

SEISMIC PROVISIONS

New Revision of AISC Seismic Provisions for Structural Steel Buildings Available

The 2016 version of the AISC standard *Seismic Provisions for Structural Steel Buildings* (ANSI/AISC 341-16) is now available.

This new version, which supersedes the 2010 version, has been approved by the AISC Committee on Specifications, is ANSI-accredited and will form the basis for the 3rd Edition *Seismic Design Manual*, which is scheduled to be published in the third quarter of 2018.

“The 2016 AISC *Seismic Provisions* continue to be the companion document to the AISC *Specification* (ANSI/AISC 360-16) for seismic design of steel structures throughout the United States,” commented James Malley,

past chairman of the AISC Task Committee on Seismic Design. “The 2016 update includes significant new material and numerous technical improvements based on recent research findings, design practice, and input from the profession. The Task Committee on Seismic Design worked diligently to increase the clarity and bring the most up-to-date thinking on seismic design to the *Provisions*.”

Please visit www.aisc.org/2016sp to view or download (for free) the 2016 AISC *Seismic Provisions* and commentary as a PDF. The 2010 version and other related documents are also available for free at www.aisc.org/standards.

BRIDGES

Nearly 56,000 Bridges Still Structurally Deficient, New Analysis Finds

There’s good and bad news to report about the condition of America’s bridges. The good news is there were 2,790 fewer structurally deficient bridges in 2016 compared to 2015. The bad news is there are still 55,710 on the structurally deficient list. About 1,900 are on the Interstate Highway System, and state transportation departments have identified 13,000 Interstate bridges that need replacement, widening or major reconstruction. These are among the key findings in the American Road and Transportation Builders Association’s (ARTBA) recently-released 2017 *Bridge Report*, which analyzes the 2016 National Bridge Inventory from the Federal Highway Administration.

The inventory of structurally deficient bridges has declined 0.5% since the 2015 report. At that pace, it would take more than two decades to replace or repair all of them, according to ARTBA Chief Economist Dr. Alison Premo Black, who conducted the analysis. Black says the data shows 28% of bridges (173,919) are over 50 years old and have

never had any major reconstruction work in that time.

“America’s highway network is woefully underperforming. It is outdated, overused, underfunded and in desperate need of modernization,” Black said. “State and local transportation departments haven’t been provided the resources to keep pace with the nation’s bridge needs.”

To help ensure public safety, bridge decks and support structures are regularly inspected for deterioration and remedial action. They are rated on a scale of zero to nine, with nine meaning the bridge is in “excellent” condition. A bridge is classified as structurally deficient and in need of repair if its overall rating is four or below. While these bridges may not be imminently unsafe, they are in need of attention.

State and congressional district-specific information from the analysis—including rankings and the locations of the 250 most heavily travelled structurally deficient bridges in the nation and top 25 most heavily traveled in each state—is available at www.artbabridgereport.org.

People and Firms

- The **Steel Erectors Association of America (SEAA)** recently announced that it has completed all requirements for full endorsement as a provider of rigger, signal person and mobile crane operator certifications and credentials from the **National Center for Construction Education and Research (NCCER)**. Since its initiation in 2014, the program has grown from concept to a network of 14 training units and assessment sites in 12 states. The program, in partnership with NCCER, is dedicated to providing an industry recognized curriculum that meets or exceeds national standards. For more information, visit www.seaa.net/craft_training.
- **Bill Lally** has been promoted to president of AISC associate member **Tensor Engineering**. **Walter Gatti**, Tensor’s founder, said, “I am confident that Bill has the vision, commitment and organizational skills required to maintain Tensor’s reputation as the leader in the structural steel bridge industry. The steel bridge industry is changing rapidly, and we will continue to work together to improve ourselves and our industry to meet the growing demand expected over the next 10 years.” Gatti will continue in his role as CEO of Tensor but will work in a reduced capacity.

BRIDGES

New Program Salvages Old Bridges

A new program administered by the Ohio Department of Transportation (ODOT) is now providing used steel beams to local governments in the state to be used for replacement bridge projects on county roads and highways.

Previously, steel beams removed from ODOT bridges were retained by the contractor, who either scrapped them or reused them for temporary shoring on other projects. Under the new program, ODOT is offering the used beams to county engineers at no cost.

This partnership between state and local governments is expected save a substantial amount of money on local bridges. ODOT is absorbing all costs associated with salvaging and transporting the beams to the county facilities with only two stipulations: The counties must use the salvaged beams within five years of delivery, and they must be used on a bridge with a minimum length of 20 ft. Under the program, ODOT compiles a list of bridges that are being replaced each year, along with information about the beams, and makes it available to the county engineers. The county engineers then determine if the beams fit their

needs and, if so, they submit a request for them. Plan notes are then prepared that direct the contractor to cut the beams only at field splices and deliver them to the county engineer's facility.

The program came about in recognition of the fact that many bridges were being replaced but the steel was still intact—e.g., due to clearance or substructure issues—and could be reused elsewhere. In cases where the deterioration is the reason for replacement, it is sometimes possible for the deteriorated section to be cut off and the remaining section used for a shorter span.

The steel beams that are coming off ODOT bridges typically have sections that are much deeper than needed for county bridges, so the county engineers must determine the best locations for the beams, such as bridges that are high off the water or ones that have long spans that need larger sections. While the reclaimed steel cannot be used in every situation, it can help free up money for replacing other structures. With virtually no increase in funding for local governments on the horizon, there is simply not enough money to keep up with the rate of deterioration of county structures.

“This program is a testament to the longevity and durability of steel as the preferred material for bridges of all shapes and sizes and, further, to steel's recyclability on a whole new level,” said Danielle Kleinhaus, NSBA's managing director. “NSBA is proud to see the collaborative and thoughtful way in which ODOT is improving our nation's infrastructure.”

The program's first bridge is on Interstate 70 in Muskingum County, near Gratiot, and is being replaced due to vertical clearance problems; one beam has been struck multiple times. The steel—eight W36×156 beams that are 45 ft. 6 in. long and eight W36×170 beams that are 74 ft. 6 in. long, totaling 79 tons of salvaged steel—will become available next year.



IN MEMORIAM

In Memory of Former AISC Board Member Tommy Valenta

Tommy Allan Valenta of Dallas passed away peacefully, surrounded by his family, on Sunday, February 12, 2017, in Houston after a long battle with cancer. He was 67 years old.

Born March 4, 1949 in Houston, Valenta attended Midwestern University in Wichita Falls, Texas and

later earned his MBA from Southern Methodist University. In 1970, he joined Texas Industries, Inc. (TXI), where he held various senior management positions. When Chaparral Steel became a wholly owned subsidiary of TXI in 2005, Valenta became its president and CEO, as well as a director—roles he remained in until his retirement in 2007. Chaparral's market value increased over 900% in his two years at the helm.

In addition to serving on the boards of HollyFrontier Corp. and American Excelsior Company, he was also involved with several industry associations, including AISC (as a board member), the Steel Manufacturers Association, the International Iron and Steel Institute and

the National Ready-Mixed Concrete Association. His charity service included roles with the Cashiers (North Carolina) Community Fund (as president), Baylor Health Care Foundation, Boy Scouts of America-Circle 10 Council Foundation, the Episcopal Diocese of Dallas Corporation (as president) and several others.

Tommy is survived by his wife of 24 years, Lana Moore Valenta, son Stephen Valenta, daughter Shelley Valenta-Hood, stepsons Kenneth, Todd and Neil Somodevilla, stepdaughter Alina Williams, 12 grandchildren and one great-grandson. He is also survived by his siblings, brother John Michael Valenta and sisters Valerie Faye Valenta Prater and Margaret Ann Valenta Davis.



ENGINEERING JOURNAL

Second-Quarter 2017 *Engineering Journal* now Available

The second-quarter 2017 issue of AISC's *Engineering Journal* is now available at www.aisc.org/ej. You can view, download and print the current digital edition. Articles in this issue include:

► **Effective Length Factors of Gin Poles**

James L. Lott and Ernest R. Jones

An iterative numerical method is used to find the first elastic buckling mode and critical buckling load of gin poles. The buckling loads are used to determine dimensionless, effective length factors, KL , referenced to the total gin pole length. A dimensionless, relative stiffness ratio of the supporting structure to the gin pole is defined and incorporated into a parametric study of the effective length factors versus the "overhang" distance above the top lateral support. Other parameters include variations in rigging of load lines and two or three lateral supports.

Keywords: gin pole, critical buckling, effective length factor, relative stiffness

► **Minimum Requirements and Section Detailing Provisions for Steel-Plate Composite (SC) Walls in Safety-Related Nuclear Facilities**

Saabastaramsbu R. Bhargwaj, Amit H. Varma and Sanjeev R. Malushte

Steel-plate composite (SC) walls are comprised of concrete walls sandwiched between steel faceplates located on the exterior surfaces. These faceplates are anchored to the concrete infill using steel

anchors and connected to each other using ties. SC walls have been used extensively in the third generation of nuclear power plants and are also being considered for small modular reactors (SMRs) of the future. The American Institute of Steel Construction (AISC) has published Supplement No. 1 to AISC N690, which includes Appendix N9 for the design of SC walls in safety-related nuclear facilities. This paper presents the minimum requirements for SC walls and the section detailing provisions from Appendix N9 along with their basis. The minimum requirements include requirements for minimum and maximum SC wall thickness, faceplate thickness, and steel and concrete material strengths. The provisions of Appendix N9 are applicable to SC walls that satisfy these minimum requirements. The design provisions account for the effects of interaction between out-of-plane shear demands (in both x- and y-directions) and the corresponding interfacial shear demands while accounting for the differences in behavior between yielding and non-yielding steel anchors and ties as classified by AISC N690 Supplement No. 1.

Keywords: AISC N690s1, modular construction, steel plate, SC wall, steel-plate composite, nuclear, safety-related.

► **A Boundary Stress Model for Fillet-Welded Connection Plates**

Logan Callele

A common structural steel connection design problem is to size a fillet-welded

plate boundary for an eccentric shear and/or normal force. Three common design models for dealing with the design of the fillet-welded plate boundary are reviewed, and a new model is presented. The new model is derived to produce designs similar to the instantaneous center of rotation method; however, the model offers an explicit solution by assuming a stress distribution on the boundary that designers can easily confirm or modify in daily practice.

Keywords: fillet weld, instantaneous center of rotation, welded connection, plate boundary, eccentric shear.

► **Ring-Shaped Steel Plate Shear Walls for Improved Seismic Performance of Buildings**

Judy Liu

Recently completed work on the innovative ring-shaped steel plate shear wall (RS-SPSW) is highlighted. The research was led by Dr. Matthew Eatherton, Associate Professor at Virginia Tech and an AISC Milek Fellow. Featured here is the research conducted at Virginia Tech, with a brief discussion of the RS-SPSW concept and behavior; a summary of the large-scale experiments; and selected nonlinear response history analysis results comparing conventional SPSW and RS-SPSW prototype buildings.

INTERNSHIPS

AISC Unveils New Resource for Students Seeking Internships

AISC has developed a new webpage—www.aisc.org/internships—to connect students looking for internships with structural steel companies that have available positions. Students can view available internships and link to the appropriate company sites or contacts. The service is free to students and the companies posting their internships.

Companies looking to post their opportunities can complete the form in the "Post an Internship Opportunity" area of the page.

SCHOLARSHIPS

AISC Accepting Applications for 2017–18 Scholarships

Full-time juniors, seniors and masters students enrolled in civil engineering, architectural engineering, construction engineering or construction management programs at U.S. universities are encouraged to apply for AISC scholarships for the 2017-18 academic year. A total of

\$109,000, provided by the AISC Education Foundation and various steel industry organizations, will be awarded to students.

For the full eligibility requirements and online application, visit www.aisc.org/scholarships. Applications are due by May 1, 2017.

STEEL DECK

Steel Deck Institute Updates Five Standards

The Steel Deck Institute (SDI) has updated five standards and made them available for free at www.sdi.org. These standards are included by reference in the 2018 *International Building Code*. The updated standards are:

- ANSI/SDI C-2017—*Standard for Composite Steel Floor Deck – Slabs*
- ANSI/SDI QA/QC-2017—*Standard for Quality Control and Quality Assurance for Installation of Steel Deck*
- ANSI/SDI T-CD-2017—*Test Standard for Composite Steel Deck – Slabs*
- ANSI/SDI RD-2017—*Standard for Steel Roof Deck – Slabs*
- ANSI/SDI NC-2017—*Standard for Non-Composite Steel Floor Deck*

“SDI’s updated suite of standards reflects recent research advancements and correlates with diaphragm design

references in AISI S310-16, *North American Standard for the Design of Profiled Steel Diaphragm Panels*,” said Bob Paul, PE, managing director of the Steel Deck Institute, also noting that AISI S310-16 is available for free at www.aisistandards.org. The updated SDI standards include:

- Specific provisions to ANSI/SDI NC-2017 for situations where non-composite steel deck is used to carry all dead and live loads without a structural concrete slab. This commonly occurs when gypsum concrete or other nonstructural fill is used as the floor surface.
- Harmonized construction loading requirements in the non-composite floor deck standard (ANSI/SDI NC-2017) with the composite floor deck C standard (ANSI/SDI C-2017).

- Revision of the permitted upper flexural strength limit for composite steel deck-slabs from the yield moment to the ultimate moment, reinstating the long-used ultimate strength model for composite steel deck-slabs.

- A change in the maximum deck support attachment spacing from 12 in. to 16 in. on center to reflect current practice.
- Editorial changes to clarify intent and improve usability of the standards without changing their requirements.

SDI’s suite of standards has been approved by the American National Standards Institute (ANSI) and is intended for use in the U.S., Canada and Mexico.

SAFETY

National Construction Safety Stand-Down Scheduled for May 8–12

OSHA’s fourth annual “National Safety Stand-Down” will take place May 8–12. It’s a voluntary event for employers to talk directly to their employees about safety, including hazards, protective methods and the company’s safety policies and goals. It can also be an opportunity for workers to talk to management about hazards they observe.

The stand-down is primarily focused on preventing falls in construction but can be used to address any safety issue. While it’s intended for job sites, fabricators looking for ways to emphasize their safety programs can also use the event to present a current safety issue or recognize the safe actions of their shop employees.

Companies can conduct activities such as toolbox talks, safety equipment inspections, developing rescue plans or discussing job specific hazards—whatever works best for their workplace. Suggestions for preparing a successful stand-down, as well as highlights from past stand-downs, can be found at www.osha.gov/stopfallsstanddown/index.html. OSHA’s Events page also shows events that are free and open to the public to help employers and workers find events in their areas. OSHA is also providing certificates of participation to employers that provide feedback about their stand-down.

OSHA is partnering with key groups to assist with this effort, including the National Institute for Occupational

Safety and Health (NIOSH), the National Occupational Research Agenda (NORA), OSHA-approved State Plans, state consultation programs, the Center for Construction Research and Training (CPWR), the American Society of Safety Engineers (ASSE), the National Safety Council, the National Construction Safety Executives (NCSE), the U.S. Air Force and the OSHA Training Institute (OTI) Education Centers. The Steel Erectors Association of America and IMPACT also promote this event.

More information about this year’s stand-down can be found here. For more information and resources on safety for the fabricated structural steel industry, visit AISC’s safety page at www.aisc.org/safety.