

GREEN NEWS

Steel Construction Product Category Rule Released

A product category rule is now available for structural steel.

The “North American Product Category Rule for Designated Steel Construction Products” marks a major step in the process of preparing a series of environmental product declarations (EPDs) for steel products used in domestic construction. Specifically identified in the PCR are fabricated structural steel, cold-formed steel sections, and concrete reinforcing steel used and/or sold in North America. This PCR is based on the European PCR for construction products (EN 15804) and conforms to ISO 21930, with specific guidance for these products in North America.

Development of this PCR was guided by the Program Operator (SCS Global Services), with contributions from AISC, the American Iron and Steel Institute (AISI), the Concrete Reinforcing Steel Institute (CRSI), the Metal Building Manufacturers Association (MBMA), the Steel Framing Alliance (SFA), Arcelor-Mittal, and Nucor Corporation.

“As part of its commitment to the transparent reporting of the environmental impacts of fabricated structural steel, AISC is actively moving forward in the development of EPDs based on

this PCR,” said John Cross, an AISC vice president.

For structural steel elements, the PCR requires that product stage modules (A1, A2, and A3) be reported in the resultant EPD. These modules include provisions of all materials, products and energy, as well as waste treatment of final residues during the product stage. The modules are defined as follows:

A1. All activities necessary for the production of structural steel including, but not limited to, the recovery or extraction and processing of feedstock materials, furnace and related process operations at the melt shop, casting and rolling into the final product. For products requiring secondary processing, all activities performed during secondary processing and transportation from the primary producer to the secondary producer are to be included. All upstream activities related to fuel use and/or electricity generation are included in this stage.

A2. Transport to the structural steel fabricator.

A3. Fabrication of structural steel elements.

For additional information and to download the PCR, please visit www.scsglobalservices.com.

NSBA

New Version of NSBA’s Steel Bridge Suite Available

The National Steel Bridge Alliance (NSBA) has released a new version of its Steel Bridge Suite, which includes updates to the AASHTO/NSBA Steel Bridge Collaboration Standards and enhancements to LRFD Simon, NSBA’s free software for preliminary steel plate and box girder design. Updates to the Collaboration Standards include:

- S8.1 - Guide Specification for Application of Coating Systems with Zinc-Rich Primers to Steel Bridges
- S10.1 - Steel Bridge Erection Guide Specification
- G13.1 - Guidelines for Steel Girder Bridge Analysis

The new version of LRFD Simon includes the following key enhancements:

- 7th Edition AASHTO Specification Support
- Internally Calculated Distribution Factors
- Deck Pour Analysis
- Web Depth Optimization
- New User Documentation
- An Assortment of Bug Fixes

Please visit NSBA’s website, www.steelbridges.org, to register and download the new version of Steel Bridge Suite.

People and Firms

- The **Steel Erectors Association of America (SEAA)** has named **Carrie Sopuch-Gulajan**, president of **Construction Insurance Agency, Inc.**, Manassas, Va., Person of the Year in recognition of her service to the steel construction industry and SEAA.

Sopuch-Gulajan is the first female to receive the award in its 11-year history.



- **Bureau Veritas**, an international conformity assessment service provider in the building and infrastructure industry, and **Green Business Certification, Inc. (GBCI)**, the certification body for the **U.S. Green Building Council’s LEED** green building rating program, finalized the terms of their exclusive global agreement to facilitate LEED certification internationally. As part of the agreement, Bureau Veritas teams around the world will review LEED projects for conformity with GBCI’s strict standards for certification.

- In other green news, the first model U.S. code focused on green building design and performance of new and existing commercial buildings, the **International Green Construction Code (IgCC)**, has been updated and is now available. Key changes in the 2015 edition address material recycling and salvaging, material selection, exterior lighting zones, infiltration rate testing for pervious pavement, acoustics, daylighting and commissioning.

STEELDAY

SteelDay Set for September 25

Where will you be on SteelDay? Whether you visit a structural steel facility or attend a webinar, this year's event offers plentiful options to interact with the industry in person or take part in the celebration without having to leave your office.

Now in its seventh year, SteelDay is a national day of education, outreach and celebration of the work and accomplishments of the American structural

steel industry. Hosted by AISC and its members and partners, SteelDay is a great opportunity to learn about the latest in the industry and see it for yourself—for free!

New to SteelDay this year is a special Lunch and Learn webinar, "Steel and the Phantasmagoria," presented by Charlie Carter, vice president and chief structural engineer with AISC. The lecture

will explore the advancements in materials, the design and construction methods we employ and the ingenious steel solutions that have resulted to make great buildings. In addition, AISC will provide Domino's pizza on SteelDay for the first 1,000 professional engineering offices to sign up for the webinar.

To sign up to attend or host a SteelDay event, go to www.steelday.org.

ENGINEERING JOURNAL

Third Quarter EJ Now Available

The third quarter 2015 issue of AISC's *Engineering Journal* is now available at www.aisc.org/ej, where you can view, download and print the current digital edition.

EJ also welcomes its new editor, Margaret Matthew, AISC senior engineer and host of AISC's Steel Profiles podcast series. She replaces Keith Grubb, who served for six years as the journal's editor and has been promoted to AISC's director of publications.

Articles in this issue include:

► **Evaluating Accumulation of Fatigue Damage in Steel Bridges Using Measured Strain Data**

Jeremiah Fasl, Todd Helwig,

Sharon L. Wood, and Karl Frank

As traffic volumes increase, bridges age, and maintenance budgets are cut, transportation officials often need quantitative data to distinguish between bridges that can be kept safely in service and those that need to be replaced or retrofitted. Strain gages can be utilized to evaluate fatigue damage in steel bridges using the techniques that are discussed in this paper. To evaluate fatigue damage, the cycles induced by vehicular traffic must be quantified using a cycle-counting algorithm, such as a rainflow algorithm. The amount of fatigue damage induced during the monitoring period can then be calculated using the traditional method, the effective stress range, or using a new approach based on the index stress range. One distinct advantage of the proposed method is that the relative amount of fatigue damage accumulated at different locations along

the bridge can be easily compared. The advantages and limitations of both methods are demonstrated using measured data from a fracture-critical steel bridge.

Keywords: strain gages, fatigue measurement, steel bridges.

► **Design of Split-Tee Connections for Special Composite Moment Frames**

Erica C. Fischer and Amit H. Varma

The beam-to-column connections of special composite moment frames (C-SMFs) serving as the primary seismic force resisting system (SFRS) of a building structure are required to meet the performance criteria specified in the 2010 AISC Seismic Provisions. Chapter K of the Seismic Provisions states that experimental results should be used to provide evidence that the specific beam-to-column connection satisfies the requirements for strength and story-drift angle. This paper focuses on the split-tee connection for C-SMFs with wide flange (WF) beams and rectangular concrete-filled tube (CFT) columns. The paper provides a general description of the split-tee connection identifying its key features and components. This is followed by discussion of expected behavior in the elastic and inelastic ranges of cyclic loading. This discussion is based on prior research and large-scale testing, and it focuses on the various limit states controlling the strength and deformation capacity of the connection. The paper includes the complete design procedure for split-tee connections along with a detailed design example. The information presented in this paper can be used to create a body

of evidence to apply for prequalification of similar split-tee connections in C-SMFs.

Keywords: seismic design, special composite moment frames, moment connection, composite construction, prequalification.

► **Structural Innovation: Combining Classic Theories with New Technologies**

William F. Baker, Lauren L. Beghini, Arkadiusz Mazurek, Juan Carrion and Alessandro Beghini

In the early stages of the design process, an engineer sets the geometry of the structure. The decisions made about the layout of the structure will determine the overall efficiency that can be achieved and the magnitude of the forces that must be accommodated. For example, the deflection of a truss can actually be decreased by removing material if a geometry is created that has a shorter total load path. This paper presents concepts and methodologies for creating and understanding efficient geometries. It starts with a review of the 19th- and 20th-century load path theories of Rankine, Maxwell, Cremona and Michell. It then combines their insights with current topology optimization and shape-finding tools as a means of exploring how engineers can create structural geometries that improve the behavior and reduce the tonnage of their designs. Several examples of classical theoretical solutions are explored along with their application to new designs.

Keywords: structural geometry, structural efficiency, structural analysis.

ACADEMIC PROGRAMS

2016 AISC Milek Fellowship Call for Proposals Now Open

University faculty are invited to apply for the 2016 AISC Milek Fellowship, a four-year fellowship given to a promising university faculty member to conduct structural steel research. The awarded faculty member will receive \$50,000 per year, for a total of \$200,000. They will also be recognized in industry publications and receive free registration to NASCC: The Steel Conference for the four years following their selection as an AISC Milek Fellow.

The Milek Fellowship program contributes to the research careers of young faculty who teach and conduct research investigations related to structural steel while producing research results beneficial to designers, fabricators, and erectors of structural steel. The award sup-

ports students with high potential to be valuable contributors to the U.S. structural steel industry. Funds are provided to conduct research that meets the long-term needs of the structural steel industry; to assist in leveraging additional outside funds for fellowship-related research; and to develop graduate students for academic and design careers in the structural steel industry.

The selected faculty fellow is required to fund one doctoral candidate each year with at least half of the yearly fellowship funds. The chosen students will be named AISC Graduate Fellows and featured in *Modern Steel Construction* magazine.

Proposals will be accepted until September 15, 2015. Required application information includes:

- Candidate's name, affiliation, mailing address, telephone and email address
- Description of the research to be conducted
- Discussion of the relevance and usefulness of the research to structural steel construction (design, detailing, fabrication, installation, maintenance, renovation, materials, management, protection from corrosion etc.)

The award is named after William A. Milek, former AISC vice president of engineering and research, in recognition of his invaluable contributions to AISC and the structural steel industry.

For complete information about the Milek Fellowship program, including the full proposal requirements and application, visit www.aisc.org/facultyfellowship.

STEELDAY

Steel Sculpture Competition Now Accepting Entries

Are you ready to make your structural steel vision come to life? Then enter AISC's fifth annual Steel Sculpture Competition! If you're an AISC full or associate member, join this year's competition and create your own innovative steel sculpture for a chance to have your company featured in *Modern Steel* as well as receive a catered lunch!

Here are the rules:

- The sculpture must be steel (and only steel), but shapes, sizes and steel type can be your personal preference.
- The sculpture must be made entirely by your staff.
- The finished sculpture must fit in a 2-ft by 2-ft by 2-ft box (for shipping purposes).
- All entries must include a photo of your sculpture with a title and the name of the company submitting the project. Use a solid, white background in your photo for optimum visibility of your sculpture.
- There's no theme! But keep in mind these characteristics of steel: adaptable, economical, quick and sustainable.
- Entrants must be AISC full or associate member companies.

Submit your sculpture entry by September 9, 2015 to AISC's Jenny McDonald at mcdonald@aisc.org.

From September 14-18, all entries will be posted to AISC's Facebook page (www.facebook.com/AISCdotORG) where visitors can vote on them. The top five finalists will be put on display at the 2016 NASCC: The Steel Conference, April 13-15 in Orlando, Fla., where the ultimate winner will be cho-

sen by attendees. The winner will also be featured in *Modern Steel* and receive a catered lunch for their company (up to \$1,500 value).

You can learn more about the competition at www.steelday.org/sculpturecomp. The competition is part of SteelDay, the structural steel industry's largest educational and networking event, held nationwide. (For more on SteelDay, see the news item on the previous page.)

