

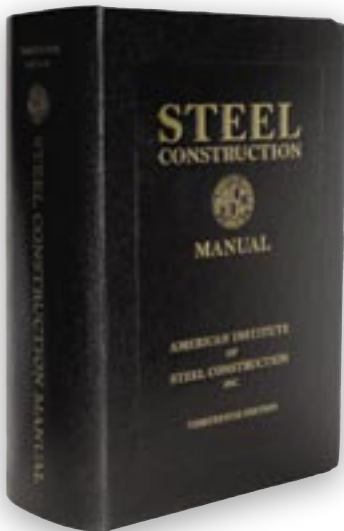
TECHNICAL DOCUMENTS

Steel Construction Manual now Available in Print

The moment you've been waiting for has arrived: printed copies of the 2005 AISC *Steel Construction Manual* are now available to purchase from www.aisc.org/bookstore.

The new manual brings together the best of ASD and LRFD and is easier to use than ever. ASD and LRFD are merged seamlessly side-by-side: tabulated ASD values have green shading and tabulated LRFD values feature blue type. Black type is used for design values that are independent of design philosophy. And included with the *Manual* is AISC's *Design Examples*, a CD-companion that provides hundreds of design examples illustrating the use of the new manual and the 2005 *Specification for Structural Steel Buildings*.

The AISC member price for the *Manual* is \$175, while non-members pay \$350. Additional discounts are available for attendees at an upcoming steel seminar—visit www.aisc.org/bookstore for more details.



Got News?

Send your news items, announcements, and industry events to Keith Grubb, grubb@modernsteel.com or Lena Singer, singer@modernsteel.com.

CONTINUING EDUCATION

Seminars from AISC Continuing Education

Did you miss the “Design Steel Your Way with the 2005 AISC Specification” seminar at the Steel Conference? AISC’s Continuing Education Department continues to offer this seminar, and the “Seismic Braced Frames” seminar, in locations across the country throughout the year. Look for seminars in these cities this spring:

Seismic Braced Frames

March 2	New York, N.Y.
March 28	Washington, D.C.
March 30	Houston, Texas
April 26	Charlotte, N.C.
April 27	Philadelphia, Pa.

Design Steel Your Way with the 2005 AISC Specification

March 8	Greensboro, N.C.
March 8	Seattle, Wash.
March 9	Raleigh, N.C.
March 9	Portland, Ore.
March 14	San Francisco, Calif.
March 16	Los Angeles, Calif.
March 22	Baltimore, Md.
March 22	Columbus, Ohio
March 23	Cincinnati, Ohio
March 23	Richmond, Va.
April 5	Portland, Maine
April 6	Manchester, N.H.
April 19	Kansas City, Mo.
April 20	Dallas, Texas
April 20	Oklahoma City
May 2	Minneapolis, Minn.
May 3	Omaha, Neb.
May 4	Chicago, Ill.
May 10	Edison, N.J.
May 11	Hartford, Conn.
May 24	Sacramento, Calif.
May 25	Las Vegas, Nev.
May 31	Denver, Colo.

“Design Steel Your Way with the 2005 AISC Specification” will accelerate your ability to design steel buildings according to the 2005 *Specification for Structural Steel Buildings*, whether you design in ASD or LRFD. Presentation topics will include proper material selection, design philosophies and analysis requirements,

member and structure stability provisions, member design, and connection design. This seminar also includes extensive handouts: Each attendee will receive a copy of the course notes and design examples, the AISC *Design Examples* CD, and a copy of the 13th Edition AISC *Steel Construction Manual*, which includes the 2005 AISC specification, the 2004 RCSC specification, and the 2005 *Code of Standard Practice for Steel Buildings and Bridges*.

This year’s 2005 AISC specification seminars also include “extras” available only to attendees. Each attendee will receive laminated copies of the *Basic Design Values* cards—two 5” x 8” cards that include the most-used information from the 2005 AISC specification, in both ASD and LRFD. With these cards, users can design all typical beams, columns, braces, tension members, and connections and perform simplified analyses. Attendees will also be eligible to win an Apple iPod Nano—one per seminar—courtesy of AISC Certification.

“Seismic Braced Frames” is a full-day seminar that concentrates on design of seismic braced frames. The course will focus on the design requirements in the 2005 AISC *Seismic Provisions for Structural Steel Buildings*. For those proficient in the 2002 AISC seismic provisions, the seminar will highlight the differences between the 2002 and 2005 editions, and the implications of these changes in your design. (Look for another seismic design seminar, “AISC Seismic Design—Updates and Resources for the 21st Century,” later in 2006.)

AISC continues to offer its “Bring a Buddy” registration program for all of its seminars. If eligible, paid registrants may add one person to their registration at a reduced rate. And, as always, AISC members attend at discounted rates. To become a member and receive the AISC member discount, please visit www.aisc.org/membership. Call 800.809.2364 or visit www.aisc.org/2006seminars for more information or to register.

SAFETY

OSHA Revokes Slip Resistance Provision from Steel Erection Standard

The Occupational Safety and Health Administration (OSHA) announced January 18, 2006 that it is revoking the provision within the Steel Erection Standard that addresses slip resistance of the walking surfaces of coated structural steel members.

According to OSHA: "The ability to comply with the slip resistance provision depends upon two technical developments: completed industry protocols for slip testing equipment and the availability of suitable slip resistant coatings." However, OSHA added, "Rule-making comments indicated that the test methods are not likely to be completed by the July effective date because ASTM will not have completed the required validation process. Comments also indicated that ASTM will likely withdraw the test methods altogether because they are brand-specific rather than generic. Lack of completed test methods has delayed the development of suitable slip resistant coatings. In addition, there has not been adequate testing of coatings to determine whether they have sufficient durability in the variety of applications in which they will be used, especially in corrosive environments."

AISC agrees with OSHA's position to withdraw the standard. Without adequate and consistent measurement, which is not currently possible, any standard becomes meaningless. Stated AISC President Roger Ferch: "While AISC is a strong supporter of measures that improve the safety of steel erection, we opposed these provisions because there was no reliable method of testing available."

EVENTS

Steel Building Seminars Slated

The Steel Structures Technology Center (SSTC) and International Code Council (ICC) will present several seminars on structural steel building design this spring. Contact SSTC for more information on these seminars: call 248.893.0132 or visit www.steel-structures.com.

Structural Steel Inspection	
Philadelphia	March 29 and 30
New York	April 5 and 6
Los Angeles (Buena Park)	May 3 and 4
San Francisco (Fremont)	May 10 and 11
Steel Connections: Seismic Applications 2006	
Los Angeles (Buena Park)	May 2
San Francisco (Fremont)	May 9
Structural Welding: Design and Specification	
Philadelphia	March 28
New York	April 4

UNIVERSITY RELATIONS

New Teaching Aids from AISC

New construction management teaching aids will be introduced at a workshop for educators presented by AISC on Thursday, April 6, 2006 at the Hyatt Rosemont Hotel in Chicago. These teaching aids are designed for courses in steel construction and construction management.

The workshop will present an overview of the teaching aids, as well as a discussion of technical topics for steel design courses, such as cambering, bolting and welding, connections and bracing, and architecturally exposed structural steel (AESS).

A \$350 travel stipend is available to educators attending this workshop. A reduced room rate of \$165 also will be offered through March 20, 2006.

For more information about registration or the stipend, please contact Fromy Rosenberg at 312.670.5408 or rosenberg@aisc.org; or contact Megan Maurer at 312.670.5418 or maurer@aisc.org.

CALL FOR PAPERS

2007 Pacific Structural Steel Conference

Organizers of the Pacific Structural Steel Conference (PSSC) are accepting abstracts through April 28 for papers to be presented at the 2007 conference, "Steel Structures in Natural Hazards."

The conference will take place March 13-17, 2007 in Wairakei, New Zealand and will address how steel structures perform in hazardous natural events such as earthquakes, wind, fire, waves, volcanic eruption, ice, and snow. Conference papers should address at least one of these topics, or one of the following related topics:

- Advances in fabrication and construction
- Bridges and marine structures
- Case studies
- Buildings
- Composite behavior
- Codes and standards
- Connections
- Design aids
- Durability
- Economics
- Fatigue and fracture
- IT in the industry
- Long-span structures
- Structural architecture
- Welding and bolting

Authors may submit any number of abstracts, but a maximum of two may be presented at the conference. In accordance with the submission guidelines, each abstract:

- must include an introduction, a summary of key points (where appropriate), and conclusions.
- may not exceed 400 words.
- should advise which of the conference's topics are applicable, if more than one topic is addressed.

Authors will be notified of acceptance by June 30. Complete papers must be submitted for review by September 1.

For more information about the 2007 PSSC or the abstract submission guidelines, please visit www.pssc2007.com.

Steel Conference Sizzles in San Antonio

BY LENA SINGER



IMPROVING STEEL DESIGN AND CONSTRUCTION THROUGH TECHNOLOGY AND TEAMWORK WERE DOMINANT THEMES OF THIS YEAR'S NASCC: THE STEEL CONFERENCE. New ideas in interoperability and Building Information Modeling (BIM), automated fabrication, design innovation, and project team coordination permeated the conference's keynote speeches, general sessions, and pre- and post-conference symposia.

A record-breaking 3,200 steel industry professionals primarily from the United States, Canada, and Mexico—but also from South America, Asia, and Europe—attended this year's conference. The event was held Wednesday, February 8 through Saturday, February 11 in San Antonio and featured technical and educational sessions for engineers, fabricators, detailers, erectors, architects, and educators alike; as well as a 65,000-plus sq. ft exhibit hall with more than 160 exhibitors representing steel design and construction software, services, and machinery.

"It's the best Steel Conference we've ever had," said Terry Zwick, Steel Conference Planning Committee Chairman, noting the outstanding attendance and excellence in the conference's varied sessions and keynote speeches.

Gene Kranz, the now-retired NASA flight director who directed the Apollo 13 space mission back to Earth after the shuttle's oxygen system failed, addressed more than 1,200 conference attendees in one of three plenary sessions.

"It was very engaging and inspiring," said Judy Liu, Assistant Professor of Civil Engineering at Purdue University and member of AISC's Partners in Education Committee, of Kranz's speech. "It showed that nothing is insurmountable."

Liu said she was impressed with Kranz's account of the cooperation that was required by NASA's team of engineers and builders to

build the space program from the ground up, and then to bring the Apollo 13 astronauts back to Earth.

"There was amazing integration and communication between the designers and builders," Liu said, "and that's a very important message for the steel construction community."

Ronald Hamburger, recipient of the 2006 T.R. Higgins award, presented his award-winning paper, "Design of Steel Structures for Blast-Related Progressive Collapse Resistance," to the general assembly. Louis Geschwindner, AISC's Vice President of Engineering and Research, said that Hamburger's talk, which will be repeated in locations throughout the United States in 2006, touched on an important issue for today's designers.

"Progressive collapse is a very timely issue," Geschwindner said. "People need to understand what it really means, and Ron is an excellent presenter."

James M. Fisher was presented with AISC's J. Lloyd Kimbrough award, the association's most distinguished honor for steel designers. In his keynote speech "Design!," Fisher, an industrial buildings designer, discussed what successful design is and how it can be attained.

"Good judgment is the single most important factor in good design," Fisher said. "It's what gets a design headed in the right direction."

Success, however, is not only dependant on the structure's ability to efficiently satisfy the structural criteria, but also its ability to meet the entire project team's expectations, he said.

"A successful design is one in which the team members and owner are satisfied."

On Wednesday, the pre-conference symposium, "Purging Extras," provided a forum that brought architects, structural engineers, steel fabricators, general contractors, and construction

managers together to approach the subject of contract “extras” in a neutral setting, and to discuss ways to work together in reducing excess in the overall project’s budget and schedule.

Following this symposium, AISC will continue to work with the Council of American Structural Engineers (CASE) in developing ways to resolve problems associated with extras, according to AISC’s Chief Structural Engineer, Charles Carter. Together the groups plan to reach out to the American Institute of Architects (AIA) to generate more solutions.

Also presented Wednesday were short courses on beam buckling and bracing, termination issues, and interoperability (a short course on designing with the AISC 2005 specification was presented Saturday). During the interoperability short course, project teams discussed how BIM accelerated schedules and lowered costs for three different structural steel projects—one high-profile project, one “standard” project, and one manufacturing facility. According to presenter Derek Cunz of MA Mortenson design-build contractors, projects like Mortenson’s recent Denver Art Museum expansion would not have been successful without interoperability.

“Projects of this complexity can’t be built without BIM,” he said.

Brian Lenartowich of Spencer Steel, Ltd. in Ilderton, Ontario said the short course, “Termination: PM Issues, Rights, Remedies and Defenses,” applied to circumstances his company is now experiencing.

“A lot of the material was directly applicable to what we’re going through,” Lenartowich said. “The lawyer who was speaking hit a couple chords with me, and I got up right away and made a couple calls. It was so parallel to what we’re experiencing—it was unbelievable.”

On Thursday evening, attendees loaded buses and headed outside the San Antonio city limits to the Knibbe Ranch. A Texas-style barbecue, hayrides, armadillo races, and a country Western band entertained more than 1,000 people on the ranch’s sprawling grounds.

Attendees were also given the opportunity on Wednesday to tour the San Antonio facilities of AISC member steel service center Triple-S/Instel.

“Seeing their operations, you think about things from your own perspective and your own material needs,” said Michelle Williams, project manager with SEAA member steel erectors Perry and Perry Builders, Inc. “They’re dealing with inventory control and quality management just like we are.”

Williams, who said this year was her first at NASCC, said that she found value in many of the conference’s general sessions, even when they did not specifically reflect the size of work or sector of steel design her company performs.

“When you scale it down to the size of work we deal with, it was good information for us,” she said. “It’s good to compare experiences with contractors and designers, and to see it from all points of view. Everybody’s getting something different out of it, depending on what their specialty is.”

The conference’s general sessions included a track for engineers, fabricators, detailers, and erectors, as well as a seismic design track—new to this year’s conference.

While the general sessions allowed members of the design and construction communities to develop better understanding of their own work and of each other’s roles in the project team, the exhibit hall—which featured leading software, machinery, and structural materials producers—provided exhibitors and attendees

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Attendees crowd around a software presentation by Bentley Systems in the exhibit hall.



AISC President Roger Ferch (left) and AISC Chairman Steve Porter (right) present AISC’s J. Lloyd Kimbrough Award to Jim Fisher of Computerized Structural Design, Milwaukee.



Terry Zwick (left), Chairman of the Steel Conference Planning Committee, thanks retired NASA flight director Gene Kranz for his outstanding presentation on the rescue of the Apollo 13 astronauts.

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a similar opportunity.

"It's a great show to be at—you see a wide cross-section of the industry," said Olimpio DeMarco, Product Marketing Manager for Autodesk. "This conference helps give us a broader understanding of the industry."

The exhibit hall also featured, for the second year, a classroom for heavy machinery manufacturers, software producers, structural materials producers, and other exhibitors. Exhibitors presented workshops with design tips and information on product developments.

Abdul Rab, Principal of Structural Engineering for Parsons Corporation in Murphy, Texas, said that a workshop on composite steel joists presented by Nucor Vulcraft could influence his future designs.

"We've designed composite beams before, but not composite joists," Rab said. "It was new to me, but now I might get into designing composite joists more."

And, as in years past, the Structural Stability Research Council (SSRC)'s Annual Stability Conference was held in conjunction with NASCC. According to Joseph A. Yura, Professor Emeritus of Civil Engineering at the University of Texas, sessions on bridge topics and thin-walled construction issues were among the best attended of this year's Stability Conference.

Yura, a widely recognized authority on stability and a lifetime member of SSRC, was presented with SSRC's Lynn S. Beedle award during the conference.

The fully restored Morial Convention Center in New Orleans will be the setting for next year's conference, April 18-21, 2007.

"The NASCC committee knows everyone is concerned about the city and conference center's restoration, and we are, too," Chairman Zwick said. "We are monitoring the progress very closely."

According to Zwick, transportation and other services are expected to be restored by the beginning of this summer—and definitely before next year's conference.

Lenartowich says he and his colleagues at Spencer Steel are already planning to attend.

"We'll definitely go to New Orleans," he said. "I think it's the right thing to do."

For more information about next year's NASCC: The Steel Conference, please visit www.aisc.org/nascc.

BUSINESS

Tax Tips for Contractors

Grant Thornton LLP, one of Grant Thornton International's six global accounting, tax, and business advisory organizations, offers 10 tax tips for 2006 that could help contractors save money in the future.

- 1 Review deferred compensation plans. Complex new rules, enacted in 2004, partially take effect this year. These rules affect any plan that results in a compensation deferral and, if violated, can result in accelerated taxation to recipients plus the payment of penalties.
- 2 Take advantage of the new I.R.C. Section 199 Domestic Production Activities Deduction. Section 199—made available in 2005—may be able to reduce taxable income by up to 3% (9% when fully enacted in 2010). This deduction is an "add-on," which does not require more money to be spent. Most contractors will benefit from this deduction, but there are complex rules for its application.
- 3 Examine capital asset depreciation methods and lives. "Catch-up" deductions are possible on under-depreciated existing assets. The business may be able to write off 100% of the under-depreciated amount in the current year without amending past returns by filing an automatic change in accounting method.
- 4 Restructure the business. How the business is organized can have a major impact on the amount of taxes paid. Consider restructuring the business to address inequities in unemployment taxation or state taxation. Also, consider establishing a partnership to provide inter-company services, with favorable income tax results.
- 5 Consider establishing a separate entity to own and lease fixed assets used in the business. Often referred to as "leasing companies" or "procurement companies," these entities help manage assets and may significantly reduce the one tax paid regardless of profitability—sales and use tax.
- 6 Offer customers more and obtain a marketing edge. Work with a tax advisor to provide a turnkey cost segregation study to customers with the business's completed project. This will allow the advisors to assist in appropriately classifying capital assets associated with the project into tax-advantaged depreciable lives.
- 7 Review employee benefits packages. The business may be able to deduct the cost of a number of fringe benefits for which your employees will not be taxed; e.g., employer-provided childcare services.
- 8 Review accounting methods. Taxation of contractors can result in the need for multiple methods of accounting. Ensure that the business is using appropriate and advantageous methods.
- 9 Determine whether the company has overpaid sales and use taxes. Most companies pay a substantial amount of money to suppliers and state tax agencies, but often overlook potential exemptions. Companies can file a refund claim to recover losses and put a system in place to prevent future overpayments.
- 10 Document any travel, meal, or entertainment expenses the business intends to deduct. This is a favorite area for examination during a tax audit, and the business records should be maintained with this in mind. Keep receipts indicating who was entertained, their relationship to the company, and what business was discussed. Travel documentation should show who traveled and for what business purpose. There often are a number of issues to consider when deducting "T and E" expenses.

Grant Thornton urges contractors to contact their local tax advisors to learn how these tax tips may apply to their contracting businesses. Visit Grant Thornton LLP at www.GrantThornton.com.

ENGINEERING JOURNAL

Second Quarter 2006 Article Abstracts

The following papers appear in the second quarter 2006 issue of AISC's *Engineering Journal*. EJ is also available online to AISC members and ePubs subscribers at www.aisc.org/epubs.

Effective Length Factors for Gusset Plate Buckling

BO DOWSWELL

Gusset plates are commonly used in steel buildings to connect bracing members to other structural members in the lateral force resisting system. Failure modes for gusset plates have been identified, and design procedures are well documented in the literature, but uncertainties still exist for gusset plates in compression. Previous research includes laboratory tests, finite element models, and theoretical studies. Many previous studies concentrated on the capacity of gusset plates in compression. A literature review revealed a total of 170 experimental specimens and finite element models with compressive loads applied. Using the experimental and finite element data from the previous studies, the capacity of gusset plates in compression are compared to the current design procedures. Based on a statistical analysis, effective length factors are proposed for use with the current design procedures.

Topics: Connections and Joints, Analysis, Stability and Bracing

In-Plane Properties and Modeling of Reduced Beam Sections

PIERRE DUMONTEIL, P.E.

In the seismic design of steel frames, one of the objectives is to provide ductile beams capable of energy dissipation through the formation of plastic hinges (or "fuses"). With wide-flange shapes, it is desirable to force these hinges away from the brittle zones near the column faces by reducing the beam section at some specified distance from these faces. Obviously, the cuts change the overall elastic properties of the reduced beam sections (RBS). However, the cuts also affect the fixed-end actions used in the elastic analysis of the structure. The first objective of this paper is to compute not only the stiffness properties of RBS, but also the fixed-end actions. Most structural analysis programs found in design offices do not let the designer input stiffness matrices and fixed end actions. Input of beam elements is usually limited to prismatic or tapered beams. The second objective will be to show how this difficulty may be overcome by modeling a

RBS with three prismatic beam elements of suitable properties. Some very simple frames will be used as examples to compare inter-story drifts, and examine the Q33 method proposed by Iwankiw and Mohammadi in an earlier paper. Coincidentally, these calculations lead to the observation that beam shear deformation is not always negligible.

Topics: Seismic Design, Analysis, Beams and Flexural Members

Cyclic Behavior of Single Angles for Ductile End Cross Frames

LYLE P. CARDEN, FRANCISCO GARCIA-ALVAREZ, AHMAD M. ITANI, AND IAN G. BUCKLE

The cyclic inelastic behavior of single angle braces used in bridge cross frames is described in this paper. Based on experiment results, it is shown that steel angles can be designed to achieve a ductile response with large inelastic strains prior to failure under cyclic loading. Preventing fracture in the connections, as well as satisfying limiting b/t and Kl/r ratios, results in good cyclic behavior and maximum cyclic strains greater than 6%. The buckling capacity is shown to be largely dependent on the effective length of the members which, in turn, is dependent on the type of end condition. Where plastic hinging is expected in the gusset plates an effective length factor of 1.0 can be assumed for the member, while if plastic hinging is expected in the member an effective length factor of 0.7 is appropriate. It is recommended that Kl/r for single angles in end cross frames of bridges be limited to 120, allowing the members to be treated like main members for seismic loads based on AASHTO provisions. The b/t ratio should be limited to those specified for special concentrically braced frames from the AISC *Seismic Provisions*. An analytical model was developed to simulate the nonlinear response of the single angles and a simplified bilinear model was developed for design purposes.

Topics: Stability and Bracing, Seismic Design, Bridges

Cyclic Behavior of Buckling Restrained Braces for Ductile End Cross Frames

LYLE P. CARDEN, AHMAD M. ITANI, AND IAN G. BUCKLE

Ductile end cross frames (ductile end diaphragms) in bridge superstructures have been studied in the past as a potential mechanism for reducing transverse seismic shear in steel plate girder bridges. In this paper, the cyclic inelastic behavior of buckling

restrained braces is studied for potential use in these end cross frames. It is shown that the buckling restrained braces exhibit excellent hysteretic behavior with similar properties in tension and compression. When subjected to different loading histories it was found that large amplitude cycles at the beginning of the loading history, followed by smaller cycles and also dynamic loading, reduced the cumulative plastic strain capacity in the braces compared to reverse static loading with increasing amplitude. The area of the hysteresis loops from the braces is typically around 80% of the circumscribing rectangular area and increased as strains increased, unlike the degradation seen in the performance of other types of concentric braces after buckling, indicating efficient energy dissipation. The response of the braces can be approximately modeled with a bi-linear representation to capture the maximum forces, displacements, and energy dissipation in the braces.

Topics: Seismic Design, Structural and Building Systems, Bridges, Stability and Bracing

Buckling Strength of Single Angle Compression Members in K-Series Joists

JOSEPH ROBERT YOST, DAVID W. DINEHART, SHAWN P. GROSS, JOSEPH J. POTE, AND JAMES DEENEY

Single angle web members in open web steel joists are typically crimped to facilitate web placement and maintain a constant chord gap with varying web angle size. If the web members are not crimped, force eccentricity will exist between the web member's area centroid and the vertical plane of symmetry for the joist. The analytical consequence of this eccentricity is that uncrimped single angle web members must be designed as eccentrically loaded columns. The resulting interaction design strength is significantly less than the concentric column analysis design strength used for crimped web members of identical cross section and slenderness. This study compares the measured and analytical strengths of similar single angle crimped and uncrimped web members in steel joists. Experimental results from 18 joist samples show that existing analytical assumptions associated with end fixity and beam-column interaction result in an overly conservative design methodology for both crimped and uncrimped web members.

Topics: Columns and Compression Members, Research