

## ENGINEERING JOURNAL

## First Quarter 2018 Engineering Journal Now Available

The First Quarter 2018 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](http://www.aisc.org/ej).

► **Framing Strategies for Enhanced Robustness in Steel Buildings**

*Gustavo Cortes, Rachel Chicchi and Judy Liu*

This paper describes the use of stiff-story framing to increase robustness in steel buildings subjected to column loss. Two case study buildings were designed; building A features a perimeter moment frame structure, while building B uses chevron braced frames. The lateral-force-resisting systems (LFRSs) and stiff stories of these two prototype buildings were then modified to create different configurations in order to study which configurations were more robust. A linear static alternate path analysis was performed for each of the configurations, and the effectiveness in resisting column loss was determined. Based on the results from the analyses, two indices that quantify vulnerability and framing efficiency were developed that can be used by designers to evaluate framing alternatives.

► **Assessment of I-Section Member LTB Resistances Considering Experimental Test Data and Practical Inelastic Buckling Design Calculations**

*Lakshmi Subramanian, Woo Yong Jeong, Raja Yellepeddi and Donald W. White*

The current AASHTO and AISC Specification equations characterizing the lateral-torsional buckling (LTB) resistance of steel I-section members are the same, with minor exceptions, and are based in large part on unified provisions calibrated to experimental data. This paper takes a fresh look at the correlation of the flexural strength predictions from these equations with a large experimental data set compiled from research worldwide. To account fully for the moment gradient and end restraint effects present in the physical tests, the study employs practical buckling calculations using inelastic stiffness reduction factors (SRFs) based on the design resistance equations. The study focuses on uniform bending tests as well as moment gradient tests in which the transverse loads are applied at braced locations.

► **Cyclic Inelastic In-Plane Flexural Behavior of Concrete-Filled Sandwich Steel Panel Walls with Different Cross-Section Properties**

*Erkan Polat and Michel Bruneau*

Flexure-dominated, concrete-filled sandwich steel plate walls (CFSSP walls) have been studied experimentally by various researchers using a small number of cross sections and wall aspect ratios. Using these past results to calibrate finite element models, the expected behavior of CFSSP walls having different geometries and cross-section properties is investigated here using finite element approaches. Results obtained show that the plastic moment can be used to conservatively predict maximum flexural strength in all cases considered and to provide valuable insights into stress and strain demands at various points during nonlinear response. Results also provide quantification of the contribution of concrete infill on wall effective stiffness; assessment of wall ductility having a failure criteria based on cumulative plastic strain at steel plate fracture; and effect of wall flange width on wall behavior of T-shaped sections.

## IN MEMORIAM

## Structural Engineering Legend Irwin G. Cantor Dies

Structural engineer Irwin G. Cantor died this past November of natural causes. He was 90 years old.

Cantor's career spanned more than six decades. During that time, he built an international structural engineering firm—initially named the Office of Irwin G. Cantor in 1971 and renamed the Cantor Seinuk Group (CSG) in 1992—which was responsible for numerous prominent high-rise structures in Manhattan and around the world. After he retired from the firm, he continued to be involved with the engineering profession through his work for the New York City Planning Commission, serving as commissioner for 20 years, and also providing in-house consulting for Tishman Speyer in New York.

He was the main force behind New York City's first seismic building code, which went into effect in 1995, and the city's peer-review rules, in addition to serving as structural committee cochair. Over his career, he received numerous awards, including the AISC Lifetime Achievement Award in 2009.

Cantor graduated from the City College of New York with a B.S. in civil engineering and was also a U.S. Air Force veteran. He was active in and recognized by multiple Jewish foundations and organizations, and he and his wife, Gloria, were founding members of the Bay Terrace Jewish Center in 1955.

Cantor is survived by Gloria, three daughters and three grandchildren.



## SUSTAINABILITY

### SMDI Releases Guide to LEED v4 Certification

The Steel Market Development Institute (SMDI) has released a guide to using steel construction products for the latest version of the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) green building certification program. The guide, *LEED v4 for Steel Products Used in Construction Applications*, is a resource intended to help construction professionals understand how steel products can earn points toward LEED v4 certification.

"A rapidly evolving green building industry and increasing demand for sustainability have led to a number of updates and a more rigorous certification process in LEED v4," said Mark Thimons, vice president of sustainability with SMDI. "The new process places an increased focus on material and resource transparency. This new guide for steel construction products will help builders leverage steel's sustainability benefits to meet their certification goals."

Steel has always been well-positioned for credits in categories like recycled content, but LEED v4 offers even more opportunities to earn credits for steel use across a range of categories, such as:

- **Materials and resources:** Steel-intensive design truly excels in this category, which focuses on minimizing the embodied energy and other impacts associated with the extraction, processing, transport, maintenance and disposal of building materials. The requirements are designed to support a life-cycle approach that improves performance and promotes resource efficiency.
- **Energy and atmosphere:** This category approaches energy from a holistic perspective, addressing energy use reduction, energy-efficient design strategies and renewable energy sources. Steel framing can provide the building block for truly energy-efficient designs, while steel cladding products can help create exceptionally tight building envelopes. Additionally, steel roofing provides an excellent platform for photovoltaic systems to earn energy and atmosphere credits.
- **Sustainable sites:** Construction professionals can earn sustainable sites points by using steel roofing products to reduce heat island effects, and prefabricated steel products to reduce on-site construction times.

The guide is available at [www.steelsustainability.org/construction/leedv4.aspx](http://www.steelsustainability.org/construction/leedv4.aspx).

## BRIDGES

### New Thermal Spray Bridge Coatings Guide Now Available

A new free guide specification by the AASHTO/NSBA Steel Bridge Collaboration, *Specification for Application of Thermal Spray Coatings on Steel Bridges (S8.2)*, is now available. The document provides guidance on shop metallizing steel girders and establishes and defines the functions, operations, requirements and activities needed to achieve a consistent quality. A collaborative effort was taken in the development of this document to ensure that owners' and applicators' representatives have clearly defined roles and responsibilities. The guide is written in specification language so it can be adopted in whole as part of the project contract documents.

The Steel Bridge Collaboration is a joint effort between the American Asso-

ciation of State Highway and Transportation Officials (AASHTO) and the National Steel Bridge Alliance (NSBA) with representatives from state departments of transportation, the Federal Highway Administration, academia and various industry groups related to steel bridge design, fabrication and inspection. The mission of the Collaboration is to provide a forum where professionals can work together to improve and achieve the quality and value of steel bridges through standardization of design, fabrication and erection.

This document and other guide specification documents from the Collaboration are available for free at [www.steelbridges.org/collaborationstandards](http://www.steelbridges.org/collaborationstandards).

## People

- **Nemetschek Group**, maker of structural analysis and design software **SCIA**, has agreed to acquire **RISA Technologies, Inc.**, a developer of structural engineering software for multi-material structures such as steel, concrete, masonry and wood—with approximately 10,000 users—as part of its worldwide structural engineering software strategy.
- Integrated design firm **SmithGroupJJR** has expanded its national presence with the opening of an office in San Diego. This is the 10th U.S. office for the firm, in addition to its location in Shanghai, China. The San Diego office is led by **Bonnie Khang-Keating**, who is also maintaining her current role leading SmithGroupJJR's Los Angeles office.
- The **American Welding Society's (AWS)** Board of Directors has appointed the organization's current COO, **Matt Miller**, to succeed **Ray Shook** as executive director and CEO upon Shook's retirement. Miller will officially begin his new role this month, and Shook will transition to the role of executive director emeritus.



## BRIDGES

## High Steel Completes Fabrication for New Tappan Zee Bridge

High Steel Structures, LLC, announced that it has completed its part of the steel fabrication for New York's \$3.98 billion Tappan Zee Bridge replacement (officially renamed the Governor Mario M. Cuomo Bridge), the largest transportation infrastructure design-build project in the U.S. In a ceremony at High Steel's Williamsport, Pa., facility, the company unveiled the last girder, freshly painted in the project's trademark blue.

High Steel's contract to produce more than 50,000 tons of structural steel for half the approach spans to the iconic three-mile-long, twin-span steel bridge is the largest in the company's history. "With fabrication complete, we are proud to say that we have hit every engineering and delivery milestone with outstanding quality," said Jeffrey L. Sterner, president and COO of High Industries, Inc.

To support the project, High Steel completed a \$11.4 million, 30,000-sq.-ft expansion of its Williamsport facility, installed new state-of-the-art equipment to improve efficiency and added approximately 200 jobs. The expansion was supported by a \$430,000 grant awarded by the Governor and the Pennsylvania Department of Community and Economic Development, and was contingent upon High Steel's winning the contract

to fabricate the bridge. High Steel also fabricated new bridge's components at its Lancaster, Pa., facilities.

The bridge is being built by Tappan Zee Constructors, a design-build LLC composed of Fluor Corporation, American Bridge Company, Granite Construction Northeast and Traylor Bros. Three AISC/NSBA member fabricators—High Steel, along with Hirschfeld Industries and Canam-Bridges—have together provided more than 110,000 tons of structural steel while playing a key role in the support of more than 7,700 jobs.

And just as the fabrication was provided domestically, so too was the steel production, with 160,000 tons of steel plate for both the superstructure and sheet piling coming from AISC member ArcelorMittal. The design-build approach generated more than \$1 billion in savings compared with the state and federal cost estimates.

The first span of the new bridge opened to westbound traffic this past August, and the second span is on track to open this year. For more about the project, see the August 2017 News section, available at [www.modernsteel.com](http://www.modernsteel.com).



## SAFETY

## AISC Now Accepting Annual Safety Awards Submissions

On-the-job safety and a positive safe work culture are essential for any steel fabricator or erector to be successful. It makes good business sense, and having a management system in place where everyone is responsible for safety is a key component. And AISC wants to recognize the best safety efforts in the industry.

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)—the Institute'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 (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, please visit [www.aisc.org/safety](http://www.aisc.org/safety).



BOARD NEWS

## AISC Elects New Board Chair, Vice Chair, Treasurer and Director

The AISC Board of Directors is pleased to announce the election of David Zalesne, president of Owen Steel Company, Inc., Columbia, S.C., as its new chair; Jack Klimp, vice president and general manager of Cianbro Fabrication and Coating Corporation, Georgetown, Mass., as vice chair; and Dan Kadrmas, president of TrueNorth Steel, West Fargo, N.D., as treasurer. In addition, the board welcomes a new director, Tyler R. Owen, general manager of Paxton and Vierling Steel, Structures Division, and president of Owen Industries Inc., Carter Lake, Iowa. All were elected to serve two-year terms at AISC's annual meeting this past September in Chicago.

Zalesne previously served as vice chair of the AISC Board and succeeds James G. Thompson, president of Palmer Steel Supplies, Inc., McAllen, Texas, as chair. Zalesne has served on the AISC Board for more than 10 years and chaired its government relations committee. He is also currently a vice chair of the Industry Trade Advisory Committee for the steel industry (ITAC-12). Prior to becoming president of Owen Steel Company in 2004, he practiced law as a partner in the Litigation Department of Klehr,

Harrison in Philadelphia, and worked as an assistant U.S. attorney in the eastern district of Pennsylvania. He has also served on the boards of several local business and community organizations. He earned a B.A. in international relations and finance from the University of Pennsylvania in Philadelphia and a law degree from Emory University School of Law in Atlanta.

"I am honored by the AISC Board to be elected to serve as its chair, and look forward to building on the great work that AISC has done to lead the American structural steel industry for nearly 100 years," said Zalesne. "With a rich history and a bright future, structural steel is a core American industry, and AISC is committed to maintaining its excellent brand in the marketplace; promoting the continued use of structural steel in America's skylines, infrastructure networks, bridges and other great projects; and supporting opportunities for American jobs and workmanship in the steel industry. Our fabricator members deserve the best representation and advocacy for our industry, and I look forward to working with the AISC

Board and our outstanding staff to meet those expectations."

Klimp joined the AISC Board in 2001 and has served terms as chairman of NSBA and president of the Steel Fabricators of New England. Prior to joining Cianbro in 2008, he worked for L.B. Foster Company and Bethlehem Steel Corporation. He earned a B.S. in metallurgical engineering from Michigan Technological University in Houghton, Mich., and an M.B.A. at Lehigh University in Bethlehem, Pa.

"I am looking forward to an active and productive term with incoming chair, Dave Zalesne; AISC president, Charlie Carter; and the entire AISC team," said Klimp. "I'm very excited to be working with such a great group and look forward to continuing to promote the use of structural steel. Following closely behind outgoing chair Jim Thompson's leadership, Dave and I will be seeking to continue to further update and strengthen the really broad range of tools AISC has developed over the years, from the quality of our technical specs and literature to the creativity of our Steel Solutions Center and steel marketing teams."



David Zalesne



Jack Klimp



Dan Kadrmas



Tyler R. Owen