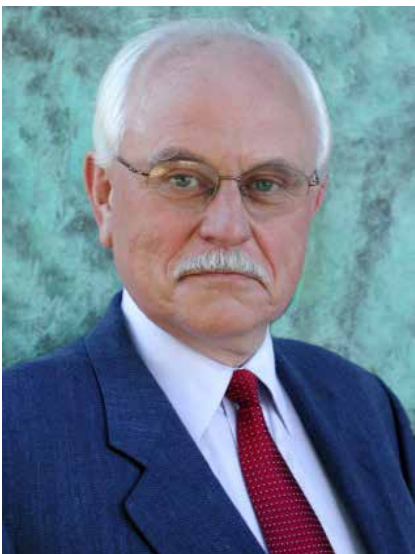
bolted or welded to the structural steel elements (390 tons of structural steel is being used on the project).

To learn more about the E-Z Riser roof-raising process, visit www.ezrusa.com.



HONORS

Reidar Bjorhovde Named ASCE Distinguished Member



Influential steel research engineer Reidar Bjorhovde, P.E., Ph.D., was recently

named a Distinguished Member of the American Society of Civil Engineers (ASCE). Distinguished membership is the society's highest accolade.

Bjorhovde is recognized for his seminal research on the stability and reliability of steel columns, reliability and design of bolted connections, reliability and performance of composite frames and heavy steel members and classifying bolted and welded connections, as well as for his significant contributions in preparing national and international steel design codes.

Bjorhovde is president of The Bjorhovde Group, which he founded in 1998. He consults on construction projects, engineering projects, design codes and research around the world, with a focus on steel materials. Before working in consulting, he was a professor

for many years at the University of Arizona and the University of Alberta in Canada, and he was also a professor and chair of the Department of Civil Engineering at the University of Pittsburgh.

He currently serves as research editor for AISC's *Engineering Journal* and is editor of the *Journal of Constructional Steel Research of Elsevier Science*. He received AISC's Lifetime Achievement Award in 2011 for his many contributions to AISC's publications, as well as the T.R. Higgins Award in 1987 for his paper on column design.

To date, only 649 of ASCE's worldwide members have been elected to receive distinguished membership since the society's founding in 1852. (ASCE currently represents more than 145,000 civil engineers worldwide.)

Fourth-Quarter Engineering Journal Now Available

Engineering Journal has replaced its digital edition browser with a single downloadable PDF file at www.aisc.org/ej. The current issue—fourth quarter 2014—will be available for download and viewing until the next issue is posted.

Articles from the complete collection of *EJ* will remain available individually in the searchable archives. Downloads of current and past articles in PDF format are free to AISC members and ePubs subscribers. Non-AISC members may subscribe to *EJ* at the AISC bookstore.

Here are the Q4 articles:

► Evaluation and Repair of Bridge Truss Gusset Plates

Howard Hill, Jonathan C. McGormley, Jonathan Lewis, Wade Clarke and Thomas Nagle

Gusset plates used to connect members in large steel trusses are important elements in many existing bridge structures. As such, their capacities can influence bridge structural load ratings, especially when the effects of deterioration and/or damage have become significant. In order to provide accurate load ratings, avoid unnecessary repairs and, when necessary, design appropriate repairs, gusset plate conditions and characteristics must be properly incorporated in the responsible engineer's evaluation. Because the cost of being conservative is far greater for existing structures than for new designs, engineers evaluating existing gusset plates should not rely too heavily on design-based methods when making final load rating and repair decisions. The purpose of this paper is to provide some practical guidance to the process of gusset plate evaluation and repair in order to promote efficient use of limited bridge maintenance resources.

Keywords: gusset plates, shear, compression, deterioration and repairs

► Two-Way Bending of Base Plates under Uniaxial Moment Loading—Alternative Approach

Edward R. Haninger and Bruce M. Tong

This Technical Note presents an alternate model for two-way bending design of column base plates under uniaxial moment loading and is based on the design premises of AISC Design Guide 1, Base Plate and Anchor Rod Design (Fisher and Kloiber, 2006). Two-way bending, in this paper, refers to bending of a column base plate in the direction perpendicular to the primary direction of bending and is also called side bending. When two-way bending governs, which is commonly the case, this procedure results in more efficient base plates that more closely reflect available strengths. A sample calculation is also provided.

Keywords: base plate, steel design, column base, two-way bending, side bending

► A Graphical Design Aid for Selecting Standard W-Shape Steel Beam-Columns with Minimum Weight

Mobammad Ali Sa'adat and Mobammad Reza Banan

This paper presents an alternative technique for selecting the lightest W-section for beam-column members. Following the AISC procedure, the number of required steps to find a feasible section highly depends on the initial trial section. A new graphical technique based on the AISC interaction formula for designing steel beam-columns is proposed. By employing the newly developed diagrams, the new approach quickly leads to the lightest feasible section for a member subjected to combined biaxial bending and axial force. The number of computational steps in the proposed method is slightly reduced from the current AISC procedure. Some advantages of the new proposed method are converging to the solution in fewer steps, imposing no limit on L_b , considering the effect of C_b , considering biaxial bending by simply using a modification factor and covering cases where L_b is not equal to KL .

Keywords: beam-column, design aid, graphical solutions

► Effective Weld Properties for Hollow Structural Section T-Connections under Branch In-Plane Bending

Matthew R. McFadden and Jeffrey A. Packer

The 2010 AISC *Specification for Structural Steel Buildings* has expanded the scope in Chapter K, "Design of HSS and Box Member Connections," to include a Section K4, "Welds of Plates and Branches to Rectangular HSS." An experimental program was undertaken to test various unreinforced HSS-to-HSS 90° T-connections subject to branch in-plane bending moment with the objective of determining the effectiveness of the welded joint. Twelve unique test specimens were designed to be weld-critical, and the results from the full-scale tests revealed that the current equation for the effective elastic section modulus for in-plane bending, S_{ip} , given in Table K4.1 of AISC 360-10, is very conservative. A modification to the current requirement that limits the effective width of the transverse weld elements is proposed, resulting in a safe but more economical weld design method for HSS-to-HSS T-connections subject to branch bending moment. By reanalyzing the data of prior weld-critical tests on HSS-to-HSS T- and X- (cross-) connections subject to branch axial loading, it is shown that the proposed new weld effective length recommendation is applicable to these connections as well. It is also concluded that the fillet weld directional strength enhancement factor, $(1.00 + 0.50\sin^{1.5}\theta)$, should not be used for strength calculations of welded joints to square and rectangular HSS, with the proposed revision, when the effective length method is used.

Keywords: hollow structural sections, welded joints, moment connections, gas-metal arc welding, effective weld properties, fillet welds, partial-joint-penetration flare-bevel-groove welds

► Current Steel Structures Research No. 36

Reidar Bjorhovde