NASCC

2018 NASCC Registration Opens January 15

If you're involved in the design or construction of steel buildings or bridges, NASCC: The Steel Conference is your once-a-year opportunity to meet more than 4,500 other industry practitioners and talk with the leading experts in the steel community, whether it's an expert on wind design, the author of a design guide on vibration or members of the committee who put together the AISC *Code of Standard Practice*. The 2018 conference takes place April 11-13 in Baltimore 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 240 exhibitors showcasing everything from fabrication equipment to structural engineering software.

"The industry connections, personal relationships, cutting-edge technology and face-to-face interactions are worth way more than the cost of the entire trip," said 2017 participant Nyckey Heath, PE, of Bennett Steel, Inc. (an AISC member and certified fabricator). "I have met many people who have proven to be valuable resources for me as an engineer, fabricator and erector. This is an investment in your company's future!"

Participants can earn up to 16 PDHs by attending the conference's dynamic, expert-led sessions (plus an additional 4 PDHs if they 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 for the conference opens January 15. For more information, visit **www.aisc.org/nascc**.

A NOTE ON STEEL QUIZ

The October Steel Quiz generated quite a bit of interest, discussion and even model building. We received a few emails from engineers asserting that such framing is not only difficult to erect but also inherently unstable and unsafe. Some engineers even declared that it was impossible to determine the forces for such a structure.

The condition shown was not fictitious. It was used on an actual project, was successfully erected (through the use of temporary hangers from the floor above) and is safely supporting loads to this day.

Though we have heard the terms *circular framing* and *infinite load path* used to describe this type of framing, it seems the more formal terminology is *reciprocal framing*. A Google search for this term produces hundreds of results ranging from blog entries by backyard builders to peer-reviewed papers. One of the links is to a discussion prompted by the October Steel Quiz:

http://tinyurl.com/steelquiz

Among the arguments and counterarguments, you will find real-world models made with rulers, butter knives, children's toys and scrap lumber supporting cinder blocks, juice bottles and even an AISC *Seismic Design Manual*.

Computer programs, mathematical models and engineering rules-of-thumb are all great tools, but in the end, all that matters is whether or not something works in the real world. We are glad we gave our readers something to think about and discuss.

People

- **Kloeckner Metals Corporation**, a producer an independent distributor of steel and metal products (and an AISC member), recently opened the doors to its newly expanded Greenville, S.C., plant. The addition encompasses a 50,000-sq.-ft bay with 43-ton cranes and a new, highly automated slitting line for processing advanced high-strength steels and aluminum. Kloeckner is investing over $11 million in the expansion, which will create 19 jobs.

- **David Gregg**, a steel industry veteran of two decades, has been named director of operations at **Max Weiss Company**, an AISC member bender-roller. Gregg, who has served as plant manager at the company since 2014, began his career as a welder-fabricator, plying the hands-on element of the industry for seven years before joining Max Weiss in 2004 as an account manager.

- **Greg Riley, SE, PE**, was recently named engineering firm **Schaefer's** new president. A professional structural engineer at Schaefer for the past 22 years, Riley started with the firm after college and accepted leadership roles as team leader, operations leader and vice president before attaining the nomination as the firm's next president. In other Schaefer news, **Ryan Konst, PE**, previously vice president, was appointed to executive vice president. And **Sally Wehrman** has become the firm's first female vice president, having previously been human resource director.

EDUCATION

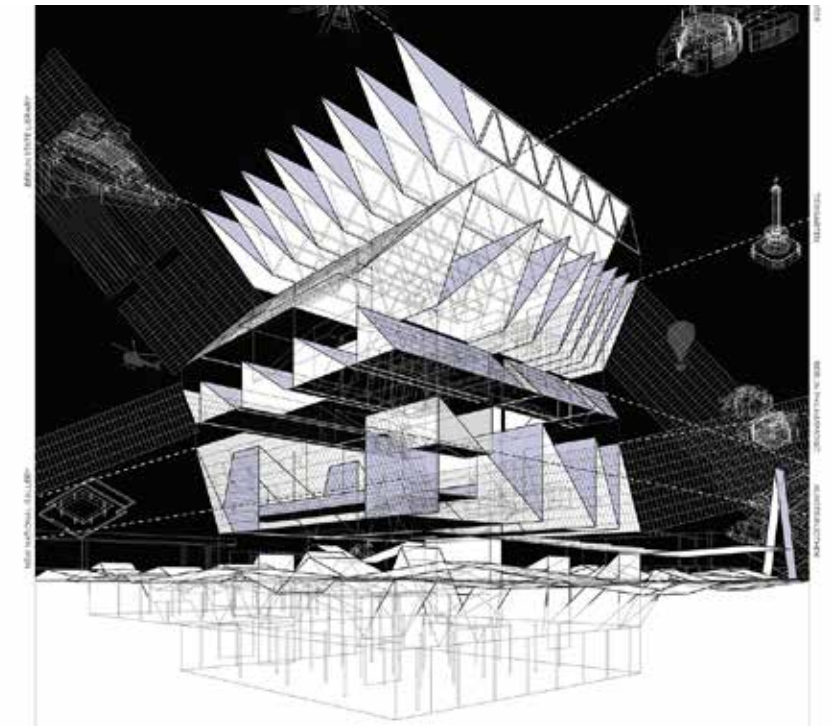
Student Design Competition Registration Open

Registration is open for the 2017-2018 Steel Design Student Competition. Administered by the Association of Collegiate Schools of Architecture (ACSA) and sponsored by AISC, the competition encourages architecture students from across North America to explore the many functional and aesthetic uses for steel in design and construction. A total of $14,000 in cash prizes will be awarded to the winning students and their faculty sponsors.

Individual students or teams participating in this year's competition are required to have a faculty sponsor, who must fill out the registration form by March 28, 2018; registration information may be modified until submission of the final project (due by May 23). There is no fee to enter the competition.

Students have the opportunity to participate in one of two categories. Category I is titled "Humanitarian Design of a Detention Center" and challenges students to create a more humanitarian design of a detention center by emphasizing family and community rather than isolation. Steel offers great benefits in this endeavor, as it allows for longer spans and more creative light-filled spaces. As usual, Category II is an open category that offers students the opportunity to select a site and building program using steel as the primary material.

More information about the competition can be found at **www.acsa-arch.org**. You can view this year's winners in the October article "The Future of Museums?" (available at **www.modernsteel.com**).



DESIGN GUIDES

AISC Releases Modular Steel-Plate Composite Wall Design Guide for Nuclear Facilities

Modular steel-plate composite (SC) walls are improving overall schedule and quality in safety-related nuclear structures, and building designers now have a comprehensive resource to facilitate their design with AISC's new Design Guide 32: *Design of Modular Steel-Plate Composite Walls for Safety-Related Nuclear Facilities*. The guidelines and design examples outlined in this document are based on the first supplement to AISC's *Specification for Safety-Related Steel Structures for Nuclear Facilities* (ANSI/AISC N690).

"AISC's steel specification for nuclear facilities, ANSI/AISC N690, saw a recent advancement with the introduction of provisions for the design of SC walls, and the next generation of nuclear power plants will see the use of SC walls to expedite construction through the use of modular assemblies composed of SC walls," said Ron Janowiak, senior staff engineer at Exelon Corporation and chair of AISC's Task Committee on Nuclear Facilities. "AISC's Design Guide 32 provides guidance to engineers on the many aspects of analysis and design of these structures based on ANSI/AISC N690."

This new guide contains both theoretical discussion as well as practical design examples. "Topics addressed include steel anchor detailing, modeling parameters for analysis, interaction equations for complex loadings, SC wall connections and various fabrication-related topics," said Janowiak. "A detailed list of references is also provided."

A downloadable PDF of the new guide is available for free to AISC members (and $60 for nonmembers) at **www.aisc.org/publications**. A printed version is also available for purchase; the cost is $40 for members and $80 for nonmembers.

AISC has produced more than 30 design guides to provide detailed information on various topics related to structural steel design and construction. All of the guides are available in printed format and as downloadable PDFs. Browse the collection at **www.aisc.org/dg**. And for more on Design Guide 32, see the "Nuclear Option" SteelWise article in the November issue, available at **www.modernsteel.com**.

EDUCATION

AISC Announces Annual Scholarship Winners

AISC recently announced its scholarship winners for the 2017-18 academic year, administering over $200,000 in financial aid to 50 deserving undergraduate and master-level students.

Now in its sixth year, the AISC David B. Ratterman Fast Start Scholarship program awarded a total of $45,000 in scholarships to 12 students attending two-year and four-year colleges. The program awards children of AISC-member company employees who will be freshmen and sophomores during the upcoming academic year.

AISC also awarded scholarships—$156,500 in all—to 38 junior, senior and masters-level students, with funding from the AISC Education Foundation and several industry association partners. AISC is proud to partner with these organizations and offers its sincere thanks for their generous continued support of our student programs.

Congratulations to the following students for earning their well-deserved scholarships for the 2017-18 academic year:

David B. Ratterman Fast Start Scholarships

$2,000 Award Recipients

- Kasside Cain, Kirkwood Community College
- Taylor Clifton, Parkland College
- Mackenzie Magsamen, Central Community College
- Tristan Moseley, Copiah Lincoln Community College
- Jarrett Schneider, Salisbury University

$5,000 Award Recipients

- Clayton Berrisford, Ball State University
- Kellie Elmen, University of Utah
- Joshua Leiter, Purdue University
- Jacob Meyer, Purdue University
- Ariana Olazaba, Dixie State University
- Kylee Roberts, Northern Arizona University
- Jennifer Wolf, Massachusetts College of Art and Design*

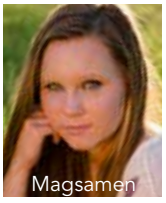
AISC Scholarships for Juniors, Seniors and Masters-Level Students

AISC Education Foundation

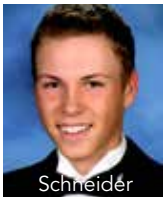
- Samuel Baer, Johns Hopkins University
- Robert Bruns, Lehigh University
- Matthew Burton, University of Cincinnati
- Zachary Cuddihy, University of Alaska Anchorage
- Kate Cuddington, Stanford University
- Justin Davis, Clemson University
- Andrew Foerster, Kansas State University
- Joyce Fung, University of California, Berkeley
- Malory Gooding, University of Cincinnati
- Isaac Klugh, Kansas State University*
- Jonathan Paquette, Virginia Tech
- Amy Poehlitz, Stanford University
- Corey Smith, Lehigh University
- Vincent Wenzel, University of California, Berkeley


Cain


Clifton


Magsamen


Moseley

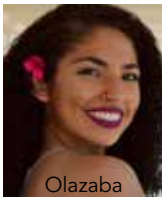

Schneider

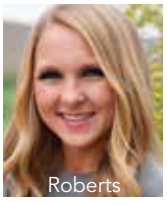

Berrisford


Elmen


Leiter


Meyer


Olazaba


Roberts


Baer


Bruns


Burton


Cuddihy


Cuddington


Davis


Foerster


Fung


Gooding


Paquette


Poehlitz


Smith


Wenzel

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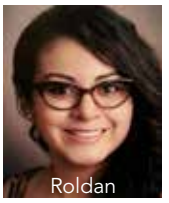
*not pictured


Dasoqi


Dokliev


Eckhoff


Kolpak


Roldan


Walus


Warchol


Woodruff


Dutton


Khandaker


McClung


Cote


Jara-Perez


Castor


Cochran


Coleman


Stephens

AISC/Associated Steel Erectors of Chicago
- Adam Dasoqi, University of Illinois at Urbana-Champaign
- Kremena Dokliev, Illinois Institute of Technology
- Kathryn Eckhoff, Northwestern University
- Sebastian Kolpak, University of Illinois at Chicago
- Arianna Roldan, University of Illinois at Urbana-Champaign
- Rafal Walus, Illinois Institute of Technology
- Kyle Warchol, University of Illinois at Urbana-Champaign

AISC/Great Lakes Fabricators and Erectors Association
- Steven Woodruff, University of Michigan

AISC/Ohio Structural Steel Association
- Matthew Burton, University of Cincinnati

AISC/Rocky Mountain Steel Construction Association
- Mitchell Dutton, University of Colorado Boulder

AISC/Southern Association of Steel Fabricators
- Raunac Khandaker, Georgia Institute of Technology
- Christian McClung, University of New Orleans

AISC/Steel Fabricators of New England
- Derek Cote, University of Hartford

AISC/Indiana Fabricators Association
- Matthew Branz, Purdue University*
- Manuel Jara-Perez, University of Evansville
- Ricardo Zambonino, Trine University*

AISC/W&W Steel/Oklahoma State University (Program includes sophomores, juniors and seniors)

Seniors
- Randall Castor, Construction Management
- Dillon Cochran, Civil Engineering
- Alexa Coleman, Architectural Engineering

Juniors
- Lauren Breedlove, Civil Engineering*
- Jose Reyna, Construction Management*
- Kennedy Stephens, Architectural Engineering

Sophomores
- Evan George, Civil Engineering*
- Jesse Matthews, Construction Management*
- Gage Strom, Architectural Engineering*

The David B. Ratterman Scholarship Jury consisted of the following individuals:
- Brad Bourne, AISC Education Foundation Chair
- Lawrence Cox, AISC Board Member
- Babette Freund, AISC Board Member
- Patrick Leonard, AISC Board Member
- Rex Lewis, AISC Past Chair
- David B. Ratterman, AISC General Counsel

The AISC Scholarship jury consisted of the following individuals:
- Benjamin Baer, Baer Associates Engineers, Ltd.
- David Bibbs, Cannon Design
- Christopher Brown, Skidmore, Owings & Merrill, LLP
- Christina Harber, AISC
- Luke Johnson, AISC
- Colleen Malone, H.W. Lochner, Inc.

*not pictured

CORE CONSTRUCTION

Steel Core System Revolutionizes High-Rise Construction

A new steel-concrete composite high-rise core wall system is revolutionizing the design and construction of tall buildings. The system uses two steel plates connected by steel spacing ties with the cavity between the plates filled with high-strength concrete. It provides the potential to shave months off the construction schedule—and reduces costs—compared with a traditional concrete core system. And most importantly, the new system has performed spectacularly in laboratory tests.

This tall shear wall system was developed through a series of studies and advancements by Magnusson Klemencic Associates (MKA). "The system is an evolution of many years of our work with composite steel columns, steel plate shear walls and performance-based seismic design," Jon Magnusson, senior principal at MKA, explained. "Ron Klemencic has led the development of the system, working with MKA engineers, contractors, steel fabricators, university researchers and AISC and obtained additional financial support from AISC and the Charles Pankow Foundation for the effort."

This system is the first application of rapid tall composite shear wall construction. There have been other applications of shorter composite walls, but not to this scale and primarily only for loads perpendicular to the wall. The tall shear wall effort has included research and lab tests of the system by Professor Amit H. Varma at Purdue University and Professor Michel Bruneau at the University at Buffalo. Klemencic added, "Amit and Michel had completed research and development on short wall systems, and their new work and contributions on the tall shear walls have been extremely valuable."

The system grew out of efforts to expedite and harden safety-related nuclear structures, and AISC has published the specification, *Specification for Safety-Related Steel Structures for Nuclear Facilities* (AISC N690-12s1, 2015), and a new design guide, Design Guide 32: *Design of Modular Steel-Plate Composite Walls for Safety-Related Nuclear Facilities*, co-authored by Varma, to facilitate their design and review.

Klemencic, chairman and CEO at MKA, recently received the distinguished engineering alumni award from Purdue University. During a recent presentation at Purdue, Klemencic offered sage advice to students and also showed a video that MKA produced as part of their construction study of this system on the Rainier Square project in Seattle. The study compared the speed of construction of a traditional concrete core and the new steel-concrete composite core. The result was dramatic. While the concrete core building took 474 working days to top out, the hybrid wall building took only 377 working days.

"The 97-working-day difference equals 136 calendar days, which means the owner will benefit from four-and-a-half months lower contractor's overhead and general conditions costs, four-and-a-half months lower financing costs and four-and-a-half months of earlier rental income," Klemencic explained.

"The steel modules are fabricated in shops with quality control and automation," explained Varma. Because the steel framing doesn't have to wait for the concrete core—the construction of which is far slower than the erection of the rest of the building's steel frame—the system greatly speeds construction.

The system provides the strength, stiffness, safety and serviceability of a reinforced concrete core without the negatives of rebar congestion and complex formwork. In addition, using the system means the entire structure is built to the tight tolerances standard in steel construction, rather than the broader tolerances permitted in concrete construction. "It fundamentally changes the game," Klemencic said.

Time is saved by eliminating rebar installation and formwork construction. And without the need to wait for the concrete to cure, the core and perimeter steel can rise in tandem, resulting in much faster erection.

Currently, Composite Plate Shear Walls–Concrete Filled are addressed in AISC's *Seismic Provisions for Structural Steel Buildings* (AISC 341-16) and Coupled Composite Steel Plate Shear Walls (CCSPSWs) are allowed by AISC's *Specification for Structural Steel Buildings* (AISC 360-16), according to Larry Kruth, AISC's vice president of engineering and research.

"Purdue's research project is scheduled to be complete mid-2019," Kruth explained. "In addition to this initial

funding for the research being done at Purdue and the University at Buffalo, AISC, along with the Charles Pankow Foundation, is funding a FEMA P695 study at both universities. When this study is completed in mid-2018, the CC-SPSW is expected to be rated with an R-Factor of R=8, which is the highest Seismic Response Modification Factor of any shear wall system of any material."

And the system is not just for use in seismic areas. "There is a great potential for the use of CCSPSWs in wind-controlled buildings," added Kruth. "In fact, Rainier Square in Seattle, where the CCSPSW will be used first, is a wind controlled design. The potential is not just for high-rise structures. This system is very desirable for use in low-rise structures due to its speed of construction, enabling the schedule to be shortened."

A presentation on the composite coupled core wall system, by Klemencic and Varma, is scheduled at the 2018 NASCC: The Steel Conference (April 11-13) in Baltimore. "This system represents the greatest innovation in steel in high-rise buildings in decades," Magnusson concluded. "It offers the performance of a concrete core with the speed and benefits of steel construction."

RESILIENCY

LCA for HARC Points to Steel Framing

The Houston Advanced Research Center (HARC) desired a headquarters building designed to not only provide office space, but to also serve as an educational tool for sustainable technologies. HARC leadership worked with Walter P Moore and its director of sustainable design, Dirk Kestner, to perform a whole-building life-cycle assessment (LCA) to evaluate multiple structural systems from the very outset of the building design process—and a steel frame with a minimized amount of concrete was proven to reduce carbon emissions.

The LCA process enabled HARC and the design and construction team to identify and quantify the environmental impacts of various materials and construction options so that better decisions were made. For example, concrete (specifically the Portland cement constituent) was found to be the largest contributor to the building's embodied environmental impact. This led the design and construction team to specify a steel-framed structure, reducing the amount of cement used on the project, and to require concrete suppliers to provide environmental product declarations (EPDs) and the use of low-carbon concrete on-site. The simple changes, understood early on in the process, saved 300,000 lb of CO_2 emissions and resulted in impressive reductions in the building material's global warming (20%), acidification (25%) and smog formation (15%) potentials.

Recently completed, the 20,000-sq.-ft facility is tracking LEED Platinum Certification and Net Zero Energy Building Certification. The building was one of the first in Texas to be subjected to a whole-building LCA. Read more about the project at **www.harcresearch.org**.

STEELDAY

SteelDay 2017 Engages Students, Professionals Across U.S.

Dozens of events around the country highlighted the ninth annual SteelDay on September 15.

Hosted by AISC and its members and partners, SteelDay offers the opportunity for AEC professionals, students and others to gain insight into the work, experience and accomplishments of the U.S. structural steel industry at free events occurring all over the country, including facility open houses, project site tours and webinars.

In Manhattan, AISC hosted a "SteelDay Eve" event for guests to learn how steel is transforming the 425 Park Avenue skyscraper in Manhattan. Owen Steel Company, Inc. (an AISC member and certified fabricator) is the fabricator for the project, which, at 47 stories/nearly 900 ft tall and highlighted by exposed steel diagrids, will be the first full-block development on Park Avenue in almost half a century.

In Washington, D.C., approximately 50 AEC professionals toured the construction site of the new DC Water Headquarters in the city's Navy Yard area. The 150,000-sq.-ft steel-framed office project is planned to be one of the most energy-efficient buildings in the Mid-Atlantic region and wraps around an operating pump station that handles about two-thirds of the metro area's sewer outflow. The building, fabricated and erected by Berlin Steel (an AISC member and certified fabricator and erector), features a 220-ft-long, four-story truss that spans across much of the current vital infrastructure.

And near Milwaukee, several construction professionals visited the job site of the under-construction, 230,000-sq.-ft, four-story Advanced Outpatient Surgical Wing of St. Catherine's Medical Center, which incorporates SidePlate (an AISC member) connections and was fabricated and erected by Construction Supply and Erection, Inc., an AISC member and certified fabricator and erector.

In more student-oriented events, another SteelDay highlight was the erection of a 10-ft-tall steel sculpture at Drexel University in Philadelphia. The new piece joins the more than 170 AISC steel sculptures located on university and college campuses across the country (and even around the world!) that are designed as a teaching tool to give students a visual understanding of steel framing and steel connections. Drexel's is the first to be installed in Philadelphia and will be used for instruction in multiple courses in the school's Department of Civil, Architectural and Environmental Engineering. The sculpture was donated by Joe Messner, president and CEO of JGM Fabricators, Coatesville, Pa. (an AISC member and certified fabricator) and is installed outside of the Bossone Research Enterprise Center. (For more about the AISC steel sculpture, including a list of school locations and information on having one constructed on your campus, visit **www.aisc.org/steelsculpture**.)

West Point's Department of Civil and Mechanical Engineering also celebrated SteelDay, with cadets and faculty visiting two local steel bridges. First, cadets were led on a tour of the nearby Bear Mountain Bridge to learn about its anchorage, history and structural design. Representatives from the New York State Bridge Authority and others provided inside knowledge of the bridge, including details on the steel parallel cable suspenders, steel trusses and 350-ft steel towers. The cadets and faculty then traveled to the Tappan Zee Bridge, where they enjoyed a briefing on the $4 billion, 3.1-mile-long, twin-span, cable-stayed bridge. There, various project representatives described the organization, planning and challenges that come with such a huge endeavor and answered cadets' questions about this new piece of critical infrastructure.

And in addition to being invited to various events, students were also encouraged to express their love of steel using social media via the Student SteelDay Contest. You can view the testimonials of the five winners at **www.aisc.org/studentsteeldaycontest**. Next year's SteelDay will take place Friday, September 28.