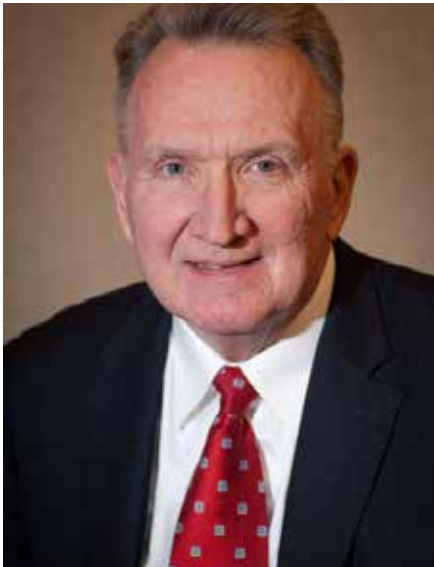


news and events

IN MEMORIAM

Alex Wilson, Prominent Metallurgical Expert, Dies



Alexander (Alex) Daniel Wilson, one of the steel industry's most distinguished metallurgical engineers, died on November 23, 2018, at the age of 73. During his 41-year career with ArcelorMittal USA and its predecessor companies, he helped advance the material properties of steel and in 2012, he was awarded an AISC Lifetime Achievement Award.

Wilson was well known and highly respected for the development and testing of new technologies for the bridge industry, including weathering steel and high-performance steels, both of which provide cost-effective and durable alternatives to other materials and are widely used in bridge construction today. He also contributed to innovations in welding, steel production and steel bridge design through his

involvement with Steel Market Development Institute's (SMDI) corrosive advisory and welding groups.

His influences reached beyond bridge applications, impacting military, structural, and pressure vessel applications with his high-strength steel and weldability work. Over the years, Wilson also conducted research with clean steels, fracture mechanic evaluations and plate steel development, published more than 65 papers and shaped the development of bridge material specifications. Looking to the next generation of talent, he oversaw the establishment of SMDI's Robert J. Dexter Memorial Lecture, which opens the SMDI Steel Bridge Task Force to promising structural engineers beginning their careers, providing a platform to present their research and new ideas.

SEISMIC DESIGN

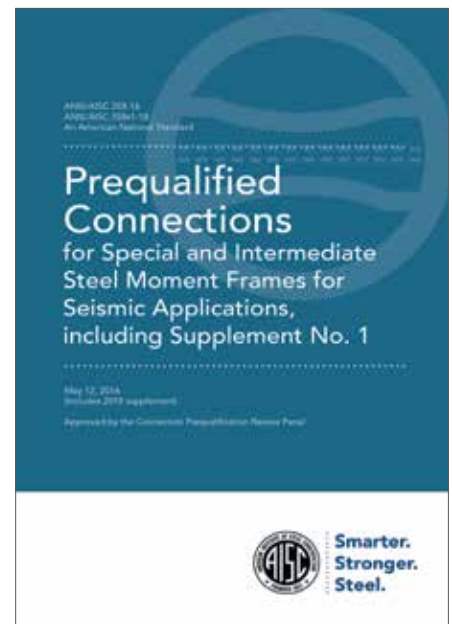
New Prequalified Seismic Moment Connection Supplement Available

Engineers now have more options for seismic design. AISC's recently released Supplement No. 1 (ANSI/AISC 358s1-18) to the 2016 version of the AISC standard, *Prequalified Connections for Special and Intermediate Steel Moment Frames for Seismic Applications* (ANSI/AISC 358-16), allows designers to specify slotted web moment connections. In addition, the supplement includes a field bolted option for the popular SidePlate moment connection. The supplement has been fully integrated into the standard, and the complete document is now available for free download at www.aisc.org/standards.

The supplement has been approved by the AISC Connection Prequalification Review Panel (CPRP) and is ANSI accredited. "The recently released supplement to ANSI/AISC 358-16 expands options available to designers for prequal-

ified moment connections in special and intermediate moment frames for seismic applications," said Michael D. Engelhardt, chairman of the AISC CPRP. "Supplement No. 1 includes a new prequalified connection, known as the SlottedWeb moment connection. The supplement also significantly expands the existing prequalification for the SidePlate moment connection to include a field bolted option. With this supplement, there are now a total of 10 prequalified moment connections available to designers."

ANSI/AISC 358 is an essential companion to the AISC *Seismic Provisions for Structural Steel Buildings* (ANSI/AISC 341-16, also available at www.aisc.org/standards), as it outlines the requirements for the prequalification of specific seismic moment connections consistent with Chapter K of the *Seismic Provisions*.



correction

In the list of annual AISC scholarship winners in the December 2018 news section (available at www.modern-steel.com), the photo of AISC/UTUC Architecture Schol-

arship winner, Conor Schafer, a student at the University of Illinois at Urbana-Champaign, was inadvertently left out. Here is Conor:



FORGE PRIZE

ACSA, AISC Announce New Competition for Visionary Designs in Steel



AISC has partnered with the Association of Collegiate Schools of Architecture (ACSA) to establish a new opportunity for emerging design professionals to be recognized for their innovative designs. The Forge Prize recognizes innovation in the use of steel. The prize invites designers to submit proposals for visionary designs that embrace steel as the primary structural component. It is intended to engage designers in developing imaginative designs that bolster steel as the 21st century building material of choice through a two-stage design challenge, culminating with a public announcement event of winners this summer.

Projects can focus on architecturally exposed structural steel (AESS), modular construction, long-span solutions, reuse, systems, urban density, etc., but are not limited in their scope or complexity. The Forge Prize is open to all innovative uses of structural steel.

During Stage One, a jury of experts will convene to identify up to three conceptual submissions that will be awarded a \$10,000 stipend to continue on to Stage Two. To the extent possible, AISC will pair the three projects with a steel fabricator to help continue design development and work out further technical or structural revisions to refine and enhance the viability of the conceptual design in a real-world application.

Stage Two contestants will prepare a final submission and present to the jury this May. The contestants and jurors will participate in a public event, where each of the three finalists will present their designs, and the jury will announce the winner they selected and provide critical commentary on all three submissions.

AISC has partnered with the Association of Collegiate Schools of Architecture (ACSA) to establish a new opportunity for emerging design professionals to be recognized for their innovative designs. The Forge Prize recognizes innovation in the use of steel. The prize invites designers to submit proposals for visionary designs that embrace steel as the primary structural component. It is intended to engage designers in developing imaginative designs that bolster steel as the 21st century building material of choice through a two-stage design challenge, culminating with a public announcement event of winners this summer.

The overall winner will receive an additional \$10,000 award, for a grand total of \$20,000.

The Forge Prize is open to designers practicing in the U.S. or Canada. Entries will be accepted for individual as well as team submissions. Team submissions are required to have a designated Team Lead. Individuals or the Team Lead should be an emerging professional, in the process of licensure or within 10-years of licensure.

The Forge Prize Jury consists of world-renowned architecture professionals with decades of experience in research, design, teaching and publishing:

- Terri Meyer Boake is a full professor at the School of Architecture at the University of Waterloo in Canada. She has been teaching building construction, structures, environmental design and film since 1986. She works with CISC, ACSA and AISC developing teaching resources for Architectural education specializing in AESS.
- Joseph G. Burns, SE, PE, CEng, is a managing principal at Thornton Tomasetti in Chicago. Burns is a passionate advocate for the deeper integration of architecture and engineering, which he promotes through technical innovation in the design of structural systems, collaboration in practice and leadership in building science education. A member of Thornton Tomasetti's board of directors, he oversees the firm's operations in Europe, the Middle East, India and Brazil.
- We are awaiting confirmation on an additional architect juror.

Here is the schedule for the award program:

- Stage One Submission Deadline: January 16, 2019
- Stage One Winners Announced: February 2019
- Stage Two Submission Deadline: May 2019
- Final Winner Announcement and Event: Summer 2019

For more on the Forge Prize, visit www.forgeprize.com.

NASCC

NASCC 2019 NASCC Registration Opens January 2

Planning to attend NASCC: The Steel Conference? You should be! It's your once-a-year opportunity to meet 5,000 other industry practitioners, talk with the leading experts in the steel community and catch up with your peers. The 2019 Steel Conference takes place April 3-5 in St. Louis and will offer around 150 technical sessions on the latest design concepts, construction techniques and cutting-edge research. The conference will also feature more than 250 exhibitors showcasing everything from fabrication equipment to structural engineering software.

You can earn up to 17 PDHs by attending the conference's dynamic, expert-led sessions (plus an additional 12 PDHs if you attend the optional pre-conference short course). One low registration fee gains you access to all of the technical sessions, the keynote sessions, the T.R. Higgins Lecture and the exhibition hall.

Registration opens January 2. For more information, visit www.aisc.org/nascc.



news and events

ENGINEERING JOURNAL

First Quarter 2019 EJ Now Available

The first quarter 2019 issue of AISC's *Engineering Journal* is now available. You can access the current issue as well as past issues at www.aisc.org/ej. Below are summaries of this edition's articles:

Observations from Cyclic Tests on Deep, Wide-Flange Beam-Columns

Paper by Gulen Ozkula, John Harris and Chia-Ming Uang

Discussion by Bruce F. Maison.

Clearance for Welded Joints

Bo Dowswell

Inadequate clearance can affect weld quality and efficiency. In extreme cases, obstructions may cause a lack of fusion between the base metal and the weld metal, causing a reduction in strength. Although flux cored arc welding (FCAW) and gas metal arc welding (GMAW) have replaced shielded metal arc welding (SMAW) as the primary fabrication processes for structural steel fabrication, existing clearance recommendations are based on the SMAW process. Because the geometry of a FCAW or GMAW welding gun is much different from that of a SMAW electrode, the historic values recommended for the SMAW process may not apply to FCAW and GMAW.

Experimental specimens were fabricated with the FCAW process to determine practical limits on connection geometry for welding joints with limited access. Each specimen was evaluated by sectioning and etching the weld at two locations along the length. Two weld clearance issues are addressed: (1) fillet welding near obstructions and (2) doubler plate welds.

The obstructed fillet weld specimens were used to determine the minimum clearance requirements for joints welded with the FCAW process. The cross-sectioned welds showed that as the distance between the weld and the obstruction plate decreased, both the production efficiency and the penetration into the base metal decreased. Revised clearance recommendations for FCAW and GMAW welding were proposed.

The doubler plate specimens were used to provide information regarding the root-pass penetration for square-cut plates, based

on the plate thickness and the distance from the inner surface of the flange to the edge of the plate. The results of this study, which was limited to only eight specimens, validated the common practice of cutting the edge square at doubler plates less than $\frac{3}{8}$ in. thick. For doubler plates thicker than $\frac{1}{4}$ in., a groove angle, α , of 15° to 30° may be required to ensure consistent weld quality.

Post-Buckling Mechanics of a Square Slender Steel Plate in Pure Shear

Maria E. Moreyra Garlock, Spencer E. Quiel, Peter Y. Wang, José Alós-Moya and Jonathan D. Glassman

Thin (slender) steel plates possess shear strength beyond the elastic buckling load, which is commonly referred to as the post-buckling capacity. Semi-empirical equations based on experimental tests of plate girders have been used for decades to predict the ultimate post-buckling strength of slender webs.

However, several recent studies have shown that the current models for predicting the ultimate shear post-buckling capacity of thin plates are based on some incorrect assumptions regarding their mechanical behavior. As a result, the current design equations provide an approximate estimate of capacity for the range of parameters in the test data upon which they are founded. This paper explores the fundamental behavior of thin plates under pure shear. Such a fundamental examination of shear post-buckling behavior in thin plates is needed to enable design procedures that can optimize a plate's shear strength and load-deformation performance for a wider range of loading and design parameters.

Using finite element analyses, which are validated against available results of previous experimental tests, outputs such as plastic strains, von Mises stresses, principal stresses, and principal stress directions are examined on a buckled plate acting in pure shear. The internal bending, shear, and membrane stresses in the plate's finite elements are also evaluated. In this study, these evaluations are performed for a simply supported plate with an aspect ratio equal to 1.0 and slenderness ratio equal to

134. Results show that localized bending in the plates due to the out-of-plane post-buckling deformations appear to be a significant factor in the ultimate shear post-buckling capacity of the plate.

Also, the compressive stresses continue to increase beyond the onset of elastic buckling in some regions of the plate, contrary to current design assumptions. Overall, this study provides new insights into the mechanics of shear post-buckling behavior of thin plates that can be exploited for design procedures that are consistent with mechanical behavior.

Complementary Evaluation of Diagonal Tension Field Inclination Angle in Steel Plate Shear Walls

Yushan Fu and Michel Bruneau

Complementarily to previous studies, research was conducted to investigate whether the equivalent constant angle of diagonal tension field action should be taken as either 40° or 45° for ductile steel plate shear walls (SPSW) designed per current codes. A two-dimensional finite element (FE) model was first calibrated against results from a prior study of "limited-ductility SPSW" by comparing effective stress contours and average angle of diagonal tension field action at different locations across the web plate.

Then, this SPSW was redesigned as a ductile SPSW in compliance with the 2016 AISC Seismic Provisions to have fully restrained beam-to-column connections and analyzed using strip models and finite element models, respectively. The AISC moment-axial force interaction equation was used to compare demands in the SPSW boundary elements obtained from the strip and finite element models.

With respect to the use of a single angle in design, it is shown that using an inclination angle of 45° is slightly (but not significantly) more conservative than using 40° as far as boundary element design is concerned. On the basis of these observations, along with findings from previous research on the diagonal tension field inclination angle, it is recommended that a single constant angle of either 40° or 45° can be used for the design of SPSW.

CONSTRUCTION MARKET

2019 Construction Holding Steady, Says Dodge Report

The 2019 Dodge Construction Outlook report from Dodge Data and Analytics predicts that total U.S. construction starts for 2019 will be \$808 billion, staying essentially even with the \$807 billion estimated for this year. Deceleration in total construction growth is expected to continue, reflecting a mixed pattern by project type.

“Over the past three years, the expansion for the U.S. construction industry has shown deceleration in its rate of growth,

a pattern that typically takes place as an expansion matures,” said Robert A. Murray, chief economist for Dodge. “After advancing 11% to 14% each year from 2012 through 2015, total construction starts climbed 7% in both 2016 and 2017, and a 3% increase is estimated for 2018. There are, of course, mounting headwinds affecting construction, namely rising interest rates and higher material costs, but for now these have been balanced by the stronger growth for the

U.S. economy, some easing of bank lending standards, still healthy market fundamentals for commercial real estate and greater state financing for school construction and enhanced federal funding for public works.”

The report was released at Dodge’s 80th annual Outlook Executive Conference in National Harbor, Md., this past fall; AISC was a sponsor of the conference. You can order a copy of the report at www.construction.com.

CONFERENCES

2019 Pacific Structural Steel Conference Now Accepting Papers

The 2019 Pacific Structural Steel Conference (PSSC ’19) is accepting abstracts for papers to be presented at the conference at the Tokyo Institute of Technology, Tokyo, Japan, November 9-11. Now in its 12th year, PSSC brings together industry experts from around the world to promote cooperation, communication and technical information in the field of steel construction. AISC is a co-organizer of the conference.

The conference is an opportunity to present and discuss various structural steel research and design topics with peers internationally. Abstracts will be accepted until January 31 and should be around 300 words. Authors will be notified of their abstract acceptance by March 31 and will be required to submit a final paper by June 30.

For more about the conference and submitting a paper abstract, visit pssc2019.jp.

MEMBERSHIP

AISC Board Approves New Full and Associate Members

Full Members

| | |
|---|-----------------------|
| AT&F | Cleveland, Ohio |
| Center Point Contractors, Inc. | Bentonville, Ark. |
| Dale Miller Enterprises d.b.a. Larrance Steel | Lawton, Okla. |
| Ehresmann Engineering, Inc. | Yankton, S.D. |
| GSI (Grain Systems, Inc.) | Omaha, Neb. |
| Maryland Iron, Inc. | Glen Burnie, Md. |
| NMI Industrial Holdings, Inc. | Sacramento, Calif. |
| Patriot Steel Fabrication, Inc. | Church Creek, Md. |
| Spokane Metals, LLC | Airway Heights, Wash. |

Associate Members

| | | |
|-------------------------------|--|------------------------|
| Acme Steel | Draper, Utah | Detailer |
| Blanco Steel Detailing | Mysore, India | Detailer |
| Crobim | Dublin, Ireland | Detailer |
| FastCAM, Inc. | Chicago | Software Vendor |
| Foster’s Structural Detailing | Denham Springs, La. | Detailer |
| Machitech Automation | Saint-Marc-des-Carrieres, Quebec, Canada | Equipment Manufacturer |
| MSD Steel | Idaho Falls, Idaho | Detailer |
| Sam Bender Detailing | Pittsburgh | Detailer |
| Schulz Iron Works | Raleigh, N.C. | Erector |
| Steel Tek Unlimited | Eden Prairie, Minn. | Detailer |
| Tekcad Steel Detailing | Scarborough, Ontario, Canada | Detailer |

news and events

SAFETY

AISC Now Accepting Annual Safety Awards Submissions

To a customer, visiting an unsafe shop or job site is like visiting a messy house. Even if safety is not an explicit requirement, its absence leaves a bad impression. On the other hand, seeing a shop or job site where the organization achieves a commendable level of safety gives a good impression. It is reasonable to think that a company managing safety is also successfully managing production and quality. AISC encourages you to manage safety to achieve that commendable record, and we want to help you display your success with an AISC Safety Award.

AISC member steel fabricators and erectors are eligible and encouraged to submit their company's safety record for AISC's annual Safety Awards. The awards, given in the Fabricator Category and Erector Category, include the Honor Award (DART=0)—AISC's top safety

award, presented for a perfect safety record of no disabling injuries—the Merit Award ($0 < \text{DART} \leq 1$) and Commendation Awards ($1 < \text{DART} \leq 2$).

"AISC's annual Safety Awards program recognizes excellent records of safety performance, and we commend these facilities for their effective accident prevention programs," said Tom Schlafly, AISC's director of safety. "Periodic recognition of safety in the workplace has been demonstrated to provide worker incentive and a reminder of the importance of safe practices."

"Owners and clients pay attention to these awards," notes Kathleen Dobson, AISC Safety Committee member and safety director for Hillsdale Fabricators/J.S. Alberici Construction (an AISC member/certified). "They want to know that a fabricator or erector is proud of their safety records—and just

as important, it means a lot to the workforce to see that their efforts are recognized by an industry leader like AISC."

The AISC Safety Awards program is open to all full fabricator members and erector associate members of AISC. For more information about the program as well as safety resources available for the fabricated and erected structural steel industry, visit www.aisc.org/safety.



CODES

2018 International Green Construction Code Released

The International Code Council (ICC), ASHRAE, the U.S. Green Building Council (USGBC) and the Illuminating Engineering Society have released the 2018 *International Green Construction Code (IgCC)*. The *IgCC* is part of the ICC's family of comprehensive, coordinated and modern model codes—including the *International Building Code*, *International Mechanical Code*, *International Plumbing Code* and *International Fire Code*—used around the world.

The *IgCC* provides a whole systems approach to the design, construction and operation of buildings and includes cost-effective measures that result in lower operating costs, better indoor environments, lower impact on natural resources and improved neighborhood connections and walkability. A public-private

collaboration, the green code correlates with the *International Energy Conservation Code*, ASHRAE Standard 90.1: *Energy Efficiency Standard for Buildings Except Low-Rise Residential Buildings* and many other referenced standards. It helps governments streamline code development and adoption, saves them the time and money needed to develop their own codes and creates uniformity among adopting jurisdictions.

You can purchase the 2018 *IgCC* at stage.iccsafe.org. To learn more about steel and sustainability, visit www.aisc.org/sustainability. And to view sustainability-related articles in our November 2018 issue—"Building (for) the Future," "Redefining Net Zero" and "Double Impact"—visit www.modernsteel.com.