2002 AISC *Seismic Provisions for Structural Steel Buildings* Now Available

The AISC *Seismic Provisions for Structural Steel Buildings*, dated 2002, is now available in print from AISC. This is a full revision of the 1997 version of this document, including Supplements Number 1 (dated Feb. 15, 1999) and 2 (dated Nov. 10, 2000).

This American National Standard, developed by the AISC Task Committee 9 on Seismic Design and approved by the AISC Committee on Specifications, is the most current specification in the United States addressing the design and construction of structural steel and composite structural steel/reinforced concrete building systems for seismic demands. The standard includes revisions resulting from new information generated by the FEMA/SAC project and other sources. One major change is related to the referencing of ASCE 7-02, *Minimum Design Loads for Buildings and Other Structures*, which allows the 2002 *Seismic Provisions* to be incorporated by reference into both the 2002 NFPA 5000 and the 2003 International Building Code. Both codes use ASCE 7-02 as their basis for design loading. Additional specific changes included in the 2002 *Seismic Provisions* include the following:

- Clarification to the glossary to verify that chord and collector/drag elements in floor diaphragms are considered to be part of the seismic load resisting system.
- Additional requirements for the toughness of filler metals to be used in complete-joint-penetration groove welds in intermediate and special moment frame systems.
- A revision to clarify member slenderness ratio requirements and better coordinate with the LRFD provisions.
- Increasing the moment frame column splice requirements to reflect the FEMA/SAC recommendations.
- Requiring that splices of columns that are not part of the moment frames develop a minimum shear force.
- Clarifying column base design demands for various systems.
- Adding a section on the use of H-pile members.
- Clarifying lateral bracing requirements of moment frame beams, including the provision of a required stiffness to be consistent with Section 3 of LRFD.
- Increasing SMF web connection design requirements to be consistent with the FEMA/SAC recommendations.
- Adding a new appendix (Appendix P) that defines procedures to be used in the pre-qualification of moment connections.
- Incorporating FEMA/SAC recommendations for weld access holes in OMF systems.
- Incorporating FEMA/SAC recommendations for the removal of weld backing and run-off tabs in OMF systems, including grinding surfaces to adequate smoothness.
- Dual units format.

These new provisions are accompanied by a major update to the commentary.

To order this publication, call 800.644.2400 or visit www.aisc.org, and refer to Publication ANSI/AISC 341-02. The complete document can also be downloaded for free from the AISC web site. ★

Educational Opportunities Abound at NASCC 2003!

The 2003 North American Steel Construction Conference (NASCC) is set for April 2-5 in Baltimore, MD—and will feature the newest innovations in structural steel engineering, fabrication, detailing and erection. This once-a-year event is an opportunity for design and construction professionals to learn how to apply the latest technology and techniques to everyday work; to discover new product offerings from leading industry vendors; and to network with peers, customers and future employees.

The conference features presentations by industry experts such as Tom Ferrell (on designing with single-plate connections), Linda Hanagan (on building floor vibrations), Jeffrey Packer (on HSS connections), Michael West (on erection stability issues), Emily Bailey (on managing EEO exposure), Michael Lederle (on cambering), and Janine Reid. See the advance program in the December 2002 issue of *MSC* or online at www.aisc.org/nascc.

The NASCC is also the ideal place to view the tools you use everyday. This year's exhibit hall expects to feature more than 200 booths. Displays will include software (engineering, detailing and fabrication), fabrication equipment, bolts, safety equipment, coatings, and much more.

This year's NASCC features more than 40 technical sessions aimed at practicing structural engineers, fabricators, detailers, and erectors. In addition, the conference features six special events:

- SSRC Stability Tutorial, included with full registration
- Practical Steel Design Tutorial: a 4.5-hour program that provides instruction on basic design from wind and low-seismic conditions; included with full registration.
- Marketing Short Course: a four-hour program that focuses on successful techniques to help increase business, including internal auditing and presentation skills.
- Financial Management Short Course
- Short Course on Correcting/Preventing Common Design & Construction Problems: a four-hour program that focuses on solutions to common problems, and suggestions to prevent the problems from occurring.
- Short Course on Bolting and Welding: a seven-hour program that focuses on both welded connection design and the fundamentals of high-strength bolting.

Join 3,000 of your peers for the steel industry's biggest event! Register online at www.aisc.org/nascc. ★

Sullivan to Speak at NASCC Baltimore

Architecture magazine Editor in Chief C.C. Sullivan will deliver a keynote address April 3, 2003 at the North American Steel Construction Conference. Sullivan's speech, "Recent Architectural Trends and Their Impact on Steel Design and Construction," is one of three keynote presentations scheduled for the 2003 NASCC, in Baltimore, MD, April 2-5.

Prior to joining *Architecture* magazine, Sullivan served as editor of *Building Design & Construction*. He has served as a contributor and editor for other magazines, including *Progressive Architecture*, *Architectural Review* (London), *Architecture Today* (London), *SD/Space Design* (Tokyo) and *Buildings*. Sullivan also studied architecture at Yale University and has worked with architects Tai Soo Kim (Hartford, CT), Emery Roth & Sons (NYC), and Angel Fernandez Alba (Madrid). ★

Geschwindner to Preview Next AISC *Specification* at NASCC Baltimore

Preliminary provisions of the new AISC *Specification* will be presented by Louis F. Geschwindner, Ph.D., P.E., AISC vice president of engineering and research, at the 2003 North American Steel Construction Conference on April 2. He will discuss the provisions in his keynote address, "Evolution of the AISC *Specification*—The Next Steps."

"AISC has embarked on the development of a unified specification that will bring the Allowable Stress Design Specifications approach and the Load and Resistance Design Specifications approach up to date and into harmony," Geschwinder said. "This new specification will permit designers to follow any of the design and loading requirements established in the applicable building codes."

Geschwindner is responsible for establishing AISC's technical long-range objectives and initiatives, and for coordinating technical activities between AISC and outside groups. He is also a professor of architectural engineering at Penn State University, and was the 2000 recipient of the T.R. Higgins Lectureship Award. Geschwindner is a member of AISC's Committee on Specifications, AISC's Technical Activities Committee, and chairman of the ASCE/SEI Committee on Design of Steel Building Structures. ★

In Memoriam

Fred R. Havens

Fred R. Havens, former president and CEO of Havens Structural Steel Company in Kansas City, MO, and a former AISC Board member and committee chairman, died peacefully on Feb. 3, 2003, at his son's home in Mequon, WI.

Fred's father, Harry Havens, founded Havens Structural Steel Company in 1919. Fred became president and CEO in 1956, and was later named chairman emeritus. He served as a member of the AISC Board from 1976-1980 and was chairman of the Market Analysis and Statistics Committee in 1980. ★

AISC Revises Detailer Membership Program

AISC has revised its membership program for structural steel detailers and has introduced a new annual fee structure based on the number of detailers and checkers in the firm.

Firms with 1-3 detailers/checkers pay $195 annually; with 4-9 detailers/checkers, $295; with 10-20 detailers/checkers, $495; and with +21 detailers/checkers, $795 annually.

Membership benefits include an online directory listing for your firm; discounts on advertising in *Modern Steel Construction*; discounts on registration and exhibiting at the NASCC; free and discounted copies of AISC literature, publications, software and seminars; privileges to attend exclusive AISC conferences; and the use of the AISC member logo on company publications and advertising.

Please contact Wendy Hurst at hurst@aisc.org for more information. ★

AISC Continuing Education—Spring 2003 Schedule

Bracing of Steel Structures

(an AISC/SSRC joint seminar)

Featured Speakers: Joseph A. Yura, Ph.D., P.E., University of Texas at Austin, & Todd Helwig, Ph.D., P.E., University of Houston.

March 11 & 12 - Omaha, NE
March 13 & 14 - San Francisco, CA

Seismic Design and the 2002 AISC Seismic Provisions

Featured Speaker: Thomas A. Sabol, Ph.D., S.E., President of Englekirk & Sabol Consulting Engineers, and Adjunct Associate Professor at UCLA.

March
25 - Waltham, MA
26 - New York City, NY
27 - Atlanta, GA

April
22 - San Diego, CA
25 - Anchorage, AK

May
6 - San Francisco, CA
8 - Pasadena, CA

Practical Steel Design: 2 - 20 Stories

Speakers will vary by location. Check www.aisc.org/seminars for information on the speaker in your area. This seminar will also be featured as a tutorial at the 2003 NASCC, April 2-5, in Baltimore, MD.

March
11 - Batavia, NY
12 - Syracuse, NY
13 - Schenectady, NY
18 - Jackson, MS

April
22 - Stillwater, OK
23 - Dallas, TX

For more information on AISC continuing education opportunities, visit www.aisc.org/seminars. ★

Student Bridges Cross the Border

Civil Engineering students celebrated their bridge-spanning skills in Mexico City, Mexico, site of the 2003 Texas regional AISC Student Steel Bridge Contest. Mexico City's LaSalle University transformed its courtyard into a construction site for the competition and welcomed guests with receptions and festivities. Although Mexican and Canadian teams have participated for several years, this is the first time the contest has been hosted outside the United States.

Judges gather at LaSalle University.

The intercollegiate contest challenged civil engineering students to design, fabricate and erect 24'-long, two-span steel bridges to support 2500 lb. Teams brought fabricated parts to the contest site and erected them over an imaginary river. Bridges were rated on stiffness, lightness, erection speed and aesthetics. Additional efficiency and cost ratings were computed from deflection, depth of profile, weight and erection person-minutes. Penalties were assessed for "accidents," such as dropping material or stepping into the river, and for violations of dimensional and handling specifications that simulate real project regulations.

Student engineers from Texas A&M at College Station won first place. They also took category awards for stiffness, cost, efficiency and erection speed. University of Texas at Arlington and Texas Tech earned second and third places, respectively. A 192-lb. cable-stayed bridge built by students from University of Texas at Austin took the prize for lightness and aesthetics. Future civil engineers from Lamar University, LaSalle University and University of Houston were tough competition.

The Texas contest was the first of 20 regional events scheduled for 2003. Student teams from nearly 200 universities will compete regionally, and 40 winners and runners-up will advance to the national competition at San Diego State University, May 23-24, 2003.

Participating students practice basic steel fabrication, project scheduling and management, and gain hands-on appreciation for the strength and versatility of structural steel. The AISC Student Steel Bridge Contest is co-sponsored by the American Society of Civil Engineers, the American Iron and Steel Institute, the James F. Lincoln Arc Welding Foundation, the National Steel Bridge Alliance, Nucor Corporation and TXI Chaparral Steel. For more information, contact AISC Director of University Relations Fromy Rosenberg at Rosenberg@aisc.org. ★

Automatic Data Collection Conference Focuses on Construction

Las Vegas, NV
March 26-28, 2003

The 2003 World Conference on the Use of Automatic Data Collection In Construction (ADCIC) will bring together segments of the construction industry from around the world to learn about automatic data collection and management technologies in construction. The conference will be held March 26-28 at the Monte Carlo Resort and Casino in Las Vegas, NV.

The three-day conference will include speakers from owner operator companies, construction companies, suppliers, manufacturers, professional organizations and educators from around the world. Keynote speakers will be Ben Schwegler of Walt Disney Imagineering and Kevin Ashton of Massachusetts Institute of Technology (M.I.T.). Technologies addressed at the conference will include: bar codes, 3D laser scanning, RFID, GPS, 4D modeling, robotics and more. In addition, manufacturers and value added resellers (VARS) will have exhibit booths at the conference to showcase their ADC products

For further information, visit the conference web page at:
www.sit.ecu.edu/cm-dept/adcic1_2003.htm
or contact Connie Ciesielski via email at ciesielskic@mail.ecu.edu. ★

2003 AISC Scholarships and Fellowships Available

AISC announces that it is now accepting applications for its 2003 undergraduate scholarships and graduate fellowships. Different awards are offered for various regions of the country, depending on the location of the applicant's university. A total of $54,500 in awards will be granted, with scholarships of up to $3,000 available to undergraduate students, and fellowships of up to $5,000 available to graduate students. Four undergraduate scholarships and eight graduate fellowships are being offered. All applications are due no later than April 18, 2003.

For more information, please visit the "University Programs" page on the Training and Education section of the AISC web site, www.aisc.org; or contact AISC University Relations Director Fromy Rosenberg at rosenberg@aisc.org, or Coordinator Kelly Mullins at mullins@aisc.org. ★

2003 Undergraduate Scholarships

AISC/Carolina Steel	$3000
AISC/Southern Association of Steel Fabricators	$2,500
AISC/Associated Steel Erectors of Chicago	5×$3,000
AISC/Indiana Fabricators Association	3×$500

2003 Graduate Fellowships

AISC/Structural Steel Fabricators of New England	$3,000
AISC/US Steel	$5,000
AISC/Kingelhofer	$5,000
AISC/Great Lakes Fabricators and Erectors Association	$5,000
AISC/Southern Association of Steel Fabricators	$2,500
AISC/Rocky Mountain Steel Construction Association	$3,000
AISC/Fred R. Havens	$5,000
AISC/Structural Steel Education Council	$4,000

AISC to Present Awards at NASCC in Baltimore

The American Institute of Steel Construction, Inc. will present four prestigious awards at the North American Steel Construction Conference in Baltimore, MD.

The **Geerhard Haaijer Educator Award**, named for one of AISC's most respected vice presidents of technology and research, is given to recognize individuals who have had a profound and lasting impact in developing a unique application for engineering practice or in the mentoring of future technical leaders; and who have advanced the use of structural steel framing in the construction industry.

This year, world-renowned researcher, educator and code-criteria developer Lynn S. Beedle of Lehigh University will receive the award. Beedle led the steel research effort at Lehigh University from the late 1940s through the 1980s, and has remained active in retirement. He was a prime influence in the development of plastic design and the code criteria that evolved from this work. He performed valuable work on high-rise building design and was a major contributor to the Structural Stability Council. Beedle is known as a first-rate educator, and many of his students have gone on to prominent positions in industry and academia.

The **Special Achievement Award** provides special recognition to individuals who demonstrate notable singular or multiple achievements in structural steel design, construction, research or education. This award honors living individuals who have made a positive and substantial impact on the structural steel design and construction industry.

This year, Gregory G. Deierlein of Stanford University will receive the award for his work on advanced frame analysis and design. He also has been a major contributor to research related to the 1994 Northridge Earthquake.

The **Lifetime Achievement Award** honors living individuals who have made a difference in the success of AISC and the structural steel industry. The award recognizes individuals who have provided outstanding service to AISC and the structural steel design/construction/academic community for a sustained period.

This year, W.F. Chen of the University of Hawaii will receive the award. Chen is a respected researcher and educator who emphases stability, frame analysis and design, and plastic analysis. He has authored about 20 books and more than 250 papers on steel design and analysis.

Robert J. McNamara of McNamara/Salvia, Inc., of Boston, MA also will receive a Lifetime Achievement Award. He is regarded as one of the foremost steel designers in the nation, and he has a large body of respected projects, including many staggered-truss framed structures. McNamara has been active with several engineering industry organizations, most notably SEI/ASCE, EERI, Tall Buildings Council, SEAoNC, Applied Technology Council and AISC. His specialty is conceptual engineering. Among his more than 500 projects are: Citicorp Center; Torre Banaven, in Carracas, Venezuala; NYNEX Tower, in Manchester, NH; One and Two International Place, in Boston; and the Aladdin Hotel in Las Vegas. ★

ATC Introduces New Training CD-ROM

The Applied Technology Council (ATC) announces the release of a CD-ROM that contains the ATC-20 *Training Slide Set for Postearthquake Safety Evaluation of Buildings*. The slide set was developed jointly by the Federal Emergency Management Agency (FEMA) and ATC to present an updated version of the ATC-20-T *Training Manual*. It is intended for educators who focus on post-earthquake safety evaluation procedures, and the earthquake performance characteristics of buildings. The set consists of 230 slides in Microsoft PowerPoint format, containing photographs, schematic drawings, textual information and lecture notes to assist in presentations. Price: $35.00 each. To obtain your copy, call the ATC at 650.595.1542 or e-mail ATC@ATC-Council.org. ★

Pentagon 9/11 Report Released

A study of the structural performance of the Pentagon during and following the Sept. 11 2002 terrorist attack says that the building's resilient structural system substantially mitigated the damage, the number of casualties, and the extent of the collapse resulting from the attack. The findings were released as part of *The Pentagon Building Performance Report*, the result of a seven month investigation by ASCE's Building Performance Study Team.

"Focusing on the roughly 400-foot-square segment of the Pentagon through which the plane impacted and traveled, the structural performance of the Pentagon's reinforced concrete was essentially identical to that of structural steel of the World Trade Center towers," said Charles J. Carter, S.E., P.E., Chief Engineer for AISC. "The impact destroyed a significant portion of the structure and simultaneously initiated a very large fire. The remaining structure initially bridged the damage, but eventually succumbed to fire-induced collapse after about 30 minutes."

Contact ASCE at www.asce.org to obtain a copy of the report. ★

Engineering Journal Abstracts for First Quarter 2003

Design Recommendations for Bolted Rectangular HSS Flange Plate Connections in Axial Tension

S. Willibald, J.A. Packer, and R.S. Puthli

The results of an experimental investigation of four bolted flange-plate connections between rectangular hollow structural sections, with bolts on all four sides, is presented. A brief overview of different design methods for bolted flange-plate connections for square and rectangular hollow structural sections under tension load are also given. A comparison of the load predictions of the various methods for the specimens in the experimental program supports the use of the design procedure that can be found in the AISC *HSS Connections Manual* (AISC, 1997). However, this is provided that the flange-plate width/height is used to calculate the bolt pitch. Moreover, the results of this experimental study on rectangular HSS connections suggest that the connection strength should be calculated for both the short and long side individually, using the minimum of both values as the actual connection resistance. All the given design recommendations should be restricted to the range of experimental verification, which is for up to 10 bolts and for rectangular HSS up to 10 in. in size and with aspect ratios up to 1.7.

Design of Free Flange Moment Connection

Jaehyung Choi, Bo idar Stojadinović, and Subhash C. Goel

The Free Flange connection is a new public-domain beam-to-column moment connection developed at the University of Michigan. This connection is designed to alleviate excessive local deformation and shear force overload of beam flanges in pre-Northridge fully-restrained steel moment connections. These design goals were achieved by cutting the web of the beam back and away from the column, thus creating portions of the beam flanges that are not constrained by the web. Such free portions of beam flanges significantly reduce connection deformation constraints; allow the flange steel to yield freely; and help to redirect most of the shear force back into the web connection. Seven full size Free Flange connection specimens were tested to validate the design concept, check the design procedure, and prequalify the connection for use in practice. The original Free Flange connection design procedure was modified based on the observed specimen behavior. The new design procedure is presented and compared to the Free Flange connection design procedure in the FEMA 350 *Design Guidelines*.

Updating Standard Shape Material Properties Database for Design and Reliability

F. Michael Bartlett, Robert J. Dexter, Mark D. Graeser, Jason J. Jelinek, Bradley J. Schmidt, and Theodore V. Galambos

This paper summarizes the mechanical properties of ASTM A992 steel as determined by tests of 207 flat-strap tensile test specimens at the University of Minnesota and the University of Western Ontario carried out in accordance with ASTM A370. Samples were obtained from 38 heats of steel from eight different shapes provided by three producers. The objectives of the study were to quantify statistical parameters for the mechanical properties of A992 steel and to investigate the necessity of updating the resistance factor for steel in the AISC *LRFD Specification*. It is concluded that A992 steel has smaller bias coefficients and smaller coefficients of variation compared to the parameters for A36 steel used in the original calibration that have increased the reliability index slightly. At the AISC LRFD calibration point of a live-to-dead ratio of three, the reliability index for a braced compact beam with a resistance factor of 0.9 increases from 2.5 to 2.6 if the discretization factor is ignored or to 2.8 if the discretization factor is included. However, an increase of resistance factor from 0.90 to 0.95 is not recommended without further study.

MTR Survey of Plate Material Used in Structural Fabrication

Roger L. Brockenbrough

A statistical survey was made for a broad sample of mill test reports (MTR) of plate grades typically used in building construction including A36, A572, A588, A852, and A514 steels. Tensile properties, impact properties, and chemical compositions were analyzed. The tensile statistics agreed with assumptions made in the development of the AISC *LRFD Specification for Structural Steel Buildings*. The yield-tensile ratios varied from 0.61 to 0.94, following the typical trend of increasing yield-tensile ratio with increasing strength level. The mean CVN values at 70°F were generally over 100 ft-lbs. for all the steels, which is attributable to the fact that the toughness data were generally reported for product with specified minimum values. The minimum CVN values at 70°F all met or exceeded the 20 ft-lbs. value specified by AISC for plate material over 2 in. thick used for built-up cross sections spliced with complete-joint-penetration groove welds and subjected to tension. The statistical analysis of composition generally indicated good weldability, particularly for A36 and A572 Grade 50.

Evaluation of Applicability of Typical Column Design Equations to Steel H-Piles Supporting Integral Abutments

Earl E. Ingram, Edwin G. Burdette, David W. Goodpasture, and J. Harold Deatherage

The use of integral abutment bridges with abutments supported on steel H-piles has become common practice in a number of states. These H-piles are subjected to various combinations of axial load and bending moment as the bridge undergoes temperature change. One commonly used approach to the design of these H-piles is, first, to perform an analysis to estimate the distance between inflection points on a pile and, second, to apply the AASHTO or AISC column design equations to the design of the pile. Tests were performed to determine the ability of piles to support combinations of axial load and bending moment that fell outside the limits of interaction diagrams based on AASHTO and AISC column design equations. Combinations of axial load and moment were measured which correspond to the plastic limit capacity of a pile cross-section with no length effects considered. The test results clearly demonstrated the inapplicability of the AASHTO and AISC column design equations, which consider length effects, to steel H-piles embedded in soil. Combinations of axial load and moment corresponding to the plastic limit capacity of a pile cross-section can more reasonably be used to evaluate the capacity of a pile.

SidePlate Systems, Inc. was pleased to be featured in the January 2003 article headlining the construction of the new Pacific Command Headquarters for the United States Department of the Navy in Honolulu, HI.

SidePlate Systems, Inc. markets the SidePlate™ steel frame connection technology used for the force protection of steel frame structures, including moment frame and braced dual-system frame buildings and specialty structures. The technology, patented in the United States and other countries, was originally developed with the use of private funding to resolve earthquake issues following the Northridge earthquake in 1994.

This letter is intended to clarify the proprietary nature of the technology and the licensing requirements for use on specific projects. For additional information, visit SidePlate's web site, www.sideplate.com.

Henry Gallart, S.E., Vice President
SidePlate Systems, Inc.