

STEEL NEWS & EVENTS

Cross wins DBIA National Press Award

The Design-Build Institute of America (DBIA) recently selected AISC Vice President of Marketing John Cross, P.E., as the winner of one of two national press awards. Each year, DBIA presents the awards to individuals who document key design-build trends that affect the construction industry. Larry Silver, editor-in-chief of *Contractor Marketing*, was also a national winner. "Both of these honorees have combined a deep understanding of the impact of accelerating design-build project delivery with an equally powerful commitment to advancing industry best practices," the DBIA said in a press release.

Cross has authored numerous articles on design-build and the steel supply and fabrication industry. In various articles in *Modern Steel Construction*, he discussed how steel fabricators can use design-build effectively; explained conceptual estimating, design-build, and the steel fabricator; and he pre-



Jeff Beard (past president, DBIA) and John Cross, P.E.

sented successful design-build case studies. In partnership with DBIA, Cross developed a series of seminars on design-build contracting and conceptual estimating that have attracted more than 200 steel fabricators. During his time with AISC, the magnitude and level of involvement by steel specialty contractors on design-build projects has grown by more than 50 percent. "It is clear that John has had much to do with this exciting development," the DBIA said. ★

AISC Announces Multi-Story Residential Design Competition

Cash prizes totaling \$15,000 will be awarded to the top two proposals in AISC's Multi-Story Residential Design Competition. The challenge is to develop innovative solutions for structural steel and floor-framing systems in multi-story residential buildings.

Designers of multi-story residential buildings—apartments, condos, hotels, dorms and senior housing—one of the fastest growing segments in the construction industry, turn to structural steel systems like Girder-Slab, Stag-

gered Truss, Stub Girder and Precast Plank construction to minimize floor-to-floor heights. This competition challenges designers to create new systems.

Proposals do not require structural steel floor systems, but designs must be compatible with structural steel framing. All entries must be received no later than Jan. 31, 2004 and winners will be announced at the North American Steel Construction Conference in Long Beach, CA, on March 24–27, 2004.

Conference Calendar

- The 13th World Conference on Earthquake Engineering will be held Aug. 1–6, 2004 in Vancouver, Canada, under the auspices of the International Association of Earthquake Engineering. For more information visit www.13wcee.com.
- The Federal Highway Administration (FHWA) conference, "Steel Bridges: Emerging Technologies with Emphasis on High Performance Steel" will be Dec. 16–17, 2004 in San Antonio, TX. Authors are invited to submit a one-page abstract related to steel bridge research, design, fabrication, construction and case studies. Deadline is Jan. 30, 2004. Interested authors should e-mail abstracts to Atorod Azizinamini, aazizi@unl.edu. For more information, contact Vasant Mistry 202.366.4599 or John Hooks 202.493.3023 of the FHWA. ★

AISC Standards Now Available for Public Review

Reaffirmation of N690-1994, *Specification for the Design, Fabrication, and Erection of Steel Safety-Related Structures for Nuclear Facilities*. This document currently is under public review. There has been one supplement to this document, dated Apr. 15, 2003.

A second supplement currently is in balloting and public review. The reaffirmation corresponds to the base document only. This standard applies to the design, fabrication, and erection of steel safety-related structures and structural elements for nuclear facilities using the Allowable Stress Design

method. The structures or structural elements subject to this *Specification* are those steel structures that are parts of the nuclear safety-related system or which support, house, or protect nuclear safety-related systems or components, whose failure would impair the safety-related functions of these systems or components. Specifically excluded from this *Specification* are pressure-retaining components, e.g., pressure vessels, valves, pumps, and piping.

A hard copy is available for the public review period ending Jan. 13,

Proposals will be reviewed and judged by a panel of designers and contractors. Entrants must grant AISC permission to develop and use the submitted innovation. The proposal must contain enough information to clearly describe the innovation and demonstrate that it has potential for use in residential construction. For complete information on AISC's Multi-Story Residential Design Competition, e-mail Janet Cummins, cummins@aisc.org, or visit www.aisc.org/contest. ★

2004. To order, e-mail Janet Cummins, cummins@aisc.org. The cost is \$20. Submit comments to Cynthia Duncan, duncan@aisc.org, by Jan. 13, 2004.

The second supplement, *Supplement No. 2 to N690-1994, Specification for the Design, Fabrication, and Erection of Steel Safety-Related Structures for Nuclear Facilities* is available for free download from the AISC web site, www.aisc.org. A hard copy is available for \$12. Comments should be submitted to Cynthia Duncan, duncan@aisc.org, by Dec. 29, 2003. ★

In Memoriam

Lynn S. Beedle, a giant in the world of structural steel design and the founder of the Council on Tall Buildings and Urban Habitat, died on Oct. 30, 2003 of pancreatic cancer. He was 85.

"He was one of the biggest engineers that AISC ever worked with, and probably the best-known American structural engineer around the world," said former student Ted Galambos, Prof. Emeritus at the University of Minnesota.

Beedle was born on Dec. 7, 1917 in Orland, CA. He earned a Bachelor of Science in civil engineering with a minor in architecture from the University of California, Berkeley. During World War II, he was assigned to the Postgraduate School of the U.S. Naval Academy in Annapolis, MD, where he served as an instructor in naval architecture. In 1942 he received a special five-year assignment as officer-in-charge of underwater explosion research at the Norfolk Shipyard in Virginia. He then served as deputy officer-in-charge of the Ship Instrumentation Group for the 1946 Bikini atomic bomb tests.

In 1947, Beedle joined Lehigh University as a Research Instructor in the Civil Engineering Department. He earned an M.S. degree in 1949 and a Ph.D. in 1952.

He was appointed an assistant professor, and rose to the rank of full professor five years later. "I met Lynn Beedle when I started as a graduate student at Lehigh," Galambos said. "And he has been a mentor of mine all of my life since then."

While at Lehigh, Beedle directed research on the plastic design of steel structures and was director of the Fritz Engineering Laboratory from 1960 to 1984. His research laid the groundwork for designing structures on the basis of their load-carrying capacity rather than their allowable stress. Beedle's students have gone on to become leaders in limit-state design, load and resistance factor design, and auto-stress design—the models for structural design specifications in the 1990s. "In the '50s and '60s, most of the new ideas for AISC specifications came from the Fritz Laboratory," Galambos said. "Lynn was at the forefront of that. He was a force behind the 1963 AISC *LRFD Specification*, which changed the whole design of steel structures."

Beedle was appointed a University Distinguished Professorship in 1978.

"Lynn formed a major steel research organization at Lehigh," said Lou Geschwindner, AISC vice president of engineering and research. "He has influenced the direction of steel design and construction in this country, and even more so if you look at all the work his students have done."

"I was at Lehigh because of Lynn Beedle," said John Fisher, Ph.D., P.E., Prof. Emeritus, Lehigh University. "He recruited me as a graduate stu-



"The whole point of tall buildings is function and even philosophy... How high can man go into the sky? How high can he support loads in the event of storms and earthquakes? How high can architecture go in creating a pleasing structure?"

—Lynn S. Beedle

dent, and I worked under him for both my masters and doctorate. He was a friend to everyone he came in contact with. He pushed them to do the best they could. He was dedicated to their work and he put his whole effort into it. He knew how to stimulate students and colleagues to obtain a superior effort, and he followed up with them after they left Lehigh. When he traveled and organized conferences, he kept contact with people and maintained relationships over many years. He had a passion for Lehigh and promoted his work internationally. Many engineers worldwide are well-acquainted with Lehigh because of his legacy."

Beedle was a member of the Structural Stability Research Council (SSRC), and he headed it for almost 25 years. The council is credited with influencing most of the research, design, and specification developments that have occurred in the area of stability for steel structures.

Beedle also founded the multidisciplinary, international Council on Tall Buildings and Urban Habitat, in 1969. The CTBUH brought together architecture, engineering, environmentalism, sociology, psychology, art, and politics to provide a rationale that underlies the construction of modern urban structures. "He felt that tall buildings were a way to deal with populations in urban areas," Fisher said. "He soon expanded it beyond engineering to social issues. He brought in many groups besides structural engineers to look at the overall application of tall buildings."

"Beedle was a very forward-thinking person," Galambos said. "He had a great vision that all

kinds of professionals from different parts of the world involved in the design of tall buildings ought to collaborate and work together."

Beedle was the council's first chairman, and in 1973 he became director, serving until 1999. The council's publications, conferences and international congresses have expanded knowledge of tall buildings and their effects on urban environments. The council also is regarded as the official arbiter of disputes over the world's tallest skyscrapers.

"Beedle showed interest in starting up organizations that have an impact on our profession in addition to all his work as a faculty member, a teacher and a researcher," Geschwindner said. "Not all faculty are interested in going that far beyond their own direct area. He was certainly a giant in our field."

Beedle's colleagues say he was a dedicated researcher and friend.

"Beedle was a scrupulous and well-organized individual," Fisher said. "He was always prepared. Whenever you met with him, he carried around a little notebook and jotted things down. He was meticulous with bookkeeping and records. He'd go and pull out the notes he had made. He maintained detail about the people he had contact with. He never forgot anyone's birthday. He knew when he had first met you. He was also a true gentleman, and never overbearing."

Beedle has authored, coauthored, or edited more than 200 books, papers, and articles, many of which have received international acclaim. He has presented more than 600 lectures at conferences in more than 40 countries. He is best known for authoring *Plastic Design of Steel Frames*; for coauthoring and editing ASCE's *Manual 41* (Plastic Design in Steel); for serving as the editor-in-chief of the first two editions of *Structural Stability: A World View*; and for serving as the editor-in-chief of the multi-volume monograph *Tall Buildings and Urban Environment Series*, published by McGraw-Hill.

Beedle was elected to the National Academy of Engineering in 1972. He received AISC's T.R. Higgins Lectureship Award, the Distinguished Service Award, and most recently, the 2003 Gerhard Haaijer Educator Award (named after one of Beedle's former students). He also received AISC's Lifetime Achievement Educators Award in 2000.

Beedle was an honorary member of both ASCE and the International Association for Bridge and Structural Engineering. He received ASCE's Ernest E. Howard Award in 1974 and later the OPAL Award for Lifetime Achievement in Management in 2002. He was awarded a John Fritz Medal in 1994.

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Engineering Journal Abstracts for Fourth Quarter 2003

Continuity Plate Detailing for Steel Moment-Resisting Connections

Jerome F. Hajjar, Robert J. Dexter, Sara D. Ojard, Yanqun Ye, and Sean C. Cotton

This paper reports research on column stiffening and new alternatives for detailing column stiffeners in steel moment-resisting frame connections. The results of nine full-scale monotonically-loaded pull-plate experiments designed to study the limit states of local flange bending (LFB) and local web yielding (LWY) in column flange and corresponding three-dimensional nonlinear finite-element analyses are summarized. The tests and analyses compare the following: 1) the behavior of continuity plates having different welding details and thicknesses relative to the girder flange; 2) a detail in which the doubler plate is fillet-welded to the column flanges; and 3) a detail in which two doubler plates are placed symmetrically several inches away from the column web (with no continuity plates being used). The current AISC provisions are found to be adequate as a result of this research for monotonic loading. However new design provisions for local flange bending and local web yielding are also presented that correlate better with test data from this research and the literature. **Topic: Connections - Moment Connections**

Development of Design Rules for Composite Construction

Ivan M. Viest

Historical development of the requirements for the design of composite structures made up of steel elements and concrete, as practiced in the United States, is reviewed. Included are buildings and highway bridges. After a brief description of the origins of composite construction in America, an emphasis is placed on early design rules issued by the American Institute of Steel Construction (AISC), American Association of State Highway Transportation Officials (AASHTO), the Joint Committee on Concrete and Reinforced Concrete, and the American Concrete Institute (ACI). The discussion is divided into two parts. The first, dealing with composite beams, traces the development of the AISC and AASHTO requirements; it also includes remarks on the strength of stud shear connectors placed in the trough of a steel deck. AISC, Joint Committee and ACI provisions for composite columns are the subject of the second part of the discussion. **Topic: Composite Design**

Constrained Axial Buckling About Non-Principal Axes

Albert G. Zvarick

When certain structural members are used in axial compression, framing considerations dictate the orientation of the cross section about

the member's longitudinal axis. When a second member is framed to the first, a constraint is imposed which forces the member to buckle about a non-principal axis. The author investigates axial buckling for this case, and formulates equations for the compound buckling of axial compression members. Formulas are derived using the differential equations of classical structural stability mechanics. **Topic: Compression Members; Single Angles**

Behavior of Built-Up Shear Links Under Large Cyclic Displacement

A.M. Itani, S. El-Fass, and B.M. Douglas

This paper discusses the cyclic behavior of the built-up shear links that are being used in the retrofitted towers of the Richmond-San Rafael Bridge in California. Two full-scale built-up links were tested under large cyclic displacement to establish their ultimate capacity, plastic rotation, and failure mode. The results of these tests showed that these links possess good ductile behavior since the plastic rotation of the two specimens exceeded 8% radians. The average overstrength ratio for the two specimens was equal to 2.1, exceeding the AISC-specified value by almost 31%. The failure mode of one link was the fracture of the bottom flange adjacent to the eccentric brace connection. The failure mode of the other specimen was the fracture of the web. **Topic: Seismic Design; Bridges; Reinforcing** ★

Beedle, continued from previous page.

Beedle was the first recipient of the International Contributions Award from the Japan Society of Civil Engineers in 1994. He was a silver medalist in the American Welding Society and a two-time recipient of *Engineering News-Record's* Construction Engineering Award. In 1999, *ENR* also named him one of the "125 Top People of the Last 125 Years" who had contributed most to the construction industry. In 2000, *The Morning Call* newspaper, based in Allentown, PA, named Beedle one of 120 "Persons of the Century" in the Lehigh Valley.

"He knew what he wanted to achieve, and he was always focused," Fisher said. "If he had his mind set, he pursued it with a great deal of zeal, and was not going to give up."

In 2002, the CTBUH honored Beedle at its first-annual Awards Gala with the first annual Lynn S. Beedle Achievement Award. Beedle also was honored by Lehigh University's Civil and Environmental Engineering Department at a luncheon in July 2003 with a new award, the Lynn S. Beedle Distinguished Civil and Environmental Engineer Award. The award will be given annually

to a Lehigh University CEE graduate or faculty member for outstanding achievement and contribution to the advancement of Civil and Environmental Engineering.

Beedle was also an elder in the First Presbyterian Church of Bethlehem, PA. Beedle and his wife, Ella, were married for 57 years. In addition to his wife, he is survived by four children, nine grandchildren, and his brother and sisters. Memorials in Beedle's honor can be made to First Presbyterian Church of Bethlehem and to the American Cancer Society.

Beedle is best remembered for his tireless efforts on behalf of his students, and his immeasurable contributions to the field of engineering. "He was a person with a keen interest in those around him, and challenged us to do things better," Galambos said. "We were very great friends. He was an example to me through our collaboration through the SSRC. He was and is a role model to me. He taught us how people can respect each other and work together, and through engineering, can achieve peace in this world." ★