

INDUSTRY NEWS

As Construction Rebounds, More Skilled Workers are Needed

The construction industry's slow climb out of a long and deep recession will continue into next year, according to McGraw-Hill Construction's 2013 forecast. Released at the company's annual Outlook conference recently in Washington, D.C., the report predicts construction starts to rise six percent to \$483.7 billion.

So what does the future hold for construction jobs? According to a similar report issued earlier this month by the Associated General Contractors of America (AGC), construction employers added 5,000 jobs between August and September, while the industry's unemployment rate hit 11.9%. AGC's officials caution that construction employment has been relatively flat for more than a year, as growing demand for residential and some commercial projects has been offset by declining public sector construction activity.

"Despite the slight uptick in construction employment for the past month, the industry is a bit smaller than it was one year ago," said Stephen E. Sandherr, AGC's chief executive officer. "It appears that for every rebounding market segment, there is another one that is shrinking."

Sandherr also noted that more than two million former construction workers have left the industry, either to retire or for other jobs in faster-growing sectors. As a result, the industry will have a hard time finding

skilled workers once construction demand rebounds. He added that federal tax and spending uncertainties are making it difficult for firms to encourage people to consider careers in construction.

The shortage comes at a particularly inopportune time, as the construction industry is projected to have one of the fastest U.S. industry job growths through this decade and add nearly 1.3 million new jobs by 2018. The industry needs to attract about 185,000 new workers annually to keep up with the current employment demand.

New worker recruitment is crucial to avoid a net shortage of skilled construction workers in the coming years. One of the challenges is that many students today don't realize there are advanced educational and training programs and good-paying career opportunities available in the trades.

One program hoping to tackle this challenge is the Build Your Future national educational and recruitment campaign. Organized by the National Center for Construction Education and Research (NCCER), the program connects youth and displaced workers with career opportunities in construction and includes resources for prospective ironworkers and welders.

To learn more about the Build Your Future campaign, visit <http://byf.org>.

NASCC

NASCC to Offer More than 100 Sessions

The 2013 NASCC: The Steel Conference—the premier educational event for those involved in the design and construction of fabricated steel buildings and bridges—will take place in St. Louis April 17-19, at America's Center Convention Complex. Presented by AISC, the three-day event will offer more than 100 sessions by top industry leaders, more than 200 exhibitors and ample networking opportunities.

Unlike other conferences that issue a general call for papers, The Steel Conference carefully selects topics of interest and then seeks out the top experts and presenters. Some of the presenters are

very well known, while others may not be household names but still bring a distinct expertise to the program. Speakers range from Will Jacobs on "Composite Floor System Design Techniques" to the always-popular Cliff Schwinger on "50 Tips for Designing Constructable and Economical Steel Buildings" to Jerry Mathison on "Fixing Weld Quality Issues." Attendees can earn up to 24 PDHs (professional development hours).

Registration is now open at www.aisc.org/nascc. Be sure to register early! The rate increases \$10 every week until the conference opens, when the price becomes \$480.

People and Firms

- **Daniel R. DiMicco**, chief executive officer and executive chairman of **Nucor Corporation**, recently announced that current Nucor president and COO, **John J. Ferriola**, will replace him as CEO, effective as of January 1. DiMicco will remain with Nucor as executive chairman. DiMicco has served as CEO for more than 12 years and has led Nucor through one of its most profitable growth periods and an industry-leading total shareholder return of 463.9%. He is also last year's recipient of AISC's Robert P. Stupp Award for Leadership Excellence, which gives special recognition to individuals who have provided unparalleled leadership in the steel construction industry. Ferriola has stepped repeatedly into roles of increasing responsibility as part of Nucor's succession planning. He joined Nucor in 1992 as manager of maintenance and engineering at the Jewett, Texas, bar mill, and has served as general manager at three divisions: Vulcraft Texas in Grapeland, the bar mill in Norfolk, Neb., and the sheet mill in Crawfordsville, Ind. He was named Executive Vice President in 2002, then COO of Steelmaking Operations in 2007. In January 2011, the Board of Directors appointed him Nucor's president and COO and elected him to the Board.



DiMicco



Ferriola

CONTINUING EDUCATION

AISC Launches Night School Online Educational Program

Looking for an educational program that enhances your professional growth and accommodates your busy schedule? AISC offers “Night School,” an evening curriculum of online courses focused on relevant structural steel design and construction topics. The first course begins January 14, 2013 and registration is now open at www.aisc.org/nightschool.

“Night School’s integrated series of courses provides an effective and economical means to learn the essentials of designing and building with structural steel,” said Nancy Gavlin, S.E., P.E., AISC’s director of education.

Each course in the curriculum will consist of eight weekly webinar sessions on Monday evenings beginning at 7 p.m. Eastern Time. The first course will focus on “Fundamentals of Connection Design” and will be presented by Thomas M. Murray,

P.E., Ph.D., emeritus professor at Virginia Polytechnic Institute and State University, Blacksburg, Va. Murray is a renowned specialist in structural steel research and design. He received AISC’s prestigious Geerhard Haaijer Award for Excellence in Education in 2010 and an AISC Lifetime Achievement Award in 2007.

The first course consists of the following 1.5-hour webinar sessions:

- Session 1: January 14 – Fundamental Concepts, Part I
- Session 2: January 28 – Fundamental Concepts, Part II
- Session 3: February 4 – Shear Connections, Part I
- Session 4: February 11 – Shear Connections, Part II
- Session 5: February 25 – Moment Connections, Part I
- Session 6: March 4 – Moment Connections, Part II

- Session 7: March 11 – Moment Connections, Part III
- Session 8: March 18 – Bracing Connections

Attendees can register for the course in two ways: They can register for the entire eight-session package and view the webinars live or recorded, one attendee per connection, earning up to 12 PDHs (1.5 PDHs per session attended) and 1 “EEU” certificate upon passing a series of eight quizzes and a final exam; or, they can sign up for individual webinars to view live only, with an unlimited number of attendees per connection, and earn 1.5 PDHs per webinar.

For additional information about AISC’s Night School program, registration details and pricing options, visit www.aisc.org/nightschool. Registration for courses two and three in the curriculum will be offered in the spring and fall of 2013.

BRIDGES

FHWA Memo Promotes Safety by Clarifying Policy on FCMs

The Federal Highway Administration’s (FHWA) Office of Bridge Technology has released a memo to provide clarification of its policy for the classification and treatment of fracture-critical members (FCMs). Proper and consistent identification of FCMs is essential to ensuring safety in the design and management of bridges and to satisfy the requirements of the Code of Federal Regulations.

There are two primary implications related to identifying FCMs in bridges: 1) specification of proper materials and testing for design and fabrication as per the AASHTO AWS Fracture Control Plan (FCP) and 2) application of proper “hands-on” in-service inspection protocol as per the National Bridge Inspection Standards (NBIS).

Redundancy is the fundamental quality that dictates whether a member will be classified as a FCM, and there are three different types commonly understood by bridge

engineers: load path redundancy, structural redundancy and internal member redundancy. For design and fabrication, the memo states that only load path redundancy may be considered. For in-service inspection protocol, structural redundancy demonstrated by refined analysis is now formally recognized and may also be considered. Internal member redundancy is currently not recognized in the classification of FCMs for either design and fabrication or in-service inspection (i.e., in order to prevent a scenario in which a cracked plate element in an important built-up member would go undetected by routine biennial inspection for an extended time period).

Finally, this memo introduces a new member classification: a system redundant member (SRM), which is a non-load path redundant member that gains its redundancy by system behavior. The SRM requires fabrication according to the AWS FCP, but need not be considered a FCM for

in-service inspection.

The memo is intended to clarify the FHWA’s position and promote consistency in the application of appropriate design and inspection requirements. As a result, owners now have the opportunity to reassess their inventory of bridges with FCMs and optimize their allocation of inspection resources. However, non-load path redundant tension members in existing bridges that were not fabricated to meet the modern FCP, introduced in 1978, are not eligible for classification as SRMs and relief from fracture critical in-service inspection based on refined redundancy analysis. High-performance steel (HPS) and the use of internally redundant detailing both have the potential to further improve the fracture propagation resistance of FCMs and should be implemented where practical. The implications of such measures are the subject of ongoing research efforts.

You can view the memo at <http://www.fhwa.dot.gov/bridge/120620.cfm>.

PUBLICATIONS

New Seismic Manual Now Available

AISC has published the 2nd Edition *Seismic Design Manual*. This new edition includes hundreds of pages of comprehensive design examples, including connections, updated for the 2010 AISC *Seismic Provisions*; side-by-side LRFD and ASD design methodologies for design examples; a new chapter on analysis; more thorough examples on connection design, including panel zone detailing and brace-to-beam/column connection design options; extended discussion and more economical design methodology for collector elements; new examples for buckling-restrained braced frames; and new chapters on composite moment frames and composite braced frames.

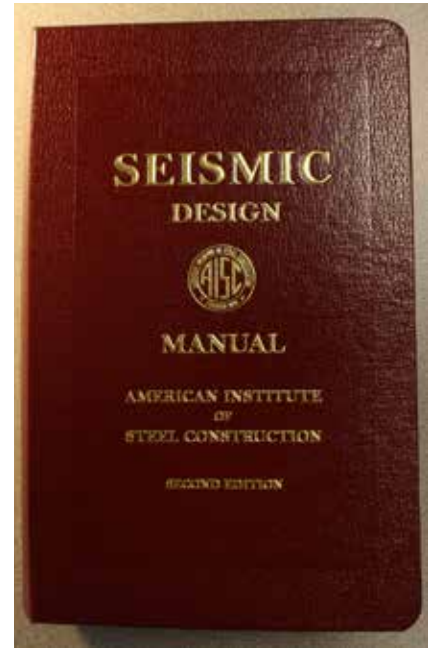
Also included are two AISC seismic-related standards: the 2010 AISC *Seismic Provisions for Structural Steel Buildings* (ANSI/AISC 341-10) and the 2010 AISC *Prequalified Connections for Special and Intermediate Steel Moment Frames for Seismic Applications*—with Supplement No. 1 (ANSI/AISC 358-10 and ANSI/AISC 358s1-11).

“To produce a useful companion to the 2010 *Seismic Provisions*, AISC

assembled a group of industry experts lead by Rafael Sabelli—the result of which is the 2nd Ed *Seismic Design Manual*,” said Mark Holland, Chairman of the AISC Committee on Manuals.

“The *Seismic Design Manual* provides the industry with a practical resource for application of the design requirements of the 2010 *Seismic Provisions*,” said Sabelli, who is Chairman of the Seismic Subcommittee. “In contrast to the *Manual of Steel Construction*, it typically follows a system-design format: Examples are organized around the illustration of an entire seismic system, with each example illustrating the design of a representative element. Connection design examples are presented for each system; in some cases alternate connection designs are presented to illustrate some of the range of approaches that designers can take. The *Seismic Design Manual* thus provides the industry with a useful collection of tools for addressing the seismic design of steel structures.”

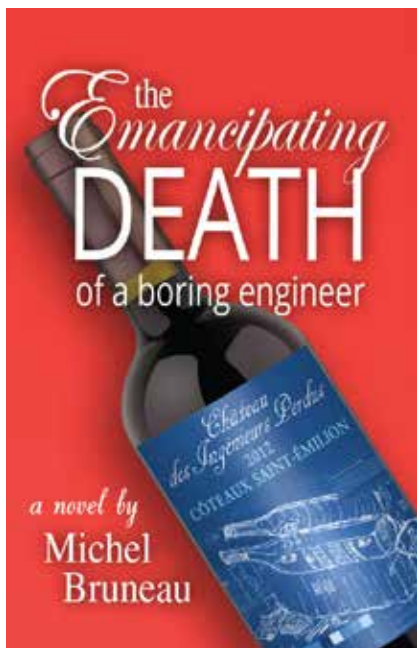
The new *Seismic Design Manual*



is available for sale in both digital and hard copy formats and can be purchased by members for \$175 or by nonmembers for \$350. Order online at www.aisc.org/bookstore or via phone by calling 800.644.2400.

BOOKS

2012 T.R. Higgins Award Winner Publishes Second Novel



Michel Bruneau, P.E., Ph.D., professor in the Department of Civil, Structural and Environmental Engineering at the University of Buffalo, N.Y., and the recipient of the 2012 AISC T.R. Higgins Award, is also an award-winning fiction writer. And he’s recently published his second novel, *The Emancipating Death of a Boring Engineer*.

Bruneau’s roots in writing fiction go back to his childhood, and in 1998 he published his first book, a collection of short stories written in French. Then, in 2010, he published his award-winning novel, *Shaken Allegiances*. A fictional account of what ensues when a devastating earthquake strikes Montreal Island in the dead of an icy winter, the Kafkaesque tale was well-received by readers and critics alike.

His new novel is a fictional story about one engineer’s unconventional journey, searching for significant

numbers, good wines and the meaning of life, love and death.

Bruneau says of his new novel, “In contrast to my previous novel, *The Emancipating Death of a Boring Engineer* is an uplifting story with an upbeat ending, because it was written with a pen of a different color.”

Print and e-book versions of the novel can be ordered from online retailers worldwide (Amazon, Apple’s iBookstore, Kobo, etc.) as well as purchased at brick-and-mortar bookstores. For more details on Bruneau’s new novel and previous work, visit www.michelbruneau.com/MB-Literature.htm.

Bruneau is featured in the February 2012 issue of *MSC* in our monthly “People to Know” section. To learn more about Bruneau, both as writer and engineer, visit his website: www.michelbruneau.com.

JOISTS

Joist System Adds New Phase to Overload Scenarios

New Millennium Building Products, LLC, is hoping to bring some flexibility to the world of roof joists.

The company has created Flex-Joist, a roof joist with a “bend but don’t break” design that provides an extra line of defense against gravity overload conditions (but isn’t designed to address lateral force events, like seismic or high wind).

“Most joists, when tested to destruction, will exceed the safe load-bearing limit, then buckle,” says Joe Pote, director of research and development with New Millennium. “Flex-Joist loses shape, but in a different way.”

The new joist introduces time delay into roof overload scenarios. While all joists will eventually buckle if a load sufficiently exceeds its carrying capability, Flex-Joist is designed to flex before it buckles, identifying an overload problem before it gets to a crisis point. Strain gauges can be attached to the primary tension members to measure ductile tensile yielding, and an alarm can signal the level of overload; the alarm system can be set up as a standalone solution or integrated into a building’s existing detection system. Since the system indicates the location and size of the overload problem—whether the design load or the safety load has been reached—building management can determine whether to evacuate, provide additional roof shoring or simply remove the load (such as snow) from the roof.

“Flex-Joist is a natural extension of New Millennium’s growth strategy,” says Gary Heasley, president of New Millennium Building Systems. “Whether it is improving on our Dynamic Joist building information modeling services or expanding our new online joist specification tools, the company is growing by addressing market needs.”

The concept for this new joist design came almost by accident, say Heasley and Pote.

“In performing quality assurance testing on one of our joist assemblies, we made a rather fortunate discovery about the limit state,” says Pote. “While attempting to make the joist fail by pushing pistons into it as far as possible, we saw that it yielded slowly. We were expecting a ‘snap’ but never got it. This was exciting because most light joist systems such as cold-formed channels, light-gage trusses or wood I-beams don’t exhibit that level of ductility.”

When this behavior was noted on more than one occasion during QA testing, New Millennium decided to explore further and commissioned a six-year research project. The technology is currently being reviewed by the International Code Council Evaluation Service (ICC-ES), which is working with New Millennium to develop appropriate acceptance criteria. Once the acceptance criteria have been defined and approved, an evaluation report will certify that Flex-Joist meets all International Building Code criteria.

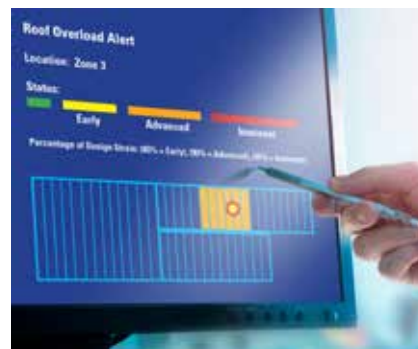
The Flex-Joist manufacturing process and appearance are identical to traditional joists; the difference is in how the members are sized. Flex-Joist combines smaller end webs and bottom chord with larger compression webs and top chord, with weight comparable to a traditional joist. The design imposes relative strength ratio criteria between the various joist components and the joist primary tension members (bottom chord and end webs). This establishes a primary ductile tensile yielding limit state that, in the event of an overload, causes the joist to gradually deform and achieve extreme deflections.

The system also shares loads between

adjacent joists. This is made possible by the ductile behavior of each joist in the system during an overload. If an individual joist is loaded in excess of the elastic limit, it will continue to sustain loads up to its plastic load capacity. Any loads added in excess of the plastic load capacity of the individual joist will be transferred to adjacent joists, while the individual joist continues to sustain its own plastic load capacity.

The development of Flex-Joist reflects New Millennium’s steady expansion. The company is in the process of opening a new deck line in Hope, Ark., and within the last year began making its FreeSpan line of castellated and cellular beams in its Continental, Ohio, facility, using members produced at Steel Dynamics, Inc.’s mini-mill in Columbia City, Ind. (SDI is the parent company of New Millennium.)

“As we grow, we’ve placed an emphasis on identifying new ways to design joists into projects,” says Heasley. “We’re always pushing for new ideas, and Flex-Joist was one of them. It generated excitement with the engineers, and our customers believe this new product will be well-received by owners.”



Informed of the location of an overload, management can “see” the estimated status of the overload and make decisions as to evacuation, roof shoring or load removal.

INDUSTRY NEWS

Overall and Structural Steel Recycling Rates at All-Time High

The recycling rate for the world’s most recycled material—steel—is at an all-time high of 92%, according to an announcement by the Steel Recycling Institute (SRI) in celebration of America Recycles Day late last year.

More than 85 million tons of steel scrap was consumed by steelmaking furnaces in 2011—an increase of nearly 10 million net tons from the previous year.

The recycling rate for structural steel has held steady at an all-time high of 98% since 2009.

Steel recycling rates are generally released up to 18 months following the end of the calendar year. They’re based on data released from the American Iron and Steel Institute’s (AIS) Annual Statistical Reports, U.S. Geological Survey, EPA Characterization of Municipal Solid

Waste, National Automobile Dealers Association, Association of Home Appliance Manufacturers and the Institute of Scrap Recycling Industries.

Visit the Steel Recycling Locator at www.recycle-steel.org for additional information. To learn more about structural steel and sustainability, visit AISC’s sustainability page at www.aisc.org/sustainability.