STANDARDS

New AISC Committee Seeks Members

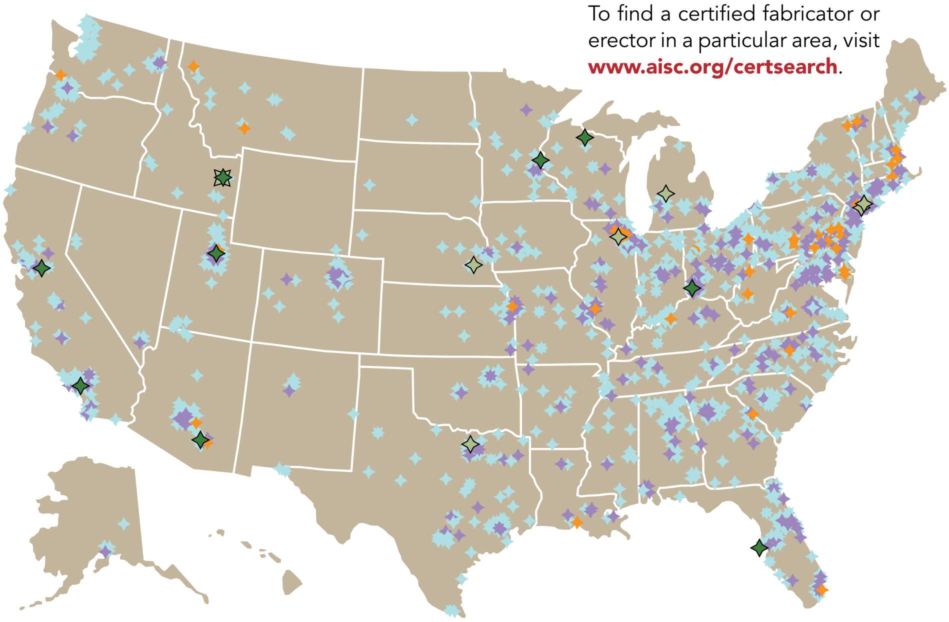
AISC is seeking applications from people interested in participating in its new Committee on Certification Standards (CCS). This is one of two committees being formed from the existing AISC Certification Committee to better address the diversity of its current activities. A second, smaller Certification Advisory Committee (CAC) will serve as an advisory body that will help guide and grow the AISC Certification program from a business perspective. However, the new CCS will maintain a "standards only" focus and provide a consensus body to oversee the development of certification standards for use in the certification process.

"We are looking for a balance of participants in the CCS," said Keith A. Grubb, P.E., S.E., a senior engineer with AISC and secretary of the new committee. "The committee will include three types of members—fabricators and erectors, representing the industry; consulting members such as structural engineers, bridge engineers, architects, and transportation department officials; and other interested parties, such as quality assurance consultants, inspectors, auditors, building officials."

If you are interested in being considered for the CCS, please email a brief resume to **grubb@aisc.org**. For additional information on the AISC Certification program, go to **www.aisc.org/certification**.

Newly Certified Facilities: October 1–31, 2010

To find a certified fabricator or erector in a particular area, visit **www.aisc.org/certsearch**.



Existing Certified Fabricator Facilities
Existing Certified Erector Facilities
Existing Certified Bridge Component Facilities
Newly Certified Fabricator Facilities
Newly Certified Erector Facilities

Newly Certified Fabricator Facilities

Amfab Steel Specialties, Inc., North Salt Lake, Utah
Am-Tec Designs, Scandia, Minn.
Bickers Metal Products, Inc., Miamitown, Ohio
Combustion Associates Inc., Corona, Calif.
King Fab, LLC., Tucson, Ariz.
Nimsgern Steel Corp., Minocqua, Wis.
RPS, Inc.-RPS Steel, Clearwater, Fla.
Schuff Steel - Stockton, Stockton, Calif.
TRC, Idaho Falls, Idaho

Newly Certified Erector Facilities

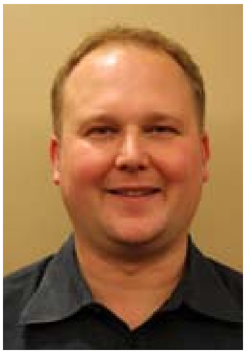
A.J. McNulty & Co., Inc., Maspeth, N.Y.
All Erection Company, Inc./T.Mooncotch, Inc., Plainfield, Ill.
G2 Inc., Cedar Springs, Mich.
Intermountain Erectors, Inc., Idaho Falls, Idaho
Northeast Structural Steel, Inc., Mt. Vernon, N.Y.
Sampson Construction Co., Inc., Lincoln, Neb.
Top Flight Steel, Inc., Rhome, Texas

People and Firms

- **Thornton Tomasetti** and **Hardesty & Hanover** have formed a strategic alliance to collaborate on the evaluation and engineering of transportation infrastructure and movable structures. The alliance unites Thornton Tomasetti's global reach in the design and evaluation of stadiums, arenas and special structures with Hardesty & Hanover's expertise in the transportation sector and architectural kinesthetics. Both firms have extensive experience in the transportation and sport markets. Hardesty & Hanover has worked on bridges and other movable structures nationally and internationally. Thornton Tomasetti has designed or evaluated more than 35 major sports facilities, and conducted a forensic investigation of the August 2007 collapse of the I-35W Bridge in Minneapolis.
- Three employee-owned professional services companies have become the Canadian operating company of **Parsons Brinckerhoff**, the 14,000 person global professional services firm specializing in infrastructure planning, design and program/construction management. The merger includes **Halsall Associates**, a consulting engineering firm founded in 1956; **Pivotal Projects**, a national project management company; and **Loop Initiatives**, a corporate sustainability consulting business.
- **Thomas R. Curtis** has been selected to head up the Sacramento, Calif., office of ZFA Structural Engineers. As a licensed structural engineer for 24 years, Curtis has prepared the structural design for a variety of projects in the Sacramento area, including public school facilities, shopping centers, and industrial/warehouse facilities.
- **Nayan B. Trivedi**, P.E., has been promoted to partner in AISC member firm Leslie E. Robertson Associates, N.Y. Trivedi joined LERA in 200 and has managed the structural design of several projects including the 35-story mixed-use Oberoi Commerz Tower, in Mumbai, India, and the 68-story Bitexco Financial Tower, and office building in Ho Chi Minh City, Vietnam. Other recent LERA promotions include **Seokkwon Jang**, P.E., **Matthew D. Melrose**, P.E., and **Hari S. Nair**, P.E., to senior associate; and **Hugh D. Kelly**, P.E., and **Tanya Lüthi**, P.E., to associate.

PERSONNEL

New Faces at AISC



Heath Mitchell, P.E.

Jacques Cattan has joined AISC as its new vice president of certification. He previously worked at AISC from 1994 to 1999 as a staff engineer. Since then Cattan has been with the Chicago architectural and engineering firm Teng & Associates as a project manager focusing on developing proposals and managing competitive and A/E design-build projects.

Also returning to the staff is Heath Mitchell, P.E., the new AISC director of technical assistance. Mitchell worked for AISC from 1999 to 2001. Since then he has been employed by PCS Structural Solutions, Tacoma, Wash., while maintaining his involvement with AISC as a committee volunteer. He also has worked part-time on the AISC technical assistance panel over the last year.

ACQUISITION

Kee Safety Acquires Lindapter

Kee Safety, Inc., a global supplier of tubular fittings including the Kee Klamp system, has purchased Lindapter, N.A., which specializes in steel-to-steel connections. Going forward, the company name will be LNA Solutions. The firm will take on Kee Safety's BeamClamp and BoxBolt product lines.

EDUCATION

Conversations With Steel Experts

AISC Continuing Education is launching a series of free podcasts entitled "Steel Profiles" beginning December 3, 2010. Issued monthly, the Steel Profiles series will present interviews with the people who are setting the parameters for structural steel design and construction.

The first installment of Steel Profiles will feature James Fisher, P.E., Ph.D., who was the chairman of the AISC Specification Committee from 2003 through 2009. As such, Fisher was at the helm for the publication of the historic 2005 *Specification*. Listen to his reflections on his tenure as specification chair.

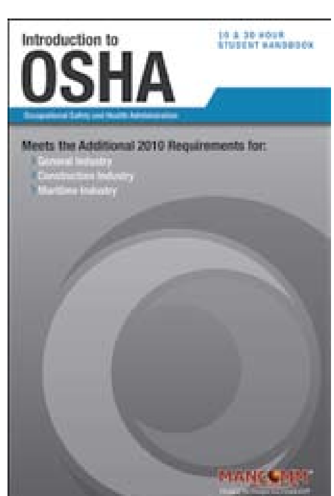
Steel Profiles podcasts can be downloaded easily from the AISC website at **www.aisc.org/podcasts**. Join in and listen to a new interview on the first Friday of every month. Or, subscribe for free through iTunes and the new AISC podcast will be downloaded automatically for you each month.

RESOURCE

Safety Training Booklet Cuts Paper, Aids Compliance

Safety instructors who provide 10- and 30-hour Occupational Safety and Health Administration (OSHA) training are now required to provide their students with information that typically consists of up to 42 pages of handouts. Compliance experts at Mancomm have condensed, rewritten and re-designed the information in those OSHA-required handouts so it now fits into a concise 16-page booklet called *Intro to OSHA*.

The table of contents can be viewed on the company's website, **www.mancomm.com**. Copies of the booklet can be ordered online for $2.95 each.



MANUFACTURING

Atlas Tube Goes Solar

Atlas Tube is teaming up with Windsor, Ontario-based OYA Solar, Inc. to install the largest rooftop solar photovoltaic (PV) system in North America. This system, which will provide 30% of the company's annual energy consumption, will be installed at the Atlas plant in Harrow, Ontario. For additional information on the PV technology, visit **www.oyasolar.ca**.

SDI Purchases Joist-Making Assets from CMC

Fort Wayne, Ind.-based Steel Dynamics Inc. (SDI) has purchased steel joist-making facilities and other assets from affiliates of Commercial Metals Company (CMC). The move came as CMC exited the joist business. These assets are now a part of SDI's wholly owned subsidiary New Millennium Building Systems.

The purchase includes three joist manufacturing plants that New Millennium intends to reopen and begin operating in coming months. Located in Hope, Ark., Fallon, Nev., and Juarez, Mexico, the facilities mark the firm's expansion into markets in the Southwest and West.

APPROVAL

Long-Span Structural Connection Gains Approval

ConXtech's ConXL moment frame connection has been accepted for use in California hospitals by the Office of Statewide Health Planning and Development (OSHPD). This follows successful completion of full-scale cyclic testing of the company's ConXL connection technology. The company worked with structural experts at Thornton Tomasetti, Simpson Gumpertz & Heger and OSHPD to develop the testing protocols which exceed OSHPD's previous full-scale test requirements.

The system uses a "lower and lock" connection technology to form a grid of special moment frames without field welding or braces. It has already been used in applications including commercial, medical office, educational, industrial and military facitilties.

OBITUARY

Ysrael Seinuk, Famed Structural Engineer

Ysrael Seinuk, a professional structural engineer whose work includes many contributions to the New York City skyline, died September 14 in Manhattan. He was 78. Seinuk's notable New York structures include the 70-story Trump World Tower, the 48-story Condé Nast Building in Times Square, and the "Lipstick" Building. A graduate of the University of Havana, Seinuk worked for six years in Cuba but left in 1960 when Fidel Castro came to power. He joined Abrams, Hertzberg & Cantor, in New York. In 1977 he formed his own firm, Ysrael A. Seinuk, P.C., a minority business enterprise, where he continued as CEO until his death. In addition, Seinuk taught structural engineering to architecture students at the Cooper Union for 40 years. He is survived by his wife, daughter and son, six grandchildren and one great grandson.

AWARDS

UAE Structures Take Home 3 NCSEA Awards

The National Council of Structural Engineers Associations (NCSEA) has honored three projects in the United Arab Emirates for their iconic structural engineering in the 2010 Excellence in Structural Engineering Awards. Projects located anywhere in the world are eligible, but must be designed by a licensed professional engineer or structural engineer.

The three winning UAE projects are the UAE Pavilion at Shanghai World Expo, the Yas Marina Hotel Link Bridge, and Sheikh Khalifa Tower in Dubai.

The UAE Pavilion was featured in the August 2010 issue of *MSC*. To read the article, go to **www.modernsteel.com/backissues**.

To read more about the other project winners on the WAM Emirates News Agency, visit **http://bit.ly/b7wIsV**.

AWARDS

Charles Roeder Receives 2011 T.R. Higgins Award

Charles W. Roeder, P.E., Ph.D., professor of civil engineering at the University of Washington, Seattle, is the 2011 recipient of the prestigious AISC T.R. Higgins Lectureship Award. The award is presented annually by AISC and recognizes an outstanding lecturer and author whose technical papers are considered an outstanding contribution to the engineering literature on fabricated structural steel.

Roeder is being honored for his paper "Gusset Plate Connections for Seismic Design," published in *Connections VI*, the proceedings of the Sixth International Workshop on Connections in Steel Structures, held June 23-25, 2008, in Chicago.

Roeder is the author of more than 75 journal articles and numerous other reports and publications. He was a participant in the preparation of the FEMA "Guidelines for Seismic Rehabilitation of Buildings," and was the team leader for connection performance on the FEMA-supported SAC Steel Project. He was co-author of the AASHTO *Steel Bridge Bearing Selection and Design Guide*. He has served as chair of national technical committees including the TRB A2C02 Steel Bridge Committee, the ASCE Seismic Effects Committee, the ASCE Composite Construction Committee and the ASCE Technical Administrative Committee on Dynamic Effects.

Roeder received the 1979 ASCE J. James R. Croes Medal, a 1984 ASCE Raymond C. Reese Research Prize, a 2002 AISC Special Achievement Award, the 2002 Puget Sound Engineers Council Academic Engineer of the Year, and the 2010 ASCE Raymond C. Reese Research Prize for his past research and publications.

Over the years his research has focused on bridges and the seismic performance of steel and composite buildings. Present research studies include development of design methods for improved seismic performance of concentrically braced frames and their gusset plate connections, evaluation of riveted bridge gusset plate connections, evaluation of pile-to-wharf connections for port facilities, and development of economical and efficient concrete-filled tube applications.

Roeder is a member of a number of professional organizations including AISC, the American Society of Civil Engineers (ASCE), the Earthquake Engineers Research Institute, and the Structural Engineers Association of Washington. He is a member of the Board of Directors for the Applied Technology Council and the Executive Committee of the Technical Activities Division for the ASCE/Structural Engineering Institute.

He received a BSCE from the University of Colorado, Boulder, a MSCE from the University of Illinois, Urbana-Champaign, and a Ph.D. from the University of California, Berkeley. His doctoral dissertation, with the late Professor Egor P. Popov, addressed the seismic performance of eccentrically braced frames. His engineering experience includes several years in the building construction industry, and he has also worked as a structural design engineer for the construction of offshore platforms. He served for two years in the U.S. Army in Fort Polk, La., and Vietnam. Currently, he is a professor of civil engineering at the University of Washington where he has been a member of the faculty since 1977. He is a registered professional engineer in Colorado and Washington.

The AISC T.R. Higgins Award is named for Theodore R. Higgins, Ph.D., AISC director of engineering and research from 1945 to 1968, who was widely acclaimed for his many contributions to the advancement of engineering technology related to fabricated structural steel. The award honors Higgins for his innovative engineering, timely technical papers, and distinguished lectures.

Recent recipients include: James O. Malley (2010) for his paper on the 2005 AISC *Seismic Provisions for Structural Steel Buildings*, published in the First Quarter 2007 AISC *Engineering Journal*; Donald W. White (2009) for his papers on stability analysis and design and the flexural provisions of the 2005 AISC *Specification for Steel Buildings*; Walterio Lopez and Rafael Sabelli (2008) for their paper on the seismic design of buckling-restrained braced frames; and R. Shankar Nair (2007) for his paper on the stability and analysis provisions of the 2005 AISC *Specification for Structural Steel Buildings*.

The distinguished panel of industry experts who served as jurors for the 2011 AISC T.R. Higgins Award nominations included:

- C. Dale Buckner, P.E., Ph.D., professor emeritus, Virginia Military Institute, Lexington, Va.
- Lawrence F. Kruth, P.E., vice president of engineering, technology & safety, Douglas Steel Fabricating Corporation, Lansing, Mich.
- T.J. Reeves, CEO, Alpha Industries, Inc., McKinney, Texas.
- Ralph M. Richard, P.E., Ph.D., professor emeritus, University of Arizona, Tucson, Ariz.
- Rafael Sabelli, S.E., director of seismic design, Walter P Moore, San Francisco.
- Clifford W. Schwinger, P.E., S.E.C.B., vice president, The Harman Group, Inc., King of Prussia, Pa.

The award, which includes a $10,000 prize, will be presented at the 2011 NASCC: The Steel Conference in Pittsburgh, May 11-14. For more information on this award program, please visit **www.aisc.org/TRHigginsAward**.

An earlier version of Roeder's award-winning paper is available as a download (free for AISC members, nominal fee for non-members) at **http://bit.ly/avcLaA**. It was co-authored by Dawn Lehman and presented at the 2007 NASCC: The Steel Conference with a title of "SCBF Gusset Plate Design."

letters

Details of Bridge Erection Program Questioned

The June 2010 issue of *Modern Steel Construction* included the article, "An Analytical Monitoring Tool for Bridge Construction," by Jason Stith et al. It is not clear how a number of issues are addressed.

If the program is to be used to accurately predict stresses and deflections during erection it would be anticipated that the program would track deflections and stresses from the as-erected position. As part of the fabrication process, steel girders are cambered for their dead load deflection. However, in order to be sure that the girders are in the correct final dead load condition the cross frames are not cambered. To add to the complexity, for curved steel girders, the girders are cambered for vertical deflection but, for practical reasons, are not cambered for horizontal deflection, i.e., the webs are cut to include dead load deflections but the horizontal geometry of the flanges is not cambered. As a result, when they are delivered to the field, the girders are erected in a cambered position. From the article it appears that it has been assumed that the girders are erected in their uncambered, i.e., final dead load position. For straight girders, the girders need to be forced to align with the cross frames only to the extent that they have camber differences due to fabrication. But for curved and skewed bridges there can be large differences between the uncambered geometry of the cross frames and the cambered position of the girders and as a result the girders need to be forced to align with the cross frames. (This can lead to issues in the field and requests to use oversized holes in the cross frame connections, which should not be allowed as (1) one loses control of the geometry, and (2) it is prohibited for curved girder bridges; see AASHTO Article 6.13.1.) Clearly the erection introduces forces and deformations into the girders and cross frames that are not accounted for in the normal design process that uses a stiffness analysis based on the final geometry. It is not clear how the effects of camber are addressed in the program.

The article discusses the program's ability to utilize a set of existing design plans to analyze an erection sequence but then goes on to indicate that the program can be used to determine cambering requirements. But typically the camber requirements are already part of a set of bridge plans, and would have been already incorporated in the analytic model being used for the erection analysis.

The article also indicates that deck pour sequences can be tracked, but it is not clear if the program includes the ability to include the installation of formwork and, if stay-in-place formwork is not used the subsequent removal of the formwork; the installation of the reinforcing, which together with the formwork installation precedes the deck pour; and finally temporary placement loads, such as the weight of the screed, that are associated with an active deck pour front. The AASHTO *Guide Specifications for Temporary Bridge Works*, Article 2.2.3.1, Construction Live Load, provides guidance on the loads associated with an active front.

The program's ability to include any eigenvalue buckling analysis appears to be a useful addition but it is not clear how the effects of the girder's fabrication tolerances, alignment, or residual stresses, all of which will affect the bucking capacity, have been included. Typically code provisions for buckling of steel members are based on tests so that the effects of fabrication tolerances and residual stresses are accounted for. A purely theoretical buckling analysis will tend to overestimate the buckling capacity.

In engineering one needs to temper any computer output with a heavy dose of reality. Merely relying on a detailed computer program fails to capture all of the engineering aspects, some of which I have listed above. Perhaps the authors can comment on these issues.

—Michael J. Abrahams
Parsons Brinkerhoff, N.Y.

The authors respond:

We would like to thank Mr. Abrahams for his questions regarding the UT Bridge program. Analyzing the behavior of the steel bridge systems during early stages of the erection and construction process poses many difficult modeling issues. The goal of the software is to provide a tool that allows the creation of a 3D finite element model of the bridge that can be used to evaluate the deformations and stability of partially erected systems as well as the behavior during casting of the concrete bridge deck. The authors are not aware of any other software that is available to create these models, nor carry out these analyses, without significant user training and experience. Even with substantial experience, most available finite element programs require significant time to construct the models. The software does not solve every problem that will come up during the construction and erection process, but the authors feel that the software is a useful program that fills a void created by a lack of computational tools for evaluating the behavior during the erection and construction process.

Some of the bridge analysis and detailing issues presented by Mr. Abrahams arose in discussions during the creation of the program. While these issues are not new they do present many challenges that were never intended to be solved with UT Bridge, but forums like this can provide a platform to discuss the issues further. First, we would like to clarify that UT Bridge is, strictly speaking, an analysis software capable of performing linear elastic and eigenvalue buckling analysis on curved and straight I-girder bridges with or without skew substructures. However, due to the ease of input and the quick analysis runs, design work can be accomplished as an iterative process.

Mr. Abrahams asked four questions that will be responded to.

1. Mr. Abrahams brings up several issues with this question including the effect of camber on the analysis. The program is a linear elastic small displacement analysis that assumes the geometric effects associated with a cambered girder are relatively small. To ease the input and development of the 3D finite element node location and meshing, the bridge is assumed to be located on a horizontal plane. Superelevation is not accounted for in the analysis. Previous research at the University of Texas has determined that

neglecting the superelevation in the modeling of a 3D FEA bridge model usually results in relatively small effects in the overall behavior of the system. The detailing of the bridge cross frames for the no load, steel only dead load, or full dead load has been discussed previously in journals, but has proved difficult to resolve analytically. The author is correct in indicating that the stresses introduced by the cambering of the girders or detailing of the cross frames is not considered in the analysis. Because UT Bridge creates a relatively robust model compared to many models that engineers may be using, the software is actually a good tool for predicting the amount of deformation that is likely to occur during erection and construction of the bridge so that the girder can be properly detailed and fabricated for the desired conditions. The authors believe that it is up to the engineer to specify whether the web should be plumb in the no-load, steel dead load, or full dead load condition. This is actually a difficult problem since the placement and curing of the concrete deck has a significant effect on the web plumbness in the final bridge. Since UT Bridge can model the time-dependent stiffening of the concrete, it provides a useful tool for estimating the deformations. UT Bridge estimates the displacements of the bridge under construction loads; however the modeling and tracking of locked-in stresses resulting from various detailing methods is not available from this software and the authors are aware of no other software that will provide such a feature. Tracking such stresses would require a great deal of knowledge about the state of stress from the fabrication process, which is complex and highly variable.

2. Our description of the software as using the information available from a set of design plans was mainly used to demonstrate that the required input is based upon information readily available to the designer or the erection engineer. While an engineer can easily use the software once the design plans are complete, there is nothing precluding an engineer from using the software during the design process. The software has been used to provide relatively accurate estimates of the camber on problematic bridges where commercially available grid-based software provided relatively poor estimates of the camber. These bridges had relatively unique geometry in which the 3D model provided better modeling of the girder stiffness compared to the simplified models that were used in the original designs. If UT Bridge had been used for camber prediction on these bridges, significant problems during construction could have been avoided.

3. The concrete deck placement analysis activates the deck elements associated with the placement of concrete and tracks the stiffening effects of the early age concrete providing the displacement and stresses. Point loads can be specified on the girders for each analysis to simulate the screed or other construction live loads. The subsequent removal of formwork is not thought to significantly impact the final displacement or stress and is not included in the program.

4. We have completed significant computational work to suggest that the capacity of a curved bridge is overestimated by an eigenvalue analysis. The curved girder capacity is governed by deformation rather than buckling. However, the eigenvalue works well for straight bridges. Mr. Abrahams is correct that the residual stresses, fabrication tolerances, and alignment will affect the buckling capacity of a curved bridge, but the researchers have found that the displacements will become excessive before a buckling failure occurs. This leads to serviceability failure that can be indicated by a linear elastic analysis.

—Jason Stith, Ph.D., Todd Helwig, P.E., Ph.D., Eric Williamson, P.E., Ph.D., Karl Frank, P.E., Ph.D., Brian Petruzzi, Hyeong Jun Kim, Ph.D.

Editor's note: The original article is available as a free download at www.modernsteel.com/backissues.