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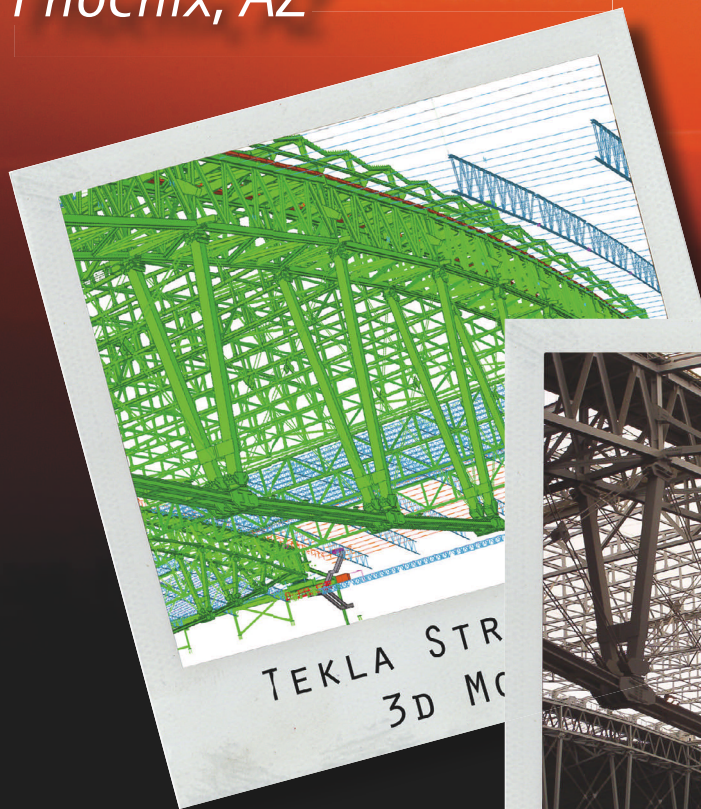
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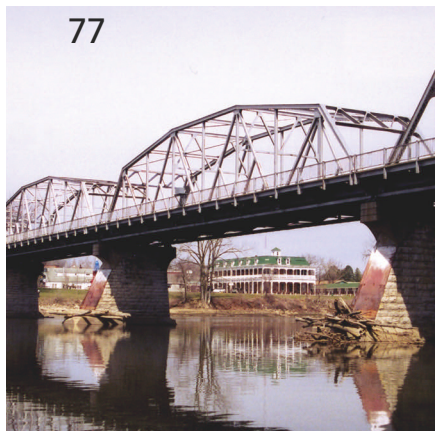
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**ON THE COVER:** UPS Worldport in Louisville, Ky. (Photo: UPS)

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# editor's note



**WHEN MY WIFE ASKED MY BOYS WHICH TEAM THEY WERE ROOTING FOR DURING THIS YEAR'S SUPER BOWL, THEY LOOKED AT HER AS THOUGH SHE WAS NUTS.** Was there really much choice when the Steelers were playing? Their dramatic victory makes this an apt time to share the story behind their great logo, which is based on the steelmark originally created by the old U.S. Steel Corp. and which has come to symbolize the steel industry.

The symbol consists of three colored "diamond-shaped" stars (technically known as hypocycloids) and originally the colors were chosen to promote the attributes of steel:

- Yellow lightens your work
- Orange brightens your leisure
- Blue widens your world.

The colors were later reinterpreted to symbolize the three main ingredients of steel:

- Yellow for coal
- Orange for iron ore
- Blue for steel scrap.

What's fascinating to me is that all of this information is available online. Just Google something like "history of Steelers logo" and you'll get 222,000 results in 0.21 seconds. (Or if you really want to have some fun, check out [www.google.com/latitude](http://www.google.com/latitude); you can load this program on your phone and it will tell you your location—or it will allow you to let others see your location in real time.)

Of course, as much fun as learning online can be, it's no substitute for personal interaction. Sure, webinars are informative (AISC offers a large selection at very low prices; check out [www.aisc.org/elearning](http://www.aisc.org/elearning)) but I've found you learn so much more from an in-person seminar, both because of the interaction between speaker and attendee and the interaction between attendee and attendee.

Fortunately, there's still time to register for the upcoming NASCC: The Steel Conference (April 1–4 in Phoenix). This is the premier conference for everyone involved in the design and construction of structural steel buildings. It offers nearly 90 technical sessions, a really cool exhibit hall (where else can you see all of the major equipment manufacturers running their beam lines?), and lots of opportunities to network with more than 3,500 of your peers.

If you've never attended, ask one of your friends about this event. The conference focuses on practical presentations of information that you can put to use as soon as you're back in the office. To find out more about the conference, visit [www.aisc.org/nascc](http://www.aisc.org/nascc).

We've also made sure the conference is as affordable as possible. Registration for AISC members is \$370 for the technical seminars, T.R. Higgins Lecture, keynote address, and entry to the exhibit hall (including the welcome reception and two box lunches). And if more than two people from your firm are coming, the price for that third person drops to just \$185 for AISC members. Check out the quality of the presentations by visiting [www.aisc.org/2008nasconline](http://www.aisc.org/2008nasconline) to view some of last year's sessions (I particularly recommend Duane Miller's brilliant session on "Important Lessons They Didn't Teach Me At College" or Larry Griffis' wonderful seminar on "Wind vs. Seismic—Which Controls?").

I hope to see you all in Phoenix!

A stylized, handwritten signature of Scott Melnick in black ink.

**SCOTT MELNICK**  
EDITOR

## MSC

MODERN STEEL CONSTRUCTION

### Editorial Offices

1 E. Wacker Dr., Suite 700  
Chicago, IL 60601  
312.670.2400 tel  
312.896.9022 fax

### Editorial Contacts

**EDITOR & PUBLISHER**  
Scott L. Melnick  
312.670.8314  
[melnick@modernsteel.com](mailto:melnick@modernsteel.com)

**SENIOR EDITOR**  
Geoff Weisenberger  
312.670.8316  
[weisenberger@modernsteel.com](mailto:weisenberger@modernsteel.com)

**DIRECTOR OF PUBLICATIONS**  
Areti Carter  
312.670.5427  
[aretic@modernsteel.com](mailto:aretic@modernsteel.com)

**GRAPHIC DESIGNER**  
Kristin Egan  
312.670.8313  
[egan@modernsteel.com](mailto:egan@modernsteel.com)

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### Advertising Contact

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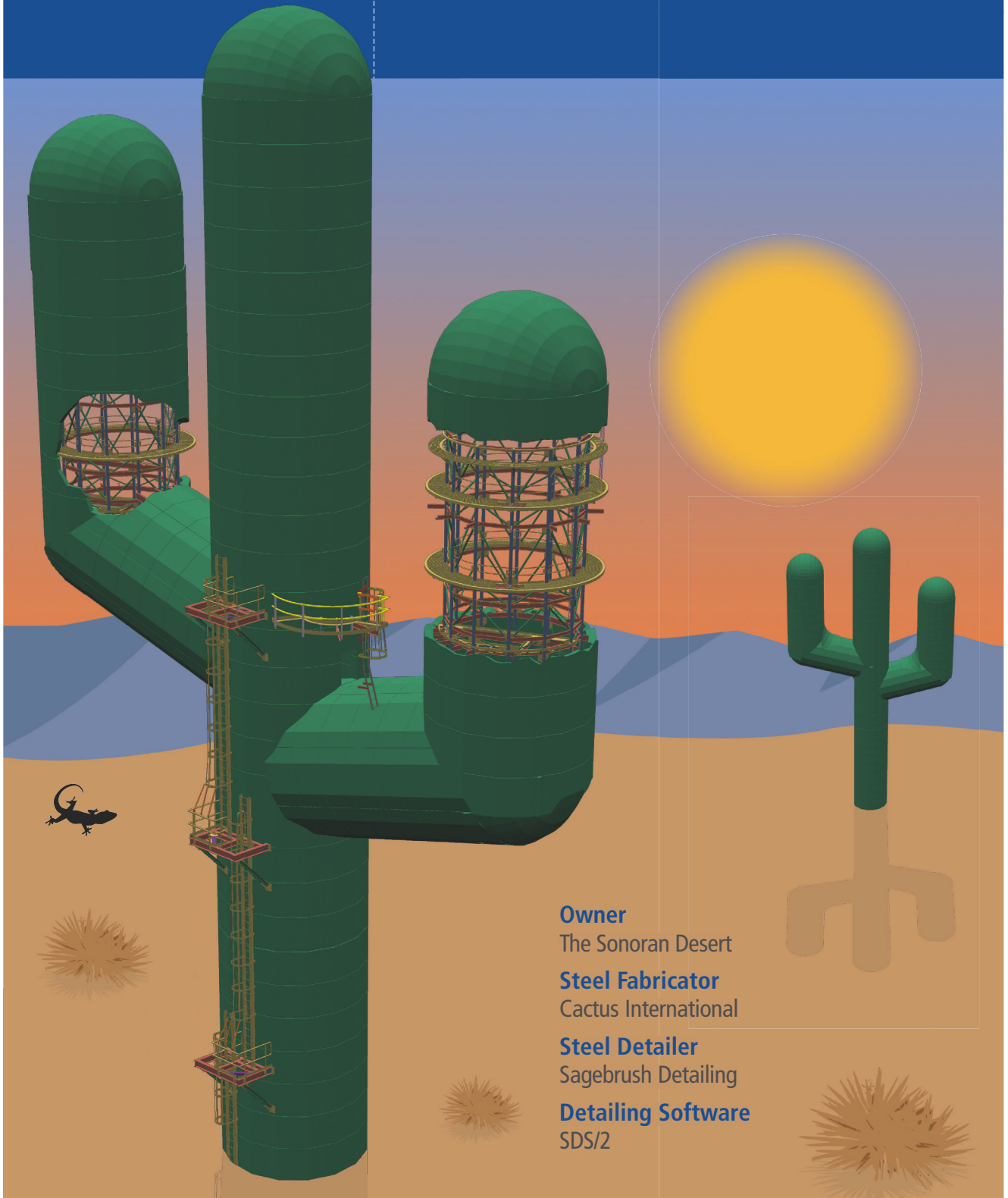
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## Single-Angle Connection Tables

**I do not understand the reason behind one of the notes for Table 10-11 in the 13th edition *Manual*. I'm unclear why a "smaller half web will result in these values being conservative."**

As shown on page 10-123 for this case, the eccentricity is considered on the leg attached to the supporting member. The eccentricity is measured from the center of the web of the supported member to the center of the bolt or weld group. The values in the tables assume a 1/2-in. web (or 1/4-in. half web) thickness dimension. The strength of the bolts (or weld for that matter) is calculated using the instantaneous center of rotation method discussed in Parts 7 and 8 of the *Manual*. If the web thickness is less than 1/2 in., then the assumed eccentricity will be larger than the actual eccentricity, and the strength given in the table will be conservative. If the web thickness is greater than 1/2 in., then the assumed eccentricity will be less than the actual eccentricity, and the strength given in the table will be unconservative and must be either reduced by the rule of thumb given in the footnote or recalculated.

Larry S. Muir, P.E.

## Referenced Design Standards

**I have several design spreadsheets that are written around the ASD 9th edition *Manual*, and I was wondering if any of the new IBC or ASCE codes reference a certain manual, like the new 13th edition, or if the older edition is still acceptable to use for design purposes.**

The IBC and ASCE 7 both reference a particular release of the AISC *Specification*; not an edition of the AISC *Steel Construction Manual*. For example, the 2006 IBC references AISC 360-05, which is the 2005 AISC *Specification*. The 13th edition AISC *Steel Construction Manual* is based upon the provisions of the 2005 AISC *Specification*, but is not the document referenced in the building code.

AISC recommends that the latest revision of specifications, manuals, and other documents should be used. However, AISC does not define which edition of the *Specification* must be followed in the execution of a project. Rather, that is stipulated by the applicable building code. That stipulation defines what is acceptable.

Most jurisdictions now use the IBC, and this means that the 2005 AISC *Specification* is probably the referenced standard. If the applicable building code does require use of an outdated specification, we recommend a discussion with the building official to see if they will accept the latest specification for use on the project.

Kurt Gustafson, S.E., P.E.

## Brace Stiffness

**I have been questioned about calculations for a stability bracing member per AISC 360-05 Appendix 6, Equations A-6-7 and A-6-8. I can calculate the required brace stiffness, but how do I calculate the actual brace stiffness provided?**

The required brace stiffness from Equation A-6-8 in the AISC *Specification* represents the required axial stiffness of the brace. The actual brace stiffness provided can be calculated using the relationship  $\Delta = PL/AE$ .

Kurt Gustafson, S.E., P.E.

## ASTM F1554 versus ASTM A449 Anchor Rods

**I am trying to better understand when to specify F1554 vs. A449 for anchor rods. Table 2-5 in the *Manual* does not indicate a preferred material specification for high-strength anchor rods. Is there a reason for this? Is there a preferred material for anchor rods?**

ASTM F1554 and ASTM A449 refer to specific material types that meet specific ASTM Standards. Both of these material types are permitted for use as anchor rods under the auspices of the AISC *Specification*. Table 2-5 in the 13th edition *Manual* shows ASTM F1554 Grade 36 as the usual grade for the general case. If you are specifically going to use a high-strength anchor rod, ASTM F1554 is the preferred type, since this is a standard specifically developed for anchor rods.

The ASTM F1554 anchor rods are available in three grades of 36, 55, and 105 ksi minimum yield stress material, and are available in specified lengths, with threading lengths as specified. ASTM A449 is a general material standard that is applicable to other applications of bolts, screws, and studs, as well as for anchor rods. ASTM A449 does not have stipulated minimum yield strength; however, the material exhibits tensile strengths similar to some of the ASTM F1554 grades. Since the nominal tensile stress listed in Table J3.2 is determined based on the  $F_u$  of the material, the EOR is able to assess the tensile capacity of the ASTM A449 rods.

Kurt Gustafson, S.E., P.E.

## Calculating $C_b$

**I'm wondering how to analyze a W-shape beam at an inflection point in terms of the  $C_b$  value. I understand that the inflection point cannot be considered a braced point, so when you calculate the  $C_b$  value some moment values will be negative and some moment values will be positive. The *Specification* says that  $C_b$  is permitted to conservatively be taken as 1.0. Is this a requirement? If not, then which one is true in order to get a  $C_b$  value?**

**Case A:**

Use the absolute values for  $M_a$ ,  $M_b$ ,  $M_c$  and  $M_{max}$  across the entire unbraced section. (This would include positive and negative moments.)

**Case B:**

Use the absolute values for  $M_a$ ,  $M_b$ ,  $M_c$  and  $M_{max}$  from one brace point to the inflection point. (This includes only negative or positive moments.)

It is not mandatory to use a  $C_b$  of 1 in all cases. Rather, the *Specification* states that is a conservative assumption that can be used in all cases if you choose. The  $C_b$  factor can be used to permit adjustments in cases where the moment diagram is non-uniform.

Your Case A describes the stated procedure, which is applicable to the unbraced segment from braced point to braced point.

Kurt Gustafson, S.E., P.E.



# steel interchange

## The Richards Factor

Design examples 3.10 and 3.11 in the *Seismic Design Manual*, take the stress for the welds as the greater of  $f_{peak}$  or  $1.25f_{avg}$ . Is this design practice specified somewhere in the *Manual* or some other publication?

The 1.25 adjustment factor accounts for the potential for uneven distribution of stress in a welded gusset plate edge connection that may have a local hot spot due to the proximity of the brace-to-gusset connection. It is called the Richards Factor and represents a measure to provide for ductility in the case of a uniform (or nearly uniform) distribution on the weld.

There was a paper that appeared in the First Quarter 2004 *AISC Engineering Journal* titled "Rationale Behind and Proper Application of the Ductility Factor for Bracing Connections." *AISC Engineering Journal* articles are available for free to AISC members at [www.aisc.org/epubs](http://www.aisc.org/epubs).

Note that the Richards Factor is discussed in the *AISC Manual* as a part of the design procedure recommended for bracing connections. It is not a requirement stipulated in the *AISC Specification*.

Kurt Gustafson, S.E., P.E.

## $C_b$ for HSS Beams?

Are  $C_b$  values permitted in the design of HSS beams? Are  $C_b$  values greater than 2.3 permitted, in any case, in ASD? Is there an instance where  $C_b = 4.7$  for an unbraced square HSS cantilever with a concentrated load at the end is justifiable?

The amplification of beam strength by  $C_b$  cannot result in a value that is larger than the full yield strength of the member ( $F_y Z$ )—that is,  $C_b$  can only be applied to the lateral-torsional buckling portions of the beam curve up to the value of full yield of the section. This is demonstrated graphically on page 3-4 of the 13th edition *AISC Manual*. Since HSS beams are not subjected to lateral-torsional buckling, and are always controlled by the yield or local buckling strength of the member,  $C_b$  does not apply.

Speaking more generally, the upper limit on  $C_b$  is 3.0, as given by formula F1-1 of the 2005 *Specification*. So yes, a value greater than 2.3 is permitted. However, there is no case where  $C_b = 4.7$  can be used.

Chris Hewitt, S.E.

## Shear Connectors Used in Multi-Story Construction

I have heard that rigid-frame beams in multi-story construction should not have welded studs applied to make them composite beams. Can you please give me a reference where this is stated?

I am not aware of any document that prohibits the use of shear connectors to provide composite action for moment-frame beams. OSHA Section 1926.754 (c) (1) (i), which deals with tripping hazards during erection, restricts the use of shop-applied studs in such cases. However, field-applied shear connectors are used very commonly in all types of structural steel construction to provide composite beam construction. Perhaps you heard that AISC recommends that the use of camber should be avoided in moment frame beams?

Kurt Gustafson, S.E., P.E.

## Double-Angle Connection Capacity

Table 10-1 Page 10-23 of the *Steel Construction Manual* for All-Bolted Double-Angle Connections lists the available ASD capacity at 32.6 kips for ¼-in.-thick A325N bolts. However, my calculation for angle shear rupture shows a value of 33.7 kips. If the hole diameter is changed from 13/16 in. to 7/8 in., the value is 32.6 kips, per your table. Is a 7/8-in. hole size assumed for a ¾-in.-diameter bolt, and if so, where is this stated? Otherwise, how is the 32.6 kip value obtained?

Yes, an extra 1/16 in. is added. Bolted connection limit state checks for net area that involve tension or shear both require the bolt hole size + 1/16 in. be deducted. See Section B3.13.b of the 2005 *AISC Specification* for this requirement. This same requirement was given in the 1989 *ASD Specification* as well.

Kurt Gustafson, S.E., P.E.

## Basic Design Value Cards

*AISC "Basic Design Values 1"* (laminated card, copyright 2005) shows bending about weak axis =  $0.9F_y S_y$  (ASD). Please verify the coefficient is 0.9 and not 0.75.

Yes, 0.9 is the correct coefficient. When using the 2005 *AISC Specification*, Section F6.1 provides the basis for weak-axis bending strength. Equation F6-1 provides the flexural strength for a compact cross-section as  $F_y Z_y / \Omega \leq 1.6F_y S_y / \Omega$ . We know the shape factor will be at least 1.5 for a W-shape in weak-axis bending but not greater than 1.6. Thus, the flexural strength can be stated as at least  $1.5F_y S_y / \Omega$ . With  $\Omega = 5/3$ , it thus is permitted to use  $0.9F_y S_y$  for ASD design, as long as all elements are compact.

Amanuel Gebremeskel, P.E.

The complete collection of Steel Interchange questions and answers is available online. Find questions and answers related to just about any topic by using our full-text search capability. Visit Steel Interchange online at [www.modernsteel.com](http://www.modernsteel.com).

Kurt Gustafson is the director of technical assistance and Amanuel Gebremeskel is a senior engineer in AISC's Steel Solutions Center. Larry Muir and Chris Hewitt are part-time consultants to AISC.

Steel Interchange is a forum to exchange useful and practical professional ideas and information on all phases of steel building and bridge construction. Opinions and suggestions are welcome on any subject covered in this magazine.

The opinions expressed in Steel Interchange do not necessarily represent an official position of the American Institute of Steel Construction, Inc. and have not been reviewed. It is recognized that the design of structures is within the scope and expertise of a competent licensed structural engineer, architect or other licensed professional for the application of principles to a particular structure.

If you have a question or problem that your fellow readers might help you solve, please forward it to us. At the same time, feel free to respond to any of the questions that you have read here. Contact Steel Interchange via AISC's Steel Solutions Center:



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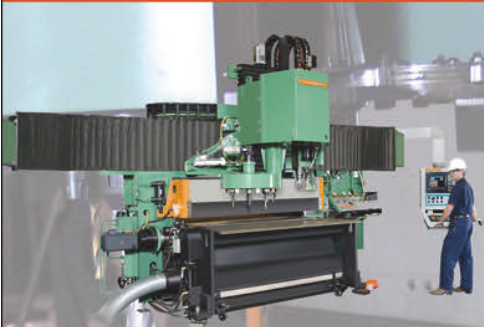
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# steel quiz

**THIS MONTH'S STEEL QUIZ** is on walking vibrations and the AISC/CISC Design Guide 11, *Floor Vibrations Due to Human Activity*. It was submitted by Brad Davis, University of Kentucky, and Tom Murray, Virginia Tech.

- 1 How are floor width and length determined for walking vibration analysis? (a) based upon the average bay size (b) based upon the largest bay size (c) based upon the overall floor plate dimensions, openings, and deck orientations (d) both b and c
- 2 What is a sub-harmonic of the fundamental frequency? (a) an integer multiple of the fundamental frequency (b) an integer divisor of the fundamental frequency (c) a frequency within 1 Hz of the fundamental frequency (d) none of the above

- 3 Which of the following statements is true about resonant floor vibrations? (a) the forcing frequency is a sub-harmonic of the fundamental frequency (b) the activities can cause large accelerations (c) human walking and rhythmic activities can create resonance (d) all of the above

- 4 True/False: The range of typical human step frequencies is 1.6 Hz (96 bpm) to 2.2 Hz (132 bpm) when walking on a flat surface?

- 5 True/False: Fast dancing and aerobics fall in the same frequency range as for walking on a flat surface.

- 6 Why does AISC Design Guide 11 recommend that floors and footbridges should have a fundamental frequency greater than 3 Hz? (a) to prevent the first harmonic of the walking force from causing resonance (b) This eliminates any tendency to vibrate (c) to control deflections under load and limit stresses in the members (d) all of the above

- 7 True/False: Walking and jumping have similar severity as occupant loadings for floor vibration design.

- 8 When should column axial deformation be considered when determining fundamental frequency? (a) in all cases (b) only when the columns are moment-connected to the beams (c) when the columns have four or more stories below the loaded floor (d) when the columns are more flexible than the girders

- 9 If a proposed framing layout does not satisfy the walking criterion, which of the following is the best approach that can be used to improve the design? (a) Increase the girder moment of inertia (b) Increase the beam moment of inertia (c) Increase the moment of inertia of the beam or girder, whichever has the higher natural frequency (d) Increase the moment of inertia of the beam or girder, whichever has the lower natural frequency

- 10 Which of the following are methods that can be used to retrofit vibration-related problem floors? (a) structural stiffening (b) addition of tuned-mass dampers (c) addition of active control systems (d) all of the above

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TURN TO PAGE 14 FOR ANSWERS





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# steel quiz

ANSWERS

- 1 (c) The floor width is the floor plan dimension perpendicular to the joists or beams. It is bounded by the edge of slab or a significant change in the framing, such as a deck direction change or large opening. The floor length is the floor plan dimension perpendicular to the girders and is also bounded by slab edges or significant changes in the framing. See AISC Design Guide 11 Section 4.2 for further information.
- 2 (b) A sub-harmonic of a frequency is an integer divisor of that frequency. For example, the third sub-harmonic of a 6 Hz natural frequency is 2 Hz. This is significant because resonance occurs if an integer multiple (harmonic) of a forcing frequency matches a natural frequency. Thus, if the natural frequency is 8 Hz, walking at 2 Hz causes resonance with the fourth harmonic of the walking force.
- 3 (d) Resonance is a phenomenon that occurs when a repetitive force is applied at a sub-harmonic of the fundamental frequency of the structure. It is possible for humans to walk or move rhythmically (dance, sway, bounce, etc.) at frequencies that cause resonance, and this can result in large accelerations. See AISC Design Guide 11 Sections 1.4 and 1.5 for further information.
- 4 True. See AISC Design Guide 11 Table 2.1.
- 5 False. Fast dancing has a frequency range of 1.5 Hz (90 bpm) to 3.0 Hz (180 bpm); Aerobics has 2 Hz (120 bpm) to 2.75 Hz (165 bpm). See AISC Design Guide 11 Table 5.2.
- 6 (a) A fundamental frequency greater than 3 Hz helps to prevent the first harmonic of the walking force from causing resonance. The first harmonic has much more energy (see AISC Design Guide 11 Table 2.1) than the higher harmonics, so very high accelerations may result if the first harmonic matches the natural frequency and causes resonance.
- 7 False. Rhythmic loading, such as jumping exercises, is the most severe occupant loading. The first three harmonics for jumping exercises have a ratio of harmonic force amplitude to bodyweight of approximately 1.5, 0.6, and 0.1, whereas the first three harmonics of walking have ratios of 0.5, 0.2, and 0.1 (see AISC Design Guide 11 Table 2.1).
- 8 (c) To evaluate a bay for aerobic (jumping exercises) excitation if the bay is located more than about four stories high. See AISC Design Guide 11 Chapter 5.
- 9 (d) The bay natural frequency will be increased by increasing the beam moment of inertia, girder moment of inertia, or both. However, it is best to increase the member with the lowest natural frequency first. If the beam and girder have the same natural frequency, then increase them together.
- 10 (d) Three methods in common use include: stiffening the structure (to increase the natural frequency) by creating a queen post truss or adding partitions or columns below; passive control via tuned-mass dampers (TMD); and active control (see AISC Design Guide 11 Section 7.3).

Anyone is welcome to submit questions and answers for Steel Quiz. If you are interested in submitting one question or an entire quiz, contact AISC's Steel Solutions Center at 866.ASK.AISC or at [solutions@aisc.org](mailto:solutions@aisc.org).



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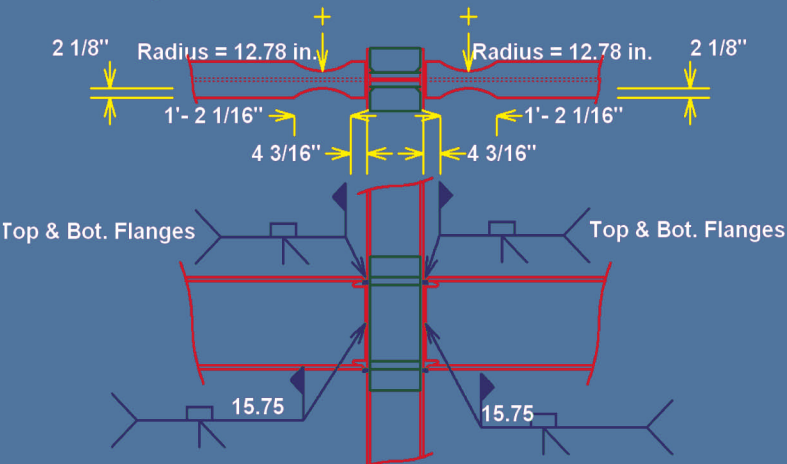
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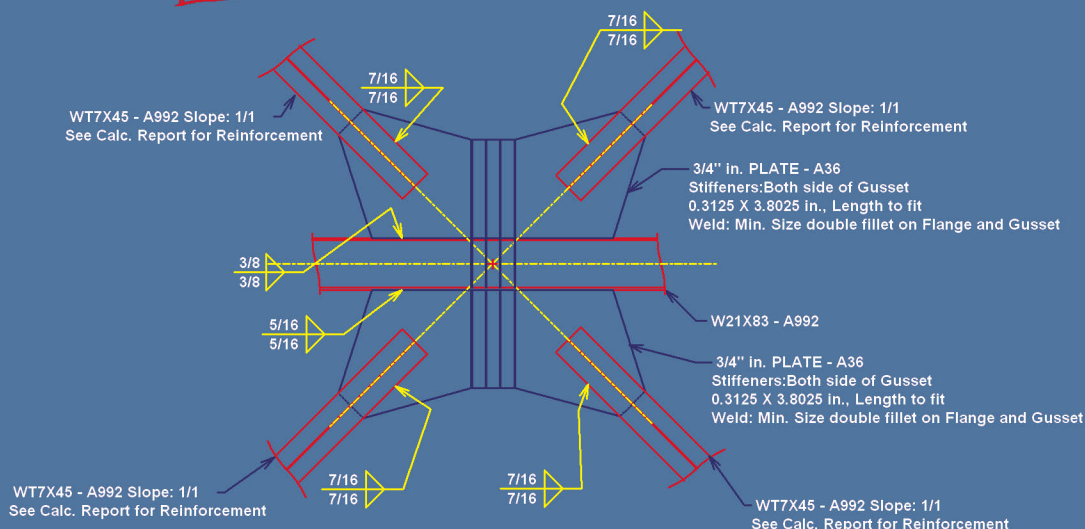
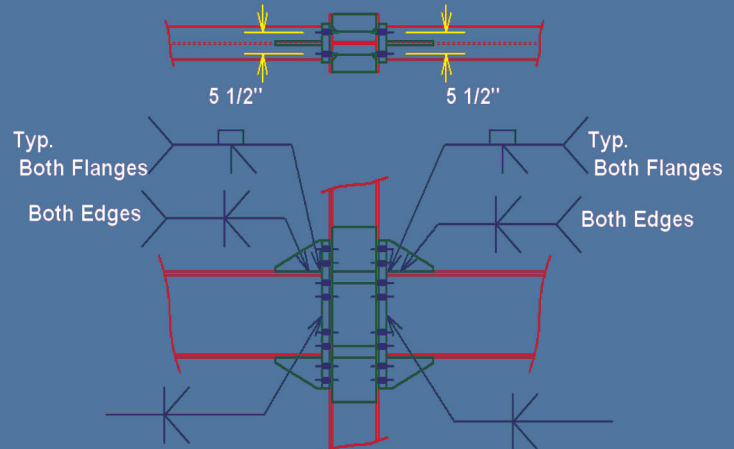
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# news & events

## GALVANIZING

### New ASTM Standard Addresses Galvanizing

A new ASTM International standard, A1057/A1057M, *Specification for Steel, Structural Tubing, Cold Formed, Welded, Carbon, Zinc-Coated (Galvanized) by the Hot-Dip Process*, addresses the galvanizing process as it is used across a variety of industries, including construction, automotive, and transportation.

The new standard is under the jurisdiction of Subcommittee A05.11

on Sheet Specifications, part of ASTM International Committee A05 on Metallic-Coated Iron and Steel Products.

ASTM A1057 classifies the coating weights and mechanical requirements inherent in the galvanizing process. Original equipment manufacturers will be able to reference the new standard in their specifications to more accurately describe their

products.

ASTM International standards are available for purchase from customer service (610.832.9585, [service@astm.org](mailto:service@astm.org)) or at [www.astm.org](http://www.astm.org). For technical information, contact Giulio Scartozzi, Allied Tube and Conduit, Harvey, Ill. (708.225.2079, [gscartozzi@alliedtube.com](mailto:gscartozzi@alliedtube.com)). Committee A05 meets this May 17-19 in Vancouver, B.C., Canada.

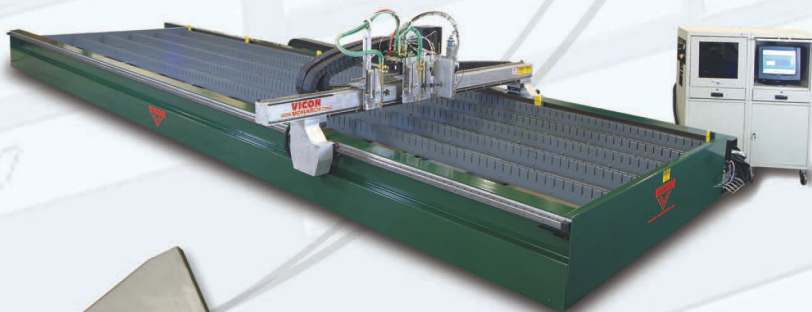
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## IN MEMORY

### Nucor Fastener's Roger Hamilton Dies

Nucor Fastener is sad to report the loss of teammate and fastener industry colleague, Roger Hamilton, who passed away unexpectedly on January 23.

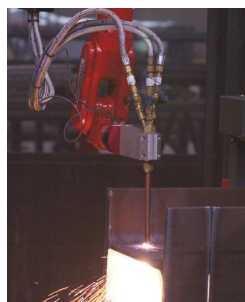
Roger graduated from Purdue University with a B.S. in Mechanical Engineering Technology in 1977, then pursued what transformed into a passion for the fastener industry and a career in fastener engineering. He started as a Co-op student with the Camcar Division of Textron in 1976, and after holding many positions with Camcar, his career continued at Sundstrand Aerospace, then Rockford Products Corporation, and finally Nucor Fastener, where he began in 2000. Roger contributed to Nucor in many ways but focused on new product development, in-house and customer training, and also marketing efforts. He was a Director on the Executive Committee for RCSC and worked in the ASTM F16 Fastener Committee.

He is survived by two sons and daughters-in-law, three sisters and brothers-in-law, two grandchildren, and his wife, Cathrine.





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## news

### ECONOMY

## Successful Contractors—Even in This Market?!

In the face of the current world economic crisis, it seems all headlines point to failure, not success. In the construction industry, most contractors are just wondering how they will survive the coming months.

In good times and bad, there are always those contractors that manage to be successful. When wondering why other people or companies are successful, it is natural to wonder what their secret is. In a study of 356 contractors, construction industry consulting firm FMI has discovered there is no single secret for what makes a contractor successful. In fact, FMI found that successful contractors fit into five different Contractor Success Profiles:

1. **Humanist**—build strong relationships with customers, employees, and the community.
2. **Generalist**—balance all six success factors (improving people and their lives; profit and wealth; sense of presence and reputation; survival and sustainability; progress on mission and preparation for the future; project execution)
3. **Tactician**—project and process success
4. **Bottom-liner**—measured by financial results
5. **Freewheeler**—appropriate responses to changing opportunities, times, or market situations

### NASCC

## Book Your Trip to Phoenix!

There's still time to register for the North American Steel Construction Conference! The Steel Conference is the premier educational event aimed at providing structural engineers, steel fabricators, erectors, and detailers with practical information and the latest design and construction techniques, via more than 80 technical sessions. In addition, the Steel Conference offers an extensive trade show featuring products and services, ranging from engineering software to the latest fabrication equipment, from more than 200 exhibitors. It's a once-a-year opportunity to learn the latest in design methodology, see the most innovative products, and network with your peers. The conference continues to grow each year, and last year's attendance exceeded 3,700.

For a complete list of sessions, or to register, please visit [www.aisc.org/nascc](http://www.aisc.org/nascc).

Contractors that succeed manage to catch problems before the chain reaction that leads to failure can get started. Successful contractors learn from their mistakes, but they learn more from their successes. In short, they create a culture of success that pervades the company and everything they strive to accomplish.

In a new report, "Profiles in Success: How Contractors Define and Achieve Success," FMI takes a close look at how contractors describe their own success and build organizations that not only serve their customers well but also build talent and careers.

Success for contractors is more than just one good job; it involves the long-term succession of the company, building communities and relationships. In a time when the tendency is to see construction as a commodity that can be put out for low bid, successful contractors have learned to differentiate their services to fit the ideals of their leaders, the markets they work in and the people that work to make the company a continuing success. The study of successful contractors found that success is a work in progress, not a singular destination.

For a copy of the report, visit FMI online at [www.fminet.com](http://www.fminet.com).

### EDUCATION

## OMG, AISC is on FB!

AISC is now on Facebook! Geared specifically towards students, the AISC page offers an events calendar, discussion board, photos, links to valuable tools and resources, etc. It's already recruited dozens of "fans," Facebook users who add the page to their personal profiles and allow other users to view the page. AISC University Relations hopes that Facebook will be just the first of multiple social media programs set up to encourage students to become more active in AISC.

If you have any ideas for articles, discussion topics, videos, pictures, etc. to post on the page, please contact Shanna Quinn at [quinn@aisc.org](mailto:quinn@aisc.org) or 312.670.5418.

You can find AISC on Facebook at [www.facebook.com/pages/Chicago-IL/American-Institute-of-Steel-Construction/40249663817](http://www.facebook.com/pages/Chicago-IL/American-Institute-of-Steel-Construction/40249663817). (Note: You must be registered with Facebook in order to interact with the page.)



# news

## INTERNSHIPS

### AISC Now Accepting Summer Intern Applications for 2009

AISC is now accepting applications from students enrolled in structural, architectural, or civil engineering programs for a summer internship at our headquarters in Chicago. Qualified applicants will be nearing completion of at least the third year of their curriculum and will have completed at least one course in structural steel design. AISC interns support the AISC engineering and research department in developing technical resources for structural steel design.

Interested students should submit their resumes, including cumulative GPA and a list of related coursework, to Cindi J. Duncan, AISC's director of engineering, at [duncan@aisc.org](mailto:duncan@aisc.org). Please contact Cindi at 312.670.5410 or via e-mail if you have questions or require additional information.

## SPECIFICATIONS

### Public Review of 2010 AISC Specification

The 2010 draft of the AISC *Specification for Structural Steel Buildings* will be available for public review from March 13 to April 27, 2009. This specification will be available for download on the AISC website at [www.aisc.org/AISC360PR1](http://www.aisc.org/AISC360PR1) along with the review form during this time. Copies are also available (for a \$12 nominal charge) by calling 312.670.5411.

Please submit comments using the form provided online to Cynthia J. Duncan, AISC's director of engineering ([duncan@aisc.org](mailto:duncan@aisc.org)) by April 27, 2009 for consideration.

## Correction

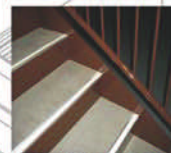
Baer Welding in Providence, Utah (AISC Member) provided steel fabrication services for the miscellaneous steel and portions of the structural steel for the Rio Tinto Stadium in Sandy Lake, Utah ("Soccer in the Rockies," 12/08, p. 47), but was not listed in the article.

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## news

### EVENTS

## Spring Steel Structures Seminars

The Steel Structures Technology Center, Inc., in cooperation with the International Code Council, will present several seminars on structural steel building design this spring. Each one-day Inspection seminar provides 7.0 continuing education hours (0.7 CEUs, 7.0 PDHs), and the Plan Reading seminar provides 2.0 continuing education hours (0.2 CEUs, 2.0 PDHs). All SSTC seminars are approved for ICC certification renewal. To find out more about these seminars, visit [www.steel-structures.com](http://www.steel-structures.com).

### Structural Steel and Bolting Inspection and Plan Reading for Steel Construction

|                              |          |
|------------------------------|----------|
| New York                     | March 25 |
| (Secaucus Meadowlands, N.J.) |          |
| Philadelphia                 | April 7  |
| (Mt. Holly, N.J.)            |          |
| Los Angeles (Buena Park)     | April 21 |
| Sacramento                   | April 29 |
| (Natomas, Calif.)            |          |

|                          |        |
|--------------------------|--------|
| Tacoma (Lakewood, Wash.) | May 6  |
| Las Vegas                | May 14 |

### Structural Welding Inspection

|              |          |
|--------------|----------|
| New York     | March 26 |
| Philadelphia | April 8  |
| Los Angeles  | April 22 |
| Sacramento   | April 30 |
| Tacoma       | May 7    |
| Las Vegas    | May 15   |

### Inspection of Seismic Steel Frames

|             |          |
|-------------|----------|
| Los Angeles | April 23 |
|-------------|----------|

## letters

### On Language

Tom Schlafly's January Topping Out article ("SteelWize") gives as an example of a seemingly trivial argument, a discussion of the use of "and" or "or" in a sentence. On reflection, I trust that he will agree that these two conjunctions have significantly different meanings that have important logical consequences when one is used versus the other.

I hope that the real message that is taken from Tom's editorial is that we must always adhere to the three C's: clarity, conciseness, and completeness when writing and speaking.

**Michael A. West**  
Computerized Structural Design  
Milwaukee, Wis.

*Tom responds:*

*Thank you for your admonition. It is true, I did not understand that the specification writer has a place between the legal scholar and the bard, and as with those, every word is carefully chosen. Certainly, the distinction between "and"*

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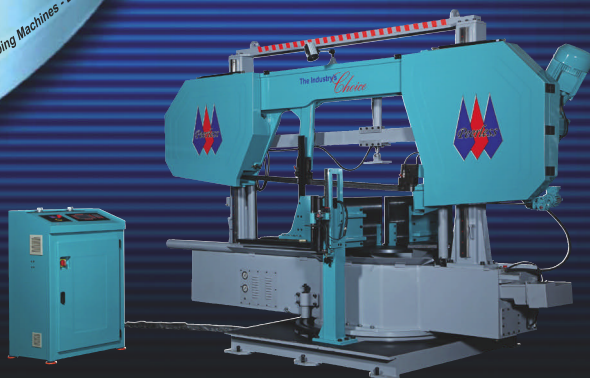
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and “or” is important. In fact, as you know, the Specification Committee at AISC has a separate Editorial Task Committee, whose members are among the first to tell me when I have not paid enough attention to the language.

The article “SteelWize” by Tom Schlafly asked for suggestions for a new word to use for the plural of “you” to differentiate between singular and plural usage. I’d like to suggest that it might be simpler to go back to the old way: “you” (and “ye”) were once used only to include the second person plural, while “thee” and “thou” were used for the second person singular. However, while this would be more clear from a grammatical usage perspective, I think it would end up being less clear, or at least unfamiliar, to a speaker of English born anytime after William Shakespeare.

**Kenneth Dawe**  
B.S. Civil Engineering, WPI 2008  
M.S. Structural Engineering, WPI 2009

Tom responds:

*“I can no other answer make, but, thanks, and thanks.” – William Shakespeare*

or

*“How far that little candle throws his beams!  
So shines a good deed in a naughty world.”  
– William Shakespeare, The Merchant of Venice*

I come down on the side of “yuns” rather than “yins” for Pittsburgh, and even after living in Texas for 14 years, I don’t recognize “all y’all”—at all. To me, “y’all” can be inclusive or refer to one person. Sometimes, I’d hear “you all,” but I lived in a funny part of Texas.

When I was a field engineer, a new engineer showed up for training. After a few days he asked me, “How do you pronounce c-o-l-u-m-n?” I don’t know if the funny pronunciation is as prevalent today as it was then. (I also didn’t realize that you understood “pea whistle” and “yo-yo”—especially yo-yo.)

You have a great grasp of the erector’s vernacular, Tom. You should do more writing about field people. Keep up the good work!

**Alan T. Sheppard**

For what it’s worth, I just wanted to let you know how much I enjoy reading Mr. Melnick’s “Editor’s Note” column each month. The topics chosen are always interesting, humorous, and insightful.

In addition, Tom Schlafly’s January “SteelWize” article was great. In response to Tom’s suggestion, in my company (headquartered in the south) the accepted practice for expressing the plural of “you” has always been “all you all.”

In general, I find this magazine to be very informative and comprehensive regarding issues in the steel industry. Keep up the good work!

**John G. Dyckman**  
Energy Nuclear Operations

Tom, I just read your “SteelWize” article in the January issue. I enjoyed it very much but could not stop thinking about how it sounded a lot like an Andy Rooney opinion from “60 Minutes.” I read he just turned 90, so maybe you can take his spot at some point with a “younger” viewpoint.

Keep up the good work!

**Greg DePhillips**  
Sales Vice President  
Marubeni-Itochu Steel America  
New York

## Keeping Abreast


I have recently retired from the practice of structural engineering at age 82 and I am no longer active in the profession. I appreciated having received MSC over these many years. It’s been a great help to me, keeping me abreast of the advances in the practice of structural engineering and in the steel fabricating industry. I could not have been successful in my practice without MSC. Many thanks, and I’m forever grateful!

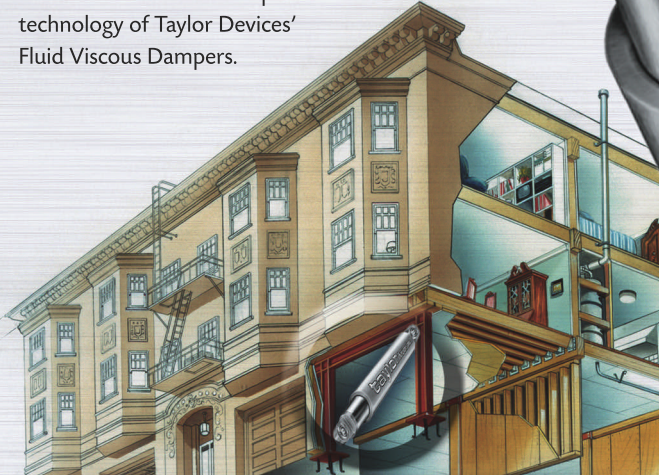

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## People and Firms

- **Kenneth Elbert Zimmerman, P.E.**, a consulting engineer with Walter P Moore and Associates, Inc. from 1946 until his retirement in 1982 and the structural engineer of record for the Houston Astrodome, died last December at age 95.
- The Association of Union Constructors renamed its annual construction innovation award the **James J. Willis Craftperson of the Year Award** in honor of Mr. Willis, an ironworking industry leader and longtime supporter of TAUC who died last December.
- Jim Mogannam recently joined structural engineering firm **Nabih Youssef Associates** as vice president. He will be located in NYA's San Francisco office.
- The **National Association of Tower Erectors** has announced two new members elected to its Board of Directors: Jim Miller and Todd Jackson.
- **McDonough Bolyard Peck, Inc.**, a construction consulting firm, announced the promotion of Roy Beeson, P.E., to vice president of its Southeastern operations, as well as the company's acquisition of New York-based FAI Construction Consultants.
- The Board of Directors of consulting engineering firm **Alfred Benesch and Company** has named a new leadership team for the firm: John Carrato, P.E., S.E., as president and CEO, and John Kweder, P.E., as COO.
- The **National Center for Construction Education and Research** announced that the Crane Operator Certification Program: Industrial/All Purpose, Rough Terrain/All Terrain, and Rubber Tire Truck Mount has received accreditation by the American National Standards Institute.
- The **North American Steel Sheet Piling Association** has launched its new website at [www.nasspa.com](http://www.nasspa.com).
- **GZA GeoEnvironmental Inc.**, an environmental and geotechnical consulting firm, has announced that John A. Schneider, P.E., has been named to the position of vice president.
- Patrick Gibbons has accepted the position of national product manager for stainless bar with **Marmon/Keystone**, a wholesale distributor of tubular products.
- Paul Rawlinson of Prescott, Merseyside, U.K. has been named the new general manager of **Rosler Metal Finishing USA, LLC**.



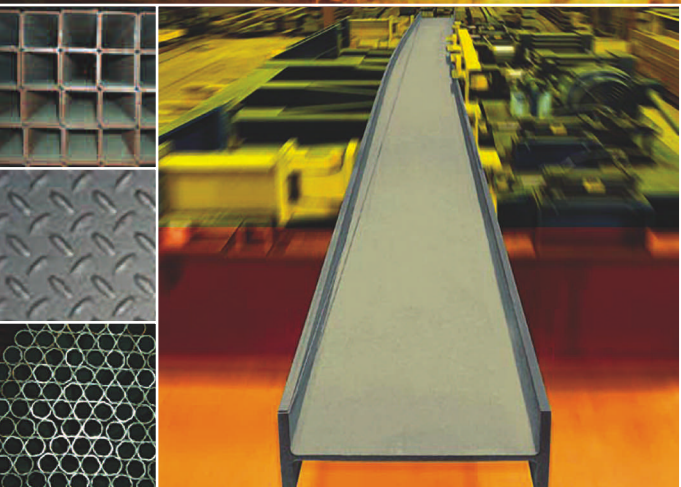


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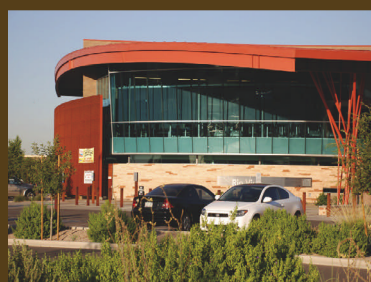
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BY GREGG BUNDSCHUH

## AISC explores a group insurance and risk management program for members.

**AIG IS BAILED OUT** by the federal government. Workers compensation costs continue to rise as claims escalate. The use of technology and building information modeling (BIM) is expanding the risks of traditional service and products. Clients are demanding greater precision and faster delivery. The business of steel fabrication is changing quickly. The risk issues are more subtle and expansive. Managing these risks through shared best practices and a comprehensive, cost-effective insurance program is more important now than ever before.

This conclusion was reached by a subcommittee of the AISC Board of Directors and has resulted in a decision to explore the development of an AISC group insurance program for its membership. Working with an insurance consultant for the past six months, the committee has evaluated the current state of the insurance market for steel fabricators, the receptivity to a group program by leading construction insurers, and the ability of such a program to deliver quality coverage at an affordable price.

A fundamental conclusion reached by the committee is that the insurance community regards most steel fabricators as "high-risk" businesses and establishes premiums on this basis. However, the insurance community does not aggregate loss experience ratings of steel fabricators and therefore has no real historical data to draw a different conclusion. The committee believes that a group insurance program can provide such data and justify better insurance rates to much of the membership. Importantly, the committee has also determined that such a program can provide additional risk management resources to the membership and become a focal point for the development of future industry best practices. Such a program dovetails with and leverages AISC Certification and the Steel Solutions Center. Beginning with a survey that was recently released to the membership, the committee will solicit the feedback of the membership to identify particular needs and concerns.

### A Group Insurance Program

The strategy of developing a group insurance program is often used by businesses perceived as high-risk by the insurance industry. If one high-risk business tries to buy insurance from a highly rated, front-line insurer, coverage can be either very expensive or not available—even if the business has an excellent safety record. The insurer figures that one catastrophic loss will wipe out any profit for this

year and far into the future. On the other hand, if many high-risk businesses band together, the same front-line insurer sees more premium and more potential for a profitable class of business. One catastrophic loss—or even two or three—balanced against a lot more money looks more attractive.

Developing an AISC group insurance program can provide the membership with a cost-effective package of necessary insurance

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coverage. Further, the range of coverage can be customized to meet the unique and specific needs of steel fabricators. Because of the numbers promised by such a group, coverage can be secured from a highly rated insurer with dedicated claims staff for AISC. And to sweeten the pie—improving performance for group members—the program should serve as a focal point for the proactive management of steel fabricators' risk.

#### Benefits

Some of the benefits banding together can bring to group members include the following:

→ **Cost:** Group purchasing provides greater negotiating power—more leverage—which often results in significant premium savings.

→ **Avoiding coverage gaps:** Many insurers and insurance brokers do not have an in-depth understanding of the steel fabrication business. As a consequence, the steel fabricator is often left with coverage gaps and uncovered claims. Identifying uninsured risks and coverage gaps is a hallmark of group insurance programs.

→ **Stability:** Right now, the insurance market is soft, but some industry insiders are predicting that will change sooner, not later. Years of decreasing premiums have thinned profit margins, and premiums will be going back up in the future. Being a member of a group means buffering yourself against wild fluctuations in the cost of insurance—and the total cost of risk.

→ **Development of industry loss history:** One issue that holds insurers back from

offering broad coverage at preferred pricing is uncertainty about the nature of a business and the losses it might generate. This is the case with steel fabricators as a class. There are little or no data on most lines of coverage. But a group insurance program enables collection of data. And better data assist premium negotiations, allowing insurers to fine-tune their proposal to the benefit of group members.

→ **Future risk retention group and/or captive insurer:** The formation of a group insurance program is often the first step toward creating a self-insuring group. Such a group insures itself for the normal, so-called working layer of loss—those losses that become predictable in their frequency and their severity over time. Then, the group can purchase excess insurance for those less common catastrophic losses. Purchasing excess coverage is much less expensive than insuring from the first dollar.

→ **Risk management services:** The insurers and insurance broker handling the group insurance program can serve as a source of steel fabricator-specific advice about risk management, insurance, and contracts.

#### Why Now?

The question then becomes: Why now? Why not wait until the insurance market turns? Right now, coverage is still fairly cheap and plentiful, at least for some. The answer is in the nature of a soft insurance market.

→ Aggregate purchasing is more cost-effective—whether in a soft insurance market, a hard insurance market, or an insurance market in transition.

→ There are more insurers willing to compete for business—particularly group business.

→ There is more flexibility in coverage enhancements and services offered.

→ While a group insurance program may be more important in a hard insurance market, it is more difficult—perhaps impossible—to form a group once underwriters have become less inclined to write business.

#### Unsteady Insurers?

The troubles in the financial markets have spilled over into the insurance markets and into the economy at large. This will likely put some insurers in jeopardy. Steel fabricators—even in a soft insurance market—must sometimes settle for buying coverage from not-so-highly rated insurers. The higher your insurer's rating, the greater the prospects of that insurer remaining available and viable over the long haul.

Banding together gives steel fabricators the leverage to purchase coverage from insurers that may not otherwise be interested. In these rocky times, there's safety in numbers and the ability to secure coverage from highly rated insurers.

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*Gregg Bundschuh is a partner with Ames & Gough, a specialty insurance brokerage and risk management consulting firm in Atlanta.*

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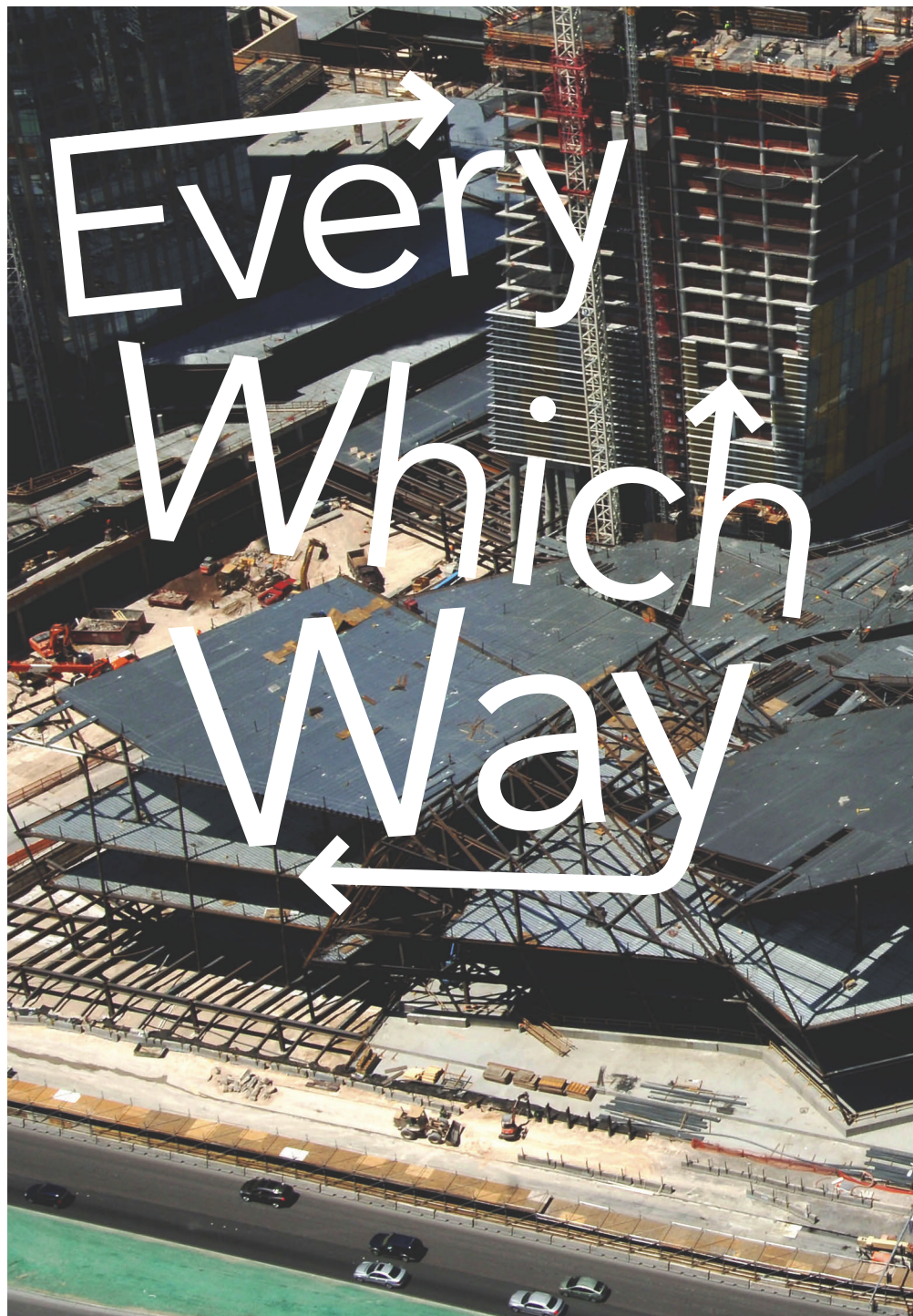
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BY GARY PROVENCHER AND DAVE FARRELL

**WITH 16,455 PIECES OF STEEL** jutting out in every direction, the Crystals at CityCenter in Las Vegas looked more like an engineering mystery than an engineering feat during erection. In fact, the project appeared so jumbled while the steel was being placed that a common question was “Did the building collapse?”

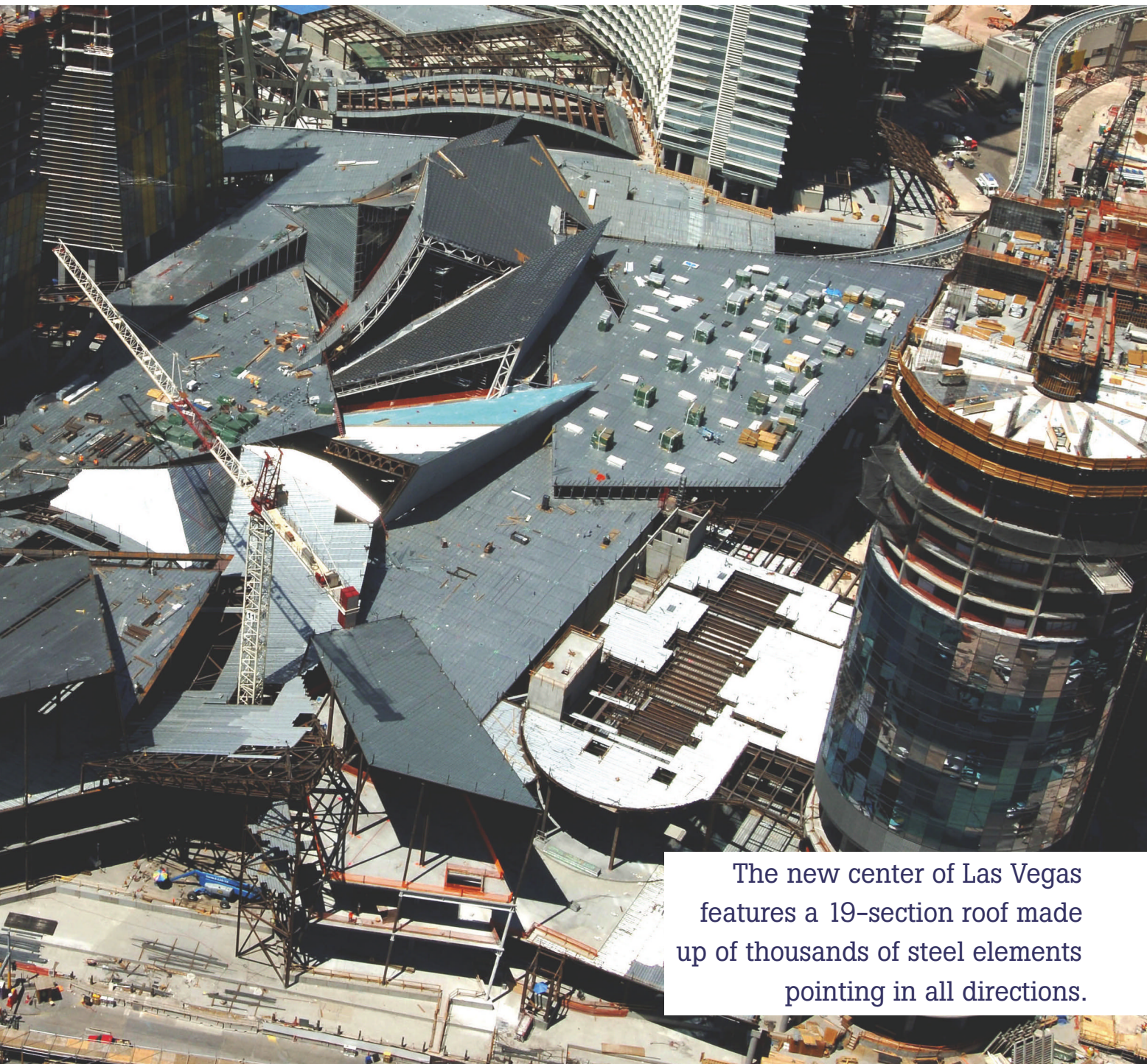
CityCenter is a \$9 billion-plus mixed-use development currently under construction on 76 acres along the Las Vegas Strip, and the exceedingly angular Crystals portion is the centerpiece of the complex’s retail

and entertainment district. A joint venture between MGM MIRAGE and Dubai World, CityCenter is currently the largest privately financed project in the United States; the entire project is scheduled for completion in late 2009.

Designed by Studio Daniel Libeskind, one of eight renowned architecture firms working on CityCenter, the Crystals includes a below-grade garage, two levels of retail, and a one-of-a-kind roof. The garage and levels one and two of the 665,000-sq.-ft facility are typical grid steel-

framed construction. The roof is what elevates the project into a class of its own. It is made up of thousands of leaning columns, curving trusses, and straight members that do not line up with any other piece of steel. The roof actually consists of 19 separate structures that are intermingled and overlap one another, including 13 planar roofs and six dramatically sloped arcade roofs; the arcade roofs were the most complex element of the project—and the project was the most complex that Schuff Steel Company has built in its 32-year history.





The new center of Las Vegas features a 19-section roof made up of thousands of steel elements pointing in all directions.

MGM Mirage

### Mind-Bending and Unfathomable

Planning and building the Crystals can be compared to completing a complicated 3D jigsaw puzzle; every piece had to fit perfectly. The design-assist project took 12 months of working through mind-bending mathematical equations and strategic planning to devise an accurate 3D model.

Schuff's project engineer spent four weeks in Australia working with Halcrow Yolles, the structural engineer, and the Australian-based steel detailer, BDS. While in Australia, daily conference calls with

the erector, engineer, and detailer were made to Adamson-Associates, the architect of record for the Crystals, and Perini Building Company, the general contractor on CityCenter, to review the progress. WebEX (internet video conferences) were also established to share models with the appropriate parties simultaneously around the world, from Australia to North America.

In total, 16,455 steel pieces were entered into Tekla Structures software. The Crystals roof has no right angles; it does not follow a pattern or have any repetitive placements of

The 19 roof sections of the Crystals contain more than 16,000 pieces of steel.

steel. Similarly, the connections of the lower floors were "standard" but the roof system required distinctive solutions at almost all end points. More than 500 unique sketches were generated for these roof connections. Each of these connections then had to be manually modeled into Tekla Structures, as no single macro could accommodate these variations.

The modus operandi was to plan ahead and then work backward. The design-assist team first determined where each of the 80



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major trusses went, and from there worked backward to resolve what each truss would support and what would support each truss. With thousands of massive beams, 160 trusses, and 69 pipe columns cutting through one another and leaning at extreme angles—as much as 40°—every piece of steel required calculations to test for load capacity, fabrication, and constructability.

3D modeling was imperative on this project. Again, using Tekla Structures, the design-assist team had the ability to interface with other programs such as Revit and AutoCAD to create BIM models for all of the trades and consultants on the project. Without these advanced software programs, the project would not have been possible; the geometry was unfathomably complex. Additionally, it would have been too cost-prohibitive to manually draw the structure. Using a 3D system, there were practically zero detailing-related errors. In total, the project involved more than 15,000 shop drawings.

Fabrication started in January 2006; the project's accelerated deadline required the use of 14 fabrication shops across the country. Fabrication was completed in March of 2008 for the majority of the project, and the majority of steel erection was completed that July. Over the two-year period, 1,433 truckloads delivered 13,900 tons of structural steel to the project site.

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### Roof after Roof after Roof...

The 3D model was used to divide the structure into 19 floor sequences—again, 13 planar roof sequences and six arcade roof sequences. Because of all of the construction at CityCenter—including hotel and condominium towers, a convention center, parking garages, a central plant, and infrastructure on the 76-acre site on one of the busiest streets in the world—the site was extremely active and congested.

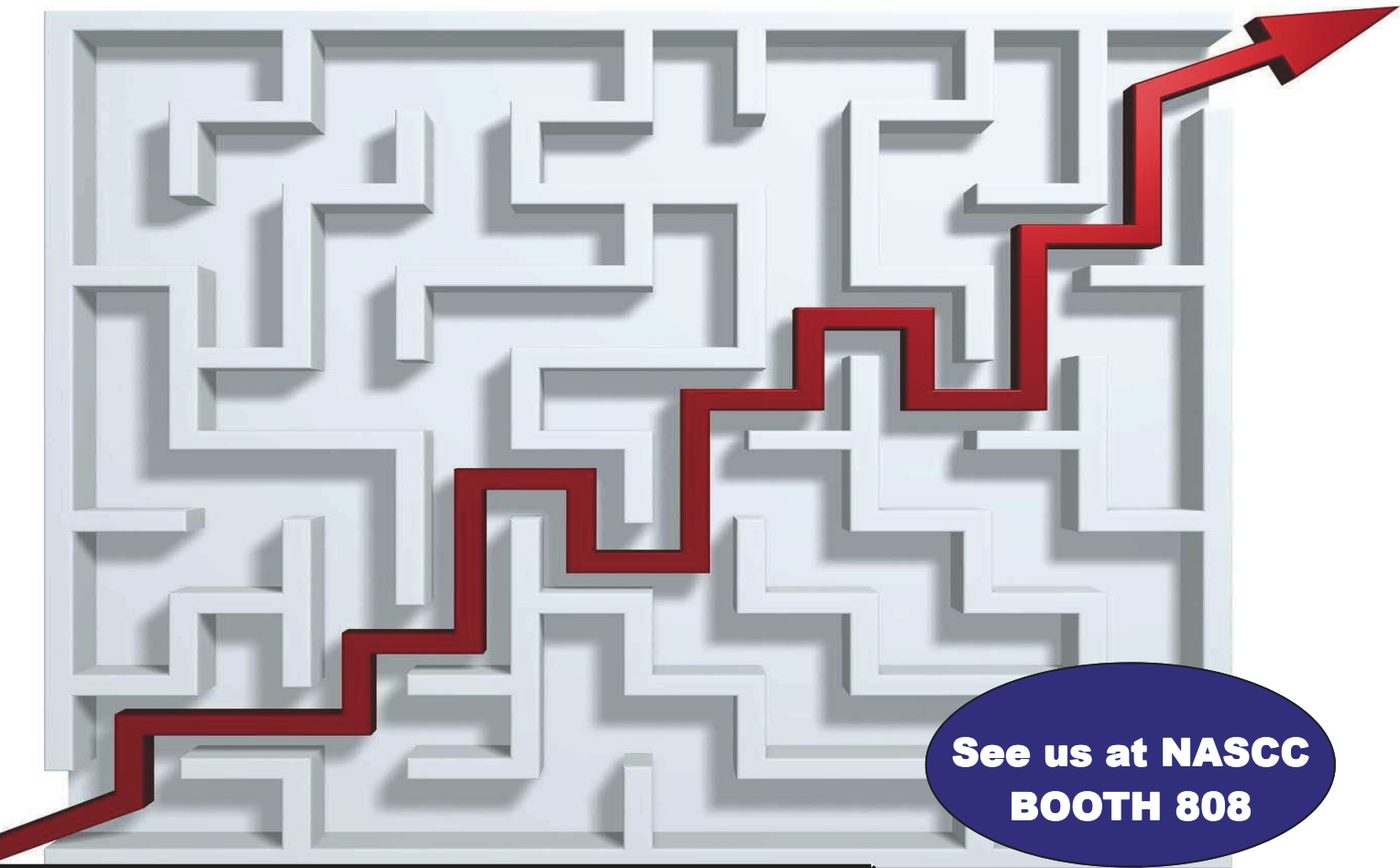
Materials could not be stored on-site and construction schedules had to be precisely coordinated with the general contractor and executive architect for CityCenter, Gensler, to access the project's tower cranes and street right-of-way and to assure safety egress.

CityCenter's master plan dictated that construction on the Crystals would start at the west side of the project and work toward the Strip. The plan was to start the erection process at the highest point of the roof. However, to guarantee stability of all the leaning trusses and columns, ironworkers had to strategically “jump” around.

All of the six arcade roofs are designed



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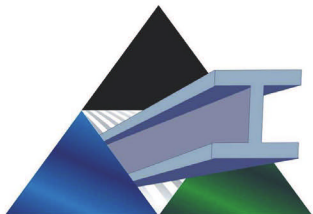
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at different angles to connect with the 13 planar roofs. The six arcade roofs converge at the apex of the facility, with the planar roofs on the side. When the entire project is complete, the arcade roofs will be covered in glass to create a massive skylight to illuminate the building's interior, hence the moniker. Stainless steel will cover the planar roofs.

With 160 roof trusses and 69 pipe columns plowing through the structure, erection was planned several sequences ahead of truss installation. Similar to the preconstruction phase, every piece of steel had to be installed one piece at a time. On average, about 40 pieces of steel were hung per day. In cases where angles were particularly intricate or pieces were exceptionally large, only four pieces of steel were hung per day.

More than 90% of the steel connections are bolted, and a total of 52,766 connections were made; some trusses and columns have up to 15 connections. When bolting was not an option, crews performed on-site welding. The banana truss—measuring 6 ft deep and almost 200 ft long—which slopes to the apex of the facility, was among the most critical welding tasks on the entire project. The banana truss was hung with two cranes, and crews welded, in the air, the truss in three different places.

Bryant Surveys, Inc., a third-party surveying firm, surveyed specific points on each truss as they were being set. The firm compared actual vs. theoretical locations to ensure that no point was more than ¼ in. off the theoretical point.

The Las Vegas Automated People Mover (APM) added another dimension of difficulty and uniqueness to the project. The APM, a monorail that stops at major casinos and destinations throughout Las Vegas, runs directly through a sizable section of the Crystals. Schuff worked closely with the APM's designer, Doppelmayer Cable Car, to coordinate the two projects. The APM sits on top of an array of massive concrete columns, five of which are within the footprint of the Crystals and were already in place when erection started. Throughout the entire project, ironworkers had to maneuver around the columns inside the project footprint.

Veer Towers, two high-rise concrete towers that lean in opposite directions, are a separate project at CityCenter but are connected to the Crystals. In the event of a seismic episode, Teflon slide bearing pads, provided by ConServ Inc., support cast-in-place steel embeds measuring 2 in. thick and as much as 5 ft high and attach





Photo by Brian Fritz

# Curve Your Enthusiasm

When it came time to turn Frank Gehry's inspiration into reality at Chicago's Millennium Park, Skidmore, Owings and Merrill turned to Chicago Metal Rolled Products for solutions to the challenge of curving pipe for the trellis that supports the speakers and lights at the Pritzker Pavilion.

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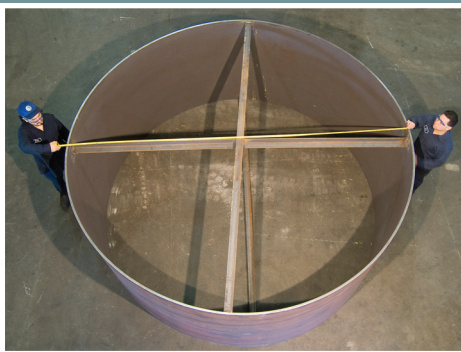


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Veer Towers to the Crystals so that each project can float independently from one another. It is estimated that it will take at least one year for both projects to settle. Veer Towers is expected to settle 3 in. and the Crystals 1 in., at which time the slide bearings will be readjusted. **MSC**

*Gary Provencher is a project engineer and Dave Farrell is a project manager, both with Schuff Steel Company.*

#### **Executive Architect for CityCenter**

Gensler, Las Vegas

#### **Design Architect for the Crystals**

Studio Daniel Libeskind, New York

#### **Architect of Record for the Crystals**

Adamson-Associates, Toronto, Ontario, Canada

#### **Structural Engineer**

Halcrow Yolles, Las Vegas

#### **Steel Fabricator and Erector**

Schuff Steel Company, Phoenix (AISC Member)

#### **Steel Detailer**

BDS Steel Detailers, Tempe, Ariz./South Brisbane, Australia (AISC Member)

#### **General Contractor for CityCenter**

Perini Building Company, Las Vegas



The weights of the various trusses range from 5 to 90 tons.

#### **Of Crystals and Steel**

The Crystals, by the numbers:

- 16,455 pieces of steel
- 13,900 tons of structural steel
- 52,766 connections
- 160 trusses, including 80 major trusses
- Weights of trusses vary from 5 tons to 90 tons
- Lengths of trusses vary from 10 ft to 180 ft
- 69 pipe columns
- Length of the pipe columns varies from 20 ft to 84 ft (in three separate shafts)
- More than 90% of the connections are bolted
- Project entailed more than 15,000 shop drawings
- There are no right angles or repetition on any of the 13 planar and six arcade roofs
- Entire project built with recycled steel
- Steel was delivered by 1,433 truckloads
- 150 ironworkers working a total of 250,000 man-hours

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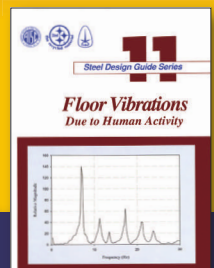
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# Splitting the Uprights

BY TAREK AYOUBI, P.E.,  
ANDREW STOEBNER, P.E.,  
AND KENNETH BYLE, P.E.

Lucas Oil Stadium in Indianapolis takes the whole concept of retractable roofs and gives it a quarter-turn.

## THE FIRST DECADE OF THE 21<sup>ST</sup> CENTURY

has marked a new era for National Football League stadiums: the Age of the Retractable Roof. Fans of the Houston Texans, Arizona Cardinals, Indianapolis Colts, and Dallas Cowboys (the latter, starting this fall) can enjoy live football without the threat of inclement weather. Too hot, too cold, or too wet and the roof slides shut.

The latest of these weather-beating venues is Lucas Oil Stadium, the new home of the Indianapolis Colts as of the 2008 season. While not the first of the retractable-roof NFL stadiums to be built, it is first in one way: Its retractable roof is the first to part lengthwise.

Another first for an NFL facility is its 214-ft-wide by 88-ft-high operable glass window wall—the largest in the nation—that gives a spectacular view of Monument Circle and downtown Indianapolis.

Lucas Oil Stadium—which seats 63,000 but is expandable to a capacity of 70,000—will serve not just its NFL team but also a wide array of concerts, special events, and conventions and will also secure the city's position as a frequent host of NCAA basketball Final Four events.

## Function Follows Form

While retractable roofs for football stadiums typically open with the panels opening at mid-field and sliding towards the end zones, the architectural look of Lucas Oil Stadium necessitated a different approach. The stadium's design celebrates Indiana's traditional field house look, complete with a gabled roof—peaking lengthwise above the middle of the field—hence the need to

Courtesy Hunt Construction



To create the pitched roof that evokes a traditional Indiana field house, the panels were oriented to slide perpendicular to the field sidelines.





Arched transverse trusses span two superframes that in turn span parallel to the field sidelines, supporting the entire roof without compromising sightlines.

Photos: © Blake Marvin/HKS Inc. (left) and Courtesy Walter P Moore (right)

reconfigure the opening point by 90° compared to other retractable roofs.

The movable roof provides a fully climate-controlled environment for trade and sports events year-round and an open-air football experience on pleasant autumn days. Two enormous panels quickly and quietly retract to create an 180,000-sq.-ft opening, the largest of any NFL venue to date. The panels separate along the roof's longitudinal ridge and roll away from each other, traveling down the straight 13.2° pitch, then land and rest along the sides of the building.

The 600-ft by 150-ft roof panels are supported atop 36-in.-diameter steel wheels aligned similarly to roller blades. The wheels roll down five sloping steel rails aligned at 144-ft centers. The rails are supported atop five peaked box trusses that span between two 752-ft-long steel "superframes" that run the length of the stadium along the field sidelines, 300 ft apart. The top of each sideline superframe is 241 ft above the stadium floor. The superframe columns are 217 ft tall and supported by 35-ft tall concrete shear walls at the street level.

Walter P Moore and mechanization expert Uni-Systems adapted a "four-bar linkage" mechanism to relieve the stresses that develop due to thermal strains between each rail. Though the rails had to be located precisely to provide low-maintenance wheel operation, Walter P Moore worked closely and creatively with the contractor and steel erector to develop adjustable field connections that would meet the strict tolerance requirements. This innovative application ensured that the panels could be installed and operated without the binding and premature wear.

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Five transverse trusses span 300 ft to create a distinctive exposed structural form. This first-of-its-kind structural layout eliminated the need for the retractable roof to overhang the edges of the stadium. At 752 ft long, the superframes comprise the longest roof span in the country.

The roof movement mechanism employs a “winding spool” technology, which had been proven on University of Phoenix Stadium in Arizona. For Lucas Oil Stadium, the technology was further refined and adapted to accommodate the 13.2° incline, the steepest of any retractable roof. A 960-hp cable-drum drive system moves the retractable panels—each weighing 1,450 tons (also the largest of any NFL facility)—to silently close the roof in just 9 to 12 minutes, depending on weather conditions. To further save energy, the drive system reclaims much of that energy spent, as the roof opens under its own weight via the force of gravity.

The roof was designed with the capacity to hang up to 200,000 lb of show rigging for center-stage or end-stage events. The five transverse trusses were designed with five catwalk systems that interconnect the entire roof structure at multiple elevations and provide the structural capacity to support the largest show rigging load of any building in North America.

With 15,500 tons of steel in the air, the roof structure itself took 18 months of the total 36-month construction schedule.

Throughout the roof, 3,100 tons of ASTM A913 Grade 65 steel was used to reduce tonnage, contributing greatly to the economy of the project's structural system. High-strength steel was used extensively in the superframe and transverse trusses to reduce the member sizes; as with all compression members, truss members in Grade 65 steel rely on maintaining short unbraced lengths. In the superframe, each chord, diagonal, and post was made with four W14 shapes laced together with angles to create 3-ft by 6-ft box shapes. These shapes allowed for efficient compression members with lengths exceeding 70 ft.

#### A Clear View

Lucas Oil Stadium is oriented on an angle so that its north façade faces downtown Indianapolis. To maximize this stunning view and

#### Sealed with a Twist

Though most operable roof stadiums experience some leakage during rainstorms, the operation requirements for Lucas Oil Stadium demanded a higher level of protection against water intrusion. An innovative and redundant seal system at the interfaces of the moving roof with fixed elements and at the roof peak keeps the venue dry.

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to connect downtown citizens visually and acoustically to the excitement of the games, the design features North America's largest independent operating glass window wall. Opening dimensions are 214 ft wide by 88 ft high, with six translating 36-ft x 88-ft panels. Each wall panel travels at 30 ft per minute for an opening time of four minutes. The bottom of each 50-ton panel rolls on two 24-in diameter steel wheels along a single rail, and the top of each panel is supported by a pair of top guide roller assemblies.

## Point(s) After

From the outset, Lucas Oil Stadium was intended to be the most flexible and well-used community asset of its type in the world. Just as important, it serves as a crucial cornerstone element in a massive renewal of downtown Indianapolis, helping the city build on its standing as a pre-eminent destination for conventions and world-class entertainment events such as NCAA Final Fours and the upcoming Super Bowl XLVI in 2012—and creates a whole new ball game for stadiums worldwide.

MSC

*Tarek Ayoubi served as project manager; Andy Stoebner served as project engineer; and Kenneth Byle served as design manager for Lucas Oil Stadium. All are with Walter P Moore and can be reached at 800.364.7300.*

## Owner

Indiana Stadium and Convention Building Authority, Indianapolis

## Architect

HKS, Inc. (Sports and Entertainment Group), Dallas

## Prime Structural Engineer and Roof Design

Walter P Moore, Houston

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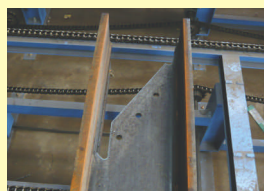
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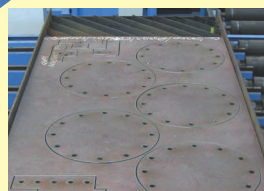


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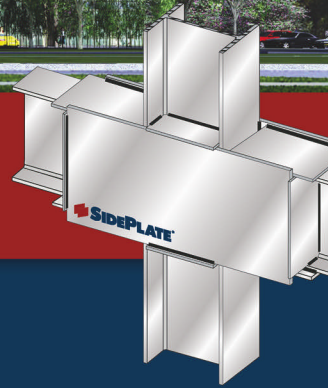
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# Special



Shop-fabricated cruciform columns were used to provide high biaxial strength and convenient field bolted connections.

UPS

## An expansion to UPS' "ultimate factory" needed to be designed around the facility's intricate conveyor system.

**THE UNITED PARCEL SERVICE** quietly runs one of the world's largest airlines, operating hundreds of aircraft and servicing more than 200 nations and territories. The heart of the company's sophisticated global distribution network is the UPS Worldport in Louisville, Ky., which was recently featured on the National Geographic Channel's "Ultimate Factories."

The bulk of the existing 4 million sq. ft of building footprint was constructed in the late 1990s, at the time called Hub 2000, giving UPS the ability to sort more than 300,000 packages an hour traveling on 110 miles of conveyors. Square footage statistics don't do justice to the sheer size of the building, since the facility is packed full of millions of square feet of conveyor platforms and mezzanines that do not count towards official square footage numbers.

Despite the massive volume of the facility, by 2006 UPS' air shipping business had grown enough that it became necessary for them to expand the facility's footprint to 5.2 million sq. ft, or the area of 80 football fields, providing the required space to expand the potential capacity of the materials handling system to 170 miles long and almost a half-million packages an hour. The original Hub 2000 project and

this expansion have resulted in the erection of nearly 43,000 tons of structural steel and more than \$2 billion in total construction cost.

### Fast-Tracking

From an engineering perspective, the key to successful fast-tracking is acquiring the necessary information as early and accurately as possible in order to minimize changes after procurement. This can sometimes be achieved by erring on the conservative side, but the design team had no such luxury for the Worldport. Early attempts at designing around upper-bound estimates of conveyor loading resulted in unreasonable designs such as W24x370 columns being required to support a two-story portion of the structure. Such an approach would result in delays and tens of millions of dollars of cost to the project. Thus, floor dead and live load information had to be well coordinated with the conveyor system to account for the extreme variability in weight and layout of the conveyors. The geometry of the facility was similarly constrained. The footprint, roof elevation, and floor-to-floor heights had to be coordinated with UPS Airlines' operations, the Federal Aviation Administration, the airport control tower line-of-sight, require-



# Delivery

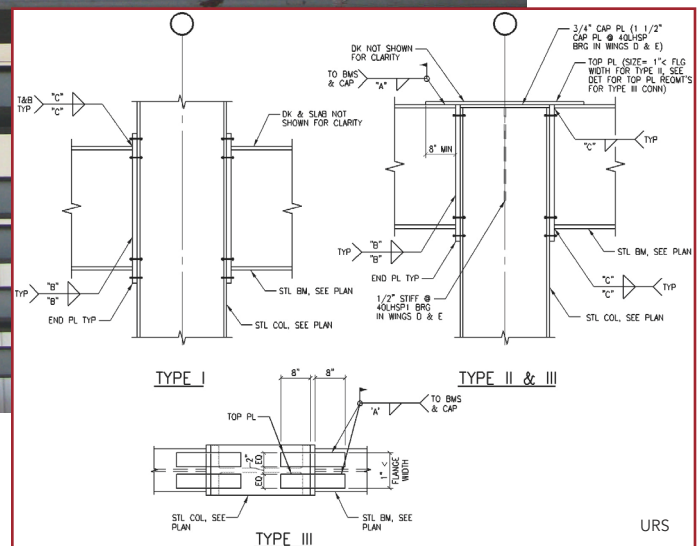
BY JOHN GEORGE, P.E., S.E.



UPS

**Right:** Extended end-plate moment connections on paper.

**Above:** Extended end-plate moment connections in action.



ments of the new conveyor system, and connectivity with the conveyor system in the existing Hub.

Working backwards from the desired occupancy dates, the construction manager, Hunt Construction, and steel fabricator used Nucor-Yamato's published rolling schedules to estimate when they would need construction documents, mill orders, and mill reservations. The dates were eye-opening to everyone and it soon became obvious the building and conveyor design teams had quite a challenge ahead of them. With those dates in hand, structural engineer URS began a series of smaller meetings with UPS and the conveyor designers to work out a schedule that would provide them enough time to design the system to a reasonable level of accuracy, while still leaving URS adequate time to design the structure prior to the required mill order dates. The largest difficulty was developing an efficient but not overly conservative means of communicating loading information, while still providing a versatile set of criteria that wouldn't require changing the design when minor modifications were made to the materials handling system. This was initially done

using large spreadsheets developed by the conveyor vendor's structural design consultant (SSOE, Inc. of Toledo, Ohio).

However, this proved cumbersome, made changes difficult, and didn't provide an intuitive picture of what was going on in the building. The process was streamlined into color-coded load maps. The maps were easily understood and provided the entire team with a better understanding of the conveyor system. They were precise in areas where the conveyor design was well developed and appropriately conservative in areas where there was uncertainty in the materials handling system design. The team worked diligently to determine what was "appropriately conservative," with URS providing guidance on areas where overestimating the loads would be very costly and areas where it would have little effect on the cost of the structure. For instance, overestimating the loads on a 100-ft clear span would be much more detrimental than placing a conservative point load on a moment frame girder that had been sized based on lateral drift criteria and had reserve strength. The load maps developed during this stage of the project were eventually incorporated into the construction documents for use by UPS





Kentuckiana Aerial Photography, Inc./UPS

Following its expansion, the UPS Worldport facility in Louisville now contains 43,000 tons of structural steel and has a footprint of 5.2 million sq. ft.

as they modify the conveyor layout in the future as necessary.

With all of the design information coordinated, URS produced three stages of deliverables for the structural steel packages:

- An early size and length estimate in spreadsheet form used for cost estimating, fabricator feedback, and coordination with steel mill rolling schedules
- A size and gross length schedule in spreadsheet form outlining the total length of each member size required, for placing the mill order.
- Structural steel construction documents for detailing and modifying the mill order.

The process proved effective, as UPS' management team monitored the complex lines of communication, with designers, contractors, and vendors interacting both directly and through UPS. The construction schedule was met and often exceeded, and the changes to the structural steel framing system were relatively small considering the size of the project. In fact, few of the changes were necessary due to modifications in loading; most were related to spatial changes in the materials handling system.

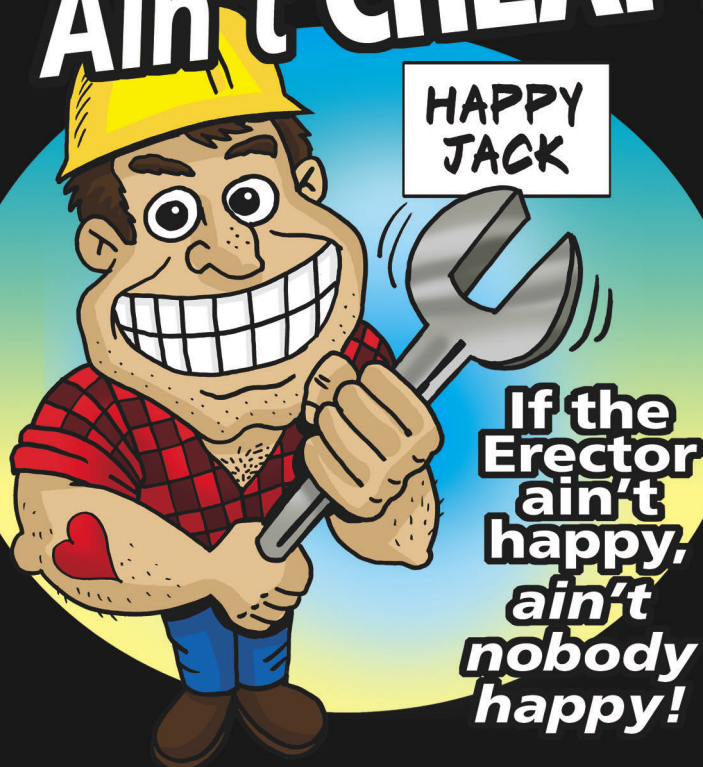
#### It's what's on the inside that Counts

There are few, if any, facilities like this in the world. So while the exterior may be a simple precast concrete façade, it is the inner workings of the UPS Worldport that make it a unique structure with its own set of design challenges. It is as much a machine as it is a building.

Selection of the superstructure framing system was the easiest part of the original building and its expansion. There really wasn't any alternative to structural steel; the facility demands the flexibility to adapt during construction and in the future. Additionally, the speed of erection offered by steel could not be matched by any other construction material.

Design of the gravity framing system was complicated by the heavy weight and variability of the conveyor system. Additionally, floor-to-floor elevations were very tight, deflection limitations were strict, and every element had to be coordinated with the conveyor system. Additionally, there is a mixture of framing designed by both URS and SSOE. In some areas URS designed the entire floor as a relatively heavy composite framing system. In other areas designated as "transport bays," URS' design was limited to "fly beams" or "primary steel" running column to column. In the transport bays SSOE designed "secondary" and "tertiary" infill that connected to the URS system. This meant lateral torsional bracing assumptions had to be well coordinated with the SSOE structural systems, and the convenient simplifications possible with a wall-to-wall rigid diaphragm could not be used within the transport bays. The roof

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framing was often charged with supporting the massive air-handlers necessary to regulate the temperature of the facility, given the massive heat load from thousands of electric conveyor motors operating throughout the building. In areas without rooftop equipment, the roof framing typically consisted of open-web steel joists supplied by Nucor-Vulcraft. In order to coordinate all of this framing with the materials handling system, the conveyor designers incorporated URS' design into an AutoCAD 3D model for clash detection.

Design for lateral loads and stability was the largest structural design challenge. Though the expansion is not particularly tall (35 to 60 ft, depending on the area), the large dead loads created relatively high seismic demands and second-order effects on the structure. These obstacles were heightened by the lack of a complete floor diaphragm system and the inability to use any form of braced frames due to potential interferences with the conveyor system. Even simple column stability under gravity loads was sometimes difficult to assess because of the unique characteristics of the building configuration.

While meeting the explicit requirements of the AISC LRFD (load and resistance factor design) 3<sup>rd</sup> edition *Steel Specification*, URS relied upon the work of the Structural Stability Research Council and the methods within the yet-to-be-adopted AISC 360-05 Direct Analysis Method to evaluate the stability of columns that didn't easily fit within the assumptions of the current steel specifications. An early design directive was to avoid using hollow structural section (HSS) columns. The building's use demands many modifications both during and after construction, and UPS prefers to make field-bolted connections to columns, which is easier with wide-flange sections. This created difficulty in the transport bays where tall W-shapes were heavily loaded and more vulnerable to minor axis buckling than HSS sections. In order to solve the problem, URS used Joseph Yura's  $\Sigma P$  concept to develop the column layout.

Using this method for evaluating lean-on column bracing, the system was designed so that W24 columns, oriented in their strong direction and unbraced from ground to roof, were capable of providing minor axis bracing to as many as two neighboring wide-flange columns. In a few isolated areas, this relationship could only be maintained by using shop-welded cruciform columns fabricated from a W24 and two WT12s to provide a column with equally large biaxial stiffness. With the preliminary design complete, the final framework was analyzed and designed using RAM Structural and SAP 2000.

Though the State of Kentucky had not yet adopted it and SAP 2000 had not yet incorporated it into the software, elements of the AISC 360-05 Direct Analysis Method were applied to the final models, which had already been designed to the LRFD 3<sup>rd</sup> edi-



UPS

Columns were up-sized as necessary to result in zero stiffeners and zero doubler plates on the entire project.

tion, to ensure overall stability to the system, considering the unique loading parameters and structural configuration.

UPS directed the team from the beginning that field welds and column stiffeners/doubler plates were not acceptable elements of the design. Despite the structure containing hundreds of moment connections, field welds were eliminated through the use of bolted extended end-plate moment connections designed and detailed in the URS construction documents. Columns were up-sized as necessary, resulting

in zero stiffeners and zero doubler plates on the entire project.

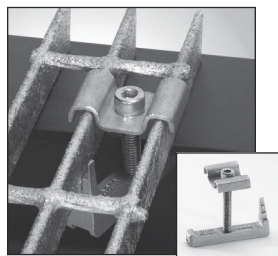
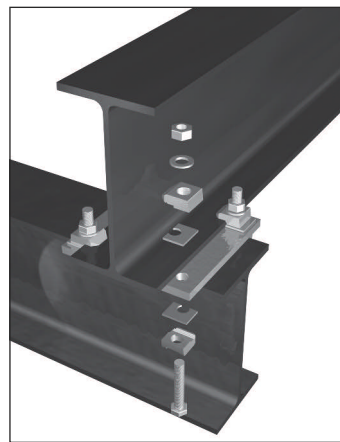
#### Paperwork

The project was released in four stages; first, the North Core expansion was released in halves, followed by Wing D extending out from the northwest corner of the core, and finally Wing E extending from the northeast. The team began design in July 2006 and released the construction drawings for Wing E in late May 2007, documenting approximately 16,000 tons of structural steel along the way.

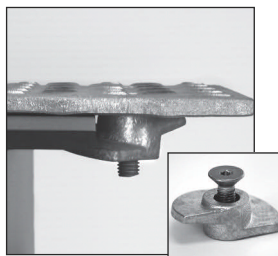
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FINISHED WELD

As mentioned earlier, a portion of the framing was designed by SSOE and a portion by URS. While URS was the engineer of record for the project, SSOE's documents contained thousands of small pieces of "secondary" and "tertiary" framing that connected to the large "primary" framing designed and detailed by URS. However, both firms had to know what the other was doing and had to confirm the shop drawings were a correct interpretation of their design intent. This was an inefficient aspect of the Hub 2000 project that UPS solved by mandating that information from both URS and SSOE be compiled into a single set of shop drawings prepared by a single detailer.

The fabricator/erector received separate sets of construction documents from the two structural engineering firms, and Arcan Detailing, the steel detailer, created a 3D SDS/2 model of the structure, which was used to produce a set of shop drawings containing both designs. Arcan's ability to absorb revisions and coordinate the work of two structural firms was the keystone to the entire construction process. The shop drawings were sent electronically to SSOE, then a single copy was printed, marked up, scanned, and sent directly to URS. URS then repeated the process and sent the completed electronic copy back to the construction manager.

Using this process, large packages of shop drawings were able to be reviewed by the construction manager, SSOE, and URS in less than two weeks, keeping the aggressive schedule on track. The team was able to complete major structural steel erection on time in May 2008; conveyor system fit-out efforts are expected to continue well into 2009.

MSC

*John George is a senior structural engineer with the Columbus, Ohio office of URS Corporation. He served as an assistant engineer on the Hub 2000 project and as lead structural engineer for the Worldport North Expansion.*

#### Owner

United Parcel Service, Atlanta

#### Architect and Structural Engineer

URS Corporation, Columbus, Ohio

#### Steel Erector

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#### Steel Detailer

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# High Energy

BY BARRY CHARNISH, P. ENG., AND JONATHAN HENDRICKS, P. ENG.

Canada's largest energy company will soon occupy the tallest building in the western half of the country.

**BUILDINGS DESIGNED BY FOSTER + PARTNERS** routinely turn out to be architectural icons. And in the case of the firm's new Bow project, a new 59-story tower in Calgary, it will be the tallest building in western Canada.

Standing 780 feet and encompassing approximately 2 million sq. ft above grade, the Bow is the new headquarters building of EnCana Corporation, the country's largest energy corporation. The crescent-shaped tower features a vast atrium partitioned in four clear height sectors of 24, 18, 12, and six stories. The façade of the atrium is an architectural exposed "diagrid" (diagonal grid) structure in six-story segments that act as one of the building's six separate systems making up the hybrid lateral force resisting system (LFRS). The other LFRS include a W-shaped rigid frame at each end of the banana-shaped structure and two additional diagrid sectors on either side of a concentric and eccentrically braced area framed through the core.

The building also features long-span composite beams creating core-to-perimeter wall open spaces.

## Structural System

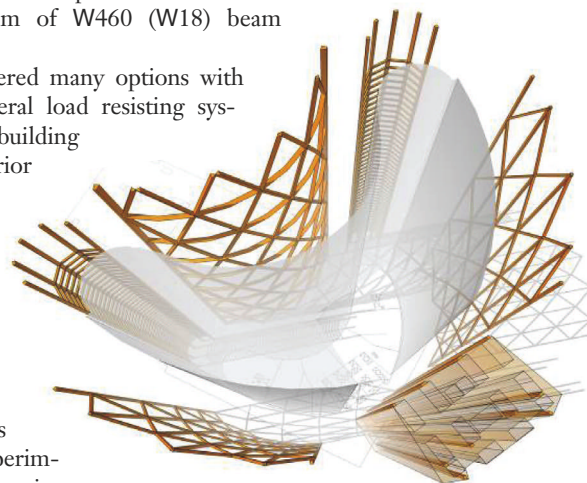
In early discussions regarding the structural system, it was determined that the bulk of the building structure would be reinforced concrete on composite steel deck with structural steel framing. This material option was selected because of the size of the columns, the speed of construction, and the limitations on the local concrete formwork industry with respect to the availability of labor and carpenter forces.

The gravity load-carrying system of the building was affected by the need to minimize the height of the building. The location of the building is just south of the Bow

River in Calgary and as a result of this location, the urban guidelines prepared by the municipality required that the building be low enough to avoid shadowing the river during the September equinox period. Thus interior columns were added to the floor plate so that beam depths could be restricted to a maximum of W460 (W18) beam depths.

We considered many options with respect to lateral load resisting system of the building from an interior core system (supplemented by secondary cores at the "fingers") to perimeter systems to hybrid systems utilizing the perimeter and the interior core.

The interior core option resulted in excessively thick reinforced concrete walls and an excessive steel braced system because of the height of the building; the height to core aspect ratio was at 15:1. This was further compounded because of the "dead" load drift issue, a result of the side core position of the core. Generally, floor loading occurred only on the inboard side of the building with only the cladding and north scissor stairs loading the north side of the core. Even in the structural steel core scheme, the resolution of the gravity load drift issue was responsible for an



The façade of the building's atrium is composed of a "diagrid" structure, in six-story segments.

Renderings: Halcrow Yolles

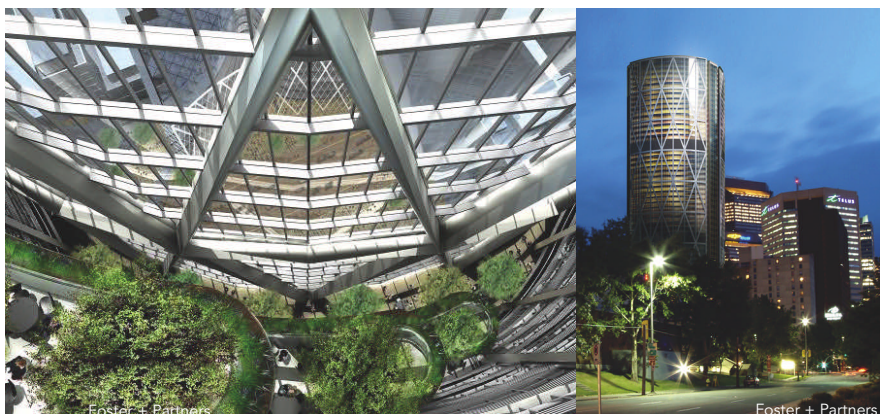
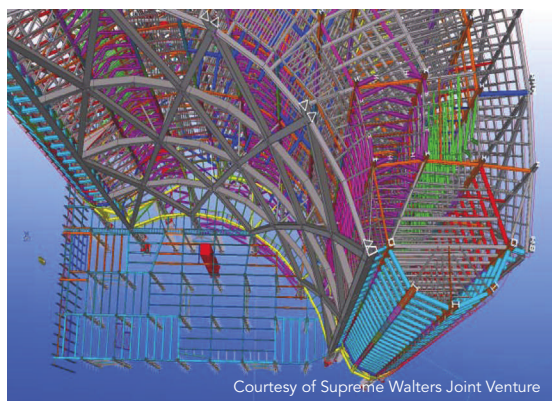


Barry Charnish is a senior principal and Jonathan Hendricks is a principal, both with Halcrow Yolles, Toronto, Canada.

This article has been excerpted from a paper to be presented at The Steel Conference, April 1-4 in Phoenix, Ariz. Learn more about The Steel Conference at [www.aisc.org/nascc](http://www.aisc.org/nascc). The complete paper will be available with the archived version of this article at [www.modernsteel.com/backissues](http://www.modernsteel.com/backissues).



A BIM model (right) and a rendering (below) of the atrium's diagrid façade. The atrium is partitioned in four clear height sectors of 24, 18, 12, and six stories.



excessive tonnage of steel for this purpose alone. In the perimeter system option, the selection included closely spaced steel columns and various layout options including closely spaced columns and diagonal bracing schemes.

Hybrid options included activating “out-rigger” frames and “belt” trusses at the garden floors, which occur approximately every twelve floors. This option was developed using full-floor trusses at the top floors of the atrium areas, which also contained a large mechanical plant area as well as the mechanical equipment rooms for the elevator lift areas. This system, while structurally efficient, negatively impacted the use of the floors.

The largest wind load on the building generally hits it from the northwest or southeast. This “broadside” loading generally hits the building where the depth of the structure is the smallest. We proposed an internal diagonal element that would reach from the core to the outside by the atrium over a six-story diagonal. While the floor by floor impact of this diagonal was relatively small, it proved to be unacceptable for the tenant’s space planning.

Ultimately, a perimeter diagrid system was selected. This decision was made based on economics of the steel framing scheme, the functionality of the tenant space, and the aesthetics of the architecture. The lateral system consists of four principal components:

1. At the northwest and northeast sections of the building’s perimeter, six-story-high diagonal grids are faceted along the perimeter.
2. These diagonal grid elements are connected through the core with a series of braced frames between the elevators and the north stairs.
3. A similar six-story diagonal grid spans outside of the south portion of the atrium and is connected to the bulk of the building by drag-struts at the ends of the atrium.
4. These two dominant diagonal grid elements are connected at the ends of the finger areas with a series of rigid frames.

These elements generally occur at the perimeter of the building. Because of the nature of the six-story diagonal grid, there was an issue of the global stability of the building between the node levels. To achieve the secondary stability, bracing was added with a wall of the finger core throughout the height of the building. Added bracing at the back of the elevators was required in the lower 24 floors to supplement this secondary bracing.

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matic element in the architectural design of this area, as it was exposed to all EnCana staff. Structurally the wall was important, as the diagonal grid was involved in completing or closing the perimeter lateral load resisting system. Complicating the structural aspects of the screen wall was the large unsupported length of the compression elements and the tendency of the screen wall to attract gravity load from adjacent floor plates.

The design options included rectangular shaped steel elements, round hollow structural sections (with possible concrete fill), and triangular-shaped steel elements. Various studies were carried out the three options—including the impacts on aesthetics, intrusion into the atrium, and ease of connection; support of secondary mechanical electrical and plumbing systems and the perimeter curtain wall; and constructability of the structural system.

On a material cost basis the round HSS with flange plate splices proved to incur the least structural cost but with consideration of the other aspects, particularly the aesthetics, a decision was made to use the triangular elements.

#### Construction Logistics

The design at the bid stage was based on the six-story basement being constructed of reinforced concrete with the structural steel commencing at the ground-floor level. Decisions by the project managers and the construction managers led to the incorporation of the structural steel to start from the raft foundation and with the concrete basement framing following after the steel was erected at grade. The steel was also extended most of the north block to provide "umbrella" steel to assist in the structural steel erection of the tower over the deep basement. The intent was for the tower steel to proceed above while the slower paced reinforced concrete basement backfilled off the main critical path schedule.

To achieve this "up-down" construction, the lowest lifts of columns were augmented with tie-down anchors into the raft design for the lower level floors. Added bracing located within the basement area was reinforced to support the building until such time as the permanent below grade shear walls and ground floor diaphragm could be constructed. In some cases this temporary bracing was embedded within the final shear wall construction.

The construction logistics developed by the fabricator and erector required the general office area with the service core and outside "finger" cores to be constructed in advance of the atrium screen wall. This base construction could be used to establish the column and diagrid node locations to facilitate the erection of the long diagonal members of the atrium screen. Unlike conventional structures with a reinforced concrete or structural steel core,

the perimeter system of the diagonal grid did not have the advantage of a central erection base to which the perimeter framing could be anchored and adjusted. It was also anticipated that the erection of the atrium screen wall would take longer than erecting the office portion due to the 10.2 meter offset of the atrium wall from the edge of slab of the office space.

Until the atrium screen wall could be erected, temporary frames were constructed to span the atrium plenum at various levels as a means of stabilizing the entire wall. These temporary frames were removed and reused as the construction of the atrium wall progresses up the height of the building. Generally the atrium wall erection was approximately six stories behind the office area construction. This delay in the atrium wall erection also helped to avoid some of the gravity load creep from the office areas that could be expected with a structure of this nature.

#### Current Status

As of this January, the structural steel erection has been completed to grade with the tower framing proceeding to the sixth floor in a staggered profile. The present schedule has the tower structural steel topping off in 2010 with the early occupancy of the building scheduled for 2011. **MSC**

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#### Executive Architect

Zeidler Partnership Architects, Toronto  
and Calgary

#### Structural Engineer

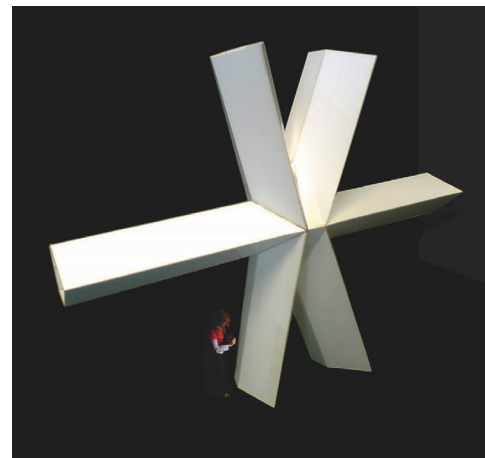
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Up close and personal with one of the diagonal grid nodes.

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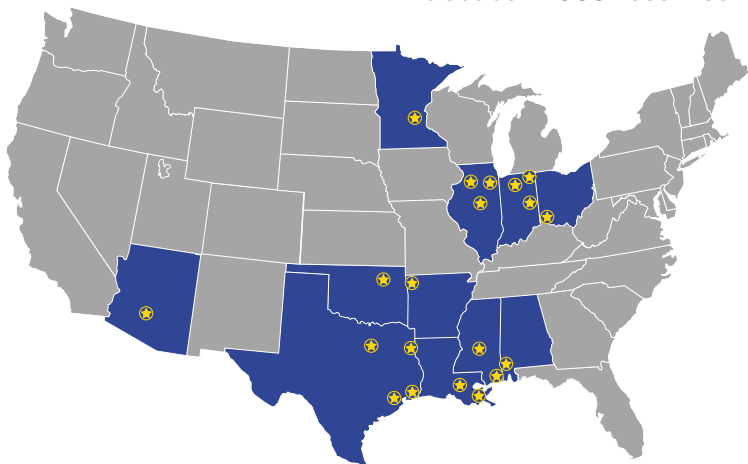
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# How to get Rich being a Detailer

BY HUGH DOBBIE SR.

There's no magic formula but there are several considerations that can put you on the path to detailing success.

**WHEN I WAS ASKED TO DO THIS PRESENTATION**, my first reaction was that surely they must have abbreviated the title. I thought it must be: "How to get Rich being a Detailer and Other Oxymorons." But when I called the office to make sure, I found to my surprise they were quite serious. They wanted to know how a detailer could make a million dollars. My instinct was to tell them, "Start with ten million, and give it time."

In looking back, it's a fact that some detailing companies *have* done well in the detailing business. I have and so have some of my contemporaries. As such, a few questions have been raised: How did we do it? Is there a magic formula? Of the hundreds of detailing companies out there, why do a few rise to the top? I have spoken recently with some of these successful detailers about their operations and attempted to nail down what makes successful companies different. Here are a few areas of consideration and pieces of advice:

## Goals

After running a couple of small detailing companies, I started Dowco Consultants in 1970. From day one, the company had a goal and a mission statement. Our goal was to treat our staff well and give them the respect we felt was due. Our first mission statement was "To provide the best possible shop detail drawings to fabricators." Most successful companies have formulated a goal and a mission statement. It's a good way to stay focused and target success.

## Staff, Your Greatest Asset

From the outset we recognized that our most important asset was our staff and we tried to treat them well. We still do. We continually upgrade our computers and equipment to make sure they have the best tools possible to do their work. We have good insurance options and other benefits. These are all things that a company can do to help keep staff happy.

## Pareto 80/20 Rule

In 1906, Italian economist and sociologist Vilfredo Pareto created a mathematical formula that came to be known as the Pareto Principle or the 80/20 rule. I like this because it applies just as equally to detailing as it does to anything else. It states that 80% of your customers take up 20% of your time, and 20% of your customers take up 80% of your time. When this is the case, obviously you want to minimize the 20% of clients who are eating up too much of your time and concentrate on your more cooperative clients who work well with you to get the job done. Or in other words, don't be afraid to get rid of bad customers. In the long run, you will save yourself not only time and money but also sanity.

## Integrity

It's important to keep your integrity intact. I was speaking with a new staff member and told him that integrity and wisdom are essential

to success in this business. Integrity means that when you promise a customer something, you should keep that promise, even if it means losing money. He then asked me, "And what is wisdom?" I told him that wisdom is: "Don't make those kinds of promises." So, deal fairly and hold onto your integrity, even when times are tough—especially when times are tough. You can't put a price on trust. It builds your strongest business relationships.

## Pricing

You will at times hear from clients who complain that your prices are too high and that they have received a lower price than yours. When you're new in the business, or desperate for work to keep your staff going, this can lead to you sharpening your bid pencil too much. You can't go buying jobs. It's never good business policy. So tell them to go ahead and give the job to the low bidder. I've had fabricators come back and say they'd prefer to give it to us because we do a better job. But guess what? That's why our price is higher. So, give a fair and honest price at the outset, and stick with it. Your business won't survive if you drop prices and start to buy jobs.

## Motivating Staff

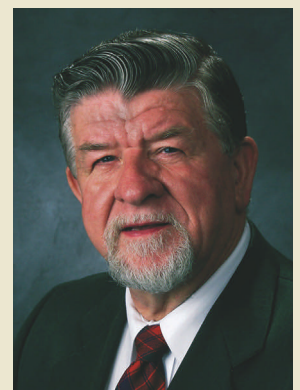
Every detailer out there knows they must produce accurate work at competitive prices, so what is it that makes the distinction between the "superior" detailer and the "average" detailer? A great staff. As I have already said, staff is your best asset and you must look after them, and they truly will go the extra mile for you when asked. There are various ways of keeping your staff happy and motivated. For instance, we hold weekly training sessions that are available on our office intranet. Every second Tuesday we have a live video conference with our various offices. We pay our staff competitive wages and pay annual bonuses when the company is doing well. When a staff member has been with the company for 20 years, we send them to Hawaii with their spouse. We have other benefits for each five-year anniversary after that.

## Communication

In every successful company, good communication is vital. Staff has to work as a team both for the company and as part of the client's team.

I'd like to inject a personal opinion here: E-mails are great for recording facts. I couldn't live without mine. I'm all for it. And we've all been raised with the admonition "Get it in writing."

But here's the thing: Writing a letter is different from e-mail, which is instant and fast. Too fast at times. I have found that excessive use of



*Hugh Dobbie is chairman and CEO of steel detailing firm Dowco Consultants, Ltd.*

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e-mail leads to a good deal of miscommunication and misinterpretation. Words are one thing, tone is another. If an e-mail has been churned out quickly with little time to think, the recipient hears an edge that isn't there and just as quickly responds, and before you know it, smoke's rising and somebody's peeved with somebody. So encourage your staff to pick up the phone and call the client. Contents of the call can always be confirmed by e-mail later, but personal contact works best, saves time, and avoids potential misunderstandings.

### Customers and Cash Flow

If you provide accurate work and delivery on time, your detailing company will make you money from repeat and satisfied customers. Collecting your money will prove to be one of your biggest challenges. Then it becomes really important to keep on top of your receivables. Phone regularly and chase your outstanding accounts. Don't let them sit. Don't let them drag out for weeks or months. Without adequate cash flow, the company can quickly fall into difficulties meeting payroll and paying bills. Because of the cyclical

nature of our business, you should use prudence and put money aside in good times to carry you through the bad—for as we've seen, bad times will come.

### Real Estate

Most of us here probably own our own home because we have learned that if you need a place to stay, you might as well own it. Use the same philosophy with your offices. I own four of the five offices I occupy in Canada. The buildings are generally larger than I need, and the additional tenants help pay the mortgage. This is also a good hedge for you in slow times. Other successful detailers that I know have also invested in real estate and have been well rewarded. (In fact, this may be the answer to the original question of how to get rich being a detailer: Invest in real estate!) But it would be wise to keep your real estate companies separate from the operating companies so that if you want to divest yourself of your real estate, it doesn't affect the operating company and vice versa.

### Continuing Education

In 1983, I took some time out from my business to obtain an MBA. Some of the courses, of course, were great theoretically but if applied, truthfully, wouldn't have helped me much. But I did find courses on economics, accounting, strategic planning, and interpersonal behavior that were all really useful in running a business. They gave me a new perspective on how I could improve my bottom line. So another key to success is to keep on learning.

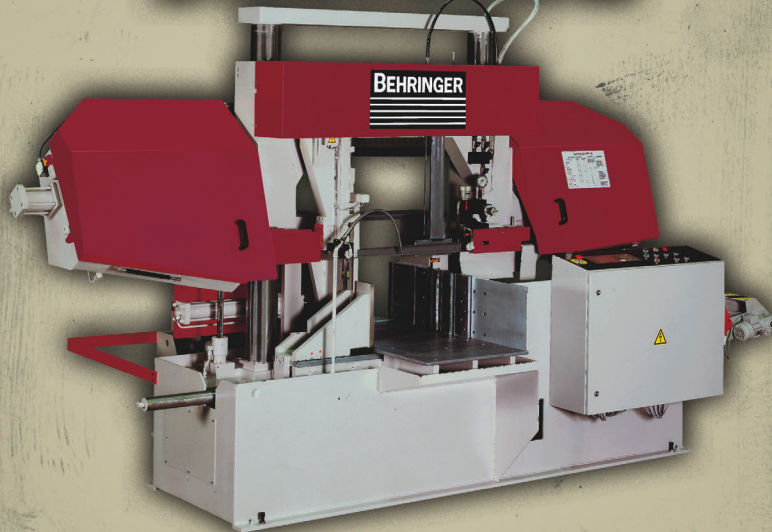
### Diversification

It's a good idea not to put all your eggs in one basket. Good detailing companies have gone out of business because they concentrated on one major client and when that client fell into difficulties, the detailer fell with him. You should be prepared to detail any kind of project. During the bad recession in the early 1980s, though not steel, one of the best jobs we had was detailing the concrete guide-way beams for Vancouver's Advanced Light Transit System (ALRT). It kept us alive through a very difficult time. We have also detailed laminated timber beams for houses in Japan and for a university in British Columbia. So be prepared for everything, and diversify.

### Add Value

To keep ahead, a detailing company should also try to offer added value to their projects. As well as providing accurate drawings on time, we provide clients with CNC files, FabTrol files, and numerous other files that we can extract from our 3D model. We do connection design and also use net meet-

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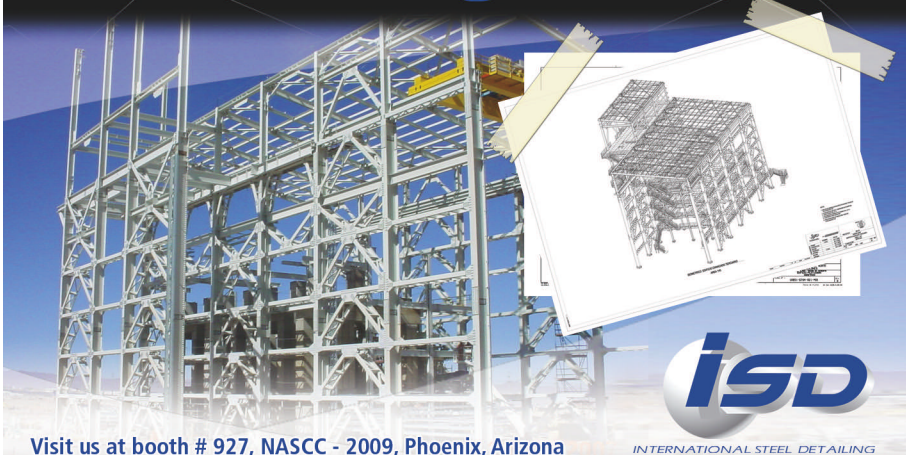
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### Growth

The size of a company also has a bearing on its success. My company, Dowco, currently employs 260. A larger staff allows for flexibility and lets you work on several large projects at the same time, so aim for steady growth. Too fast could make you stumble though, so make sure your finances are in place to handle any expansion. Slow and steady is good. **MSC**



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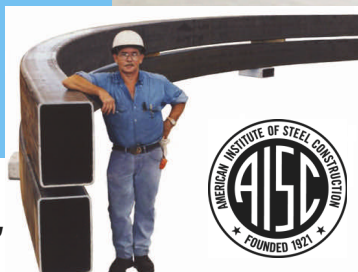
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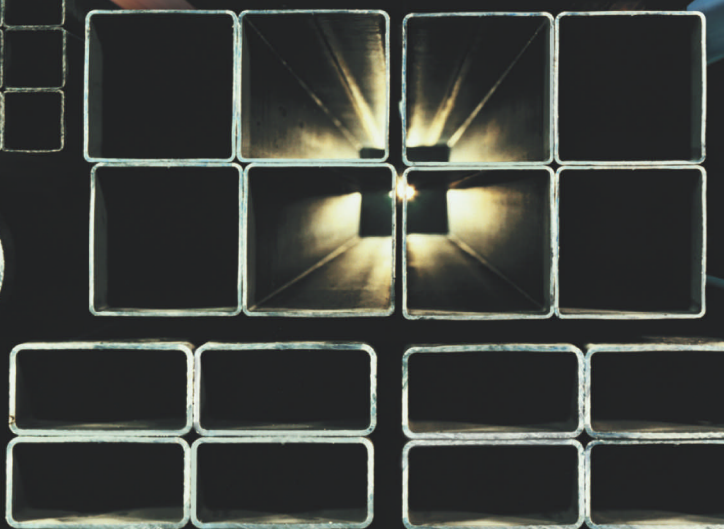
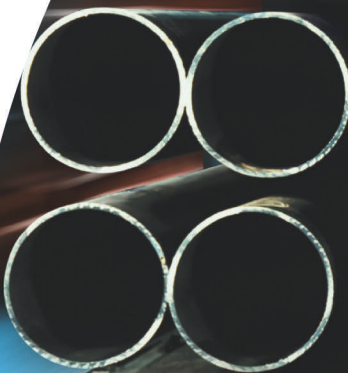
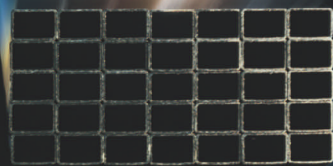
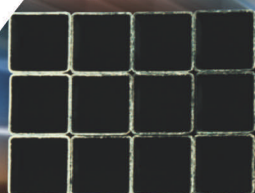
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# Design of Vertical Bracing Connections for High-Seismic Drift

BY WILLIAM A. THORNTON AND LARRY S. MUIR

The effects of frame distortion have been routinely neglected in the design of bracing connections. No longer.

**IT IS COMING TO BE REALIZED** for high-seismic applications where story drifts of 2% to 2½% must be accommodated, that frame distortion cannot be ignored. Such story drifts are on the order of ten times the drifts that are expected for wind and low seismic ( $R \leq 3$ ) design, and they occur in part because the actual maximum considered earthquake (MCE) forces are reduced to about ⅓ of the forces such an event could produce. This is done by first using ⅓ of the MCE forces and then dividing them by an “R” factor on the order of 6, so the MCE load reduction factor is  $6 \times \frac{1}{3} = 9$ .

The rationale for this reduction factor is twofold: 1) The forces are of short duration and are reversing, so the response to them does not necessarily achieve the maximum values; and 2) It allows economical designs to be achieved. The price paid for this MCE force reduction is the high drift and the requirement for ductile response that allows large distortions without fracture and resulting building collapse. If one used an  $R$  of 1, or even ⅓, the drift under even the MCE forces would be no greater (and probably less because of the duration factor) than traditional wind design. Some designers of hospitals and nuclear power plants do just this. However, the current AISC *Seismic Provisions* (2005) have no requirement to consider frame distortions and the resulting distortional forces.

## Distortional Forces

These forces exist because a braced frame, although considered a pinned structure, is in reality a braced rigid frame. They would be reduced to essentially zero by the use of an actual pin, as shown in Figure 1, or they can be controlled by the use of a designed hinge in the beam, as shown in Figure 2 (both on next page). If no pin or hinge is used, the maximum distortional forces can be derived from the maximum distortional moment,  $M_D = \min\{2M_{P_{column}}, M_{P_{beam}}\}$

In this formula, the column is considered continuous above and below the location being considered. Figure 3 shows a statically admissible distortional forces distribution. These forces are to be added algebraically to those resulting from the Uniform Force Method (AISC 2005) of bracing connection analysis.

Note that when the brace force is tension, the distortional forces  $F_D$  are compression. These forces tend to “pinch” the gusset

and can cause it to buckle even when the brace is in tension. This gusset pinching has been observed in physical tests.

## For Example...

Figure 4 shows a connection designed to satisfy the current *Seismic Provisions*. This design, which does not consider distortional forces, is given in the AISC *Design Guide for Vertical Bracing Connections* (2009). The statically admissible interface forces for the connection of Figure 4 are given in Figure 5. These forces would be correct if a beam hinge, such as shown in Figures 1 or 2, were used. However, with no hinge, as shown in Figure 4, the maximum possible (demand) distortional moment is

$$\begin{aligned} M_D &= \min\{R_y M_{P_{beam}}, 2R_y M_{P_{column}}\} \\ &= \min\{1.1(826), 2(1.1)2260\} \\ &= 909 \text{ kip-ft} \end{aligned}$$

From the geometry of Figures 3 and 4,

$$F_D = \frac{M_D}{\beta + e_b \left( \frac{\beta}{\alpha} \right)} = \frac{909}{14.5 + 8.5 \left( \frac{14.5}{18} \right)} = 609 \text{ kips}$$

where  $e_b$  is the half depth of the beam.

The horizontal component of  $F_D$  is

$$H_D = \frac{\bar{\alpha}}{\sqrt{\bar{\alpha}^2 + \beta^2}} \times 609 = 474 \text{ kips}$$



William A. Thornton is with Cives Engineering Corporation, Roswell, Ga., and Larry S. Muir is a steel consultant based in Atlanta.

This article has been excerpted from a paper to be presented at The Steel Conference, April 1-4 in Phoenix, Ariz. Learn more about The Steel Conference at [www.aisc.org/nascc](http://www.aisc.org/nascc). The complete paper will be available with the archived version of this article at [www.modernsteel.com/backissues](http://www.modernsteel.com/backissues).



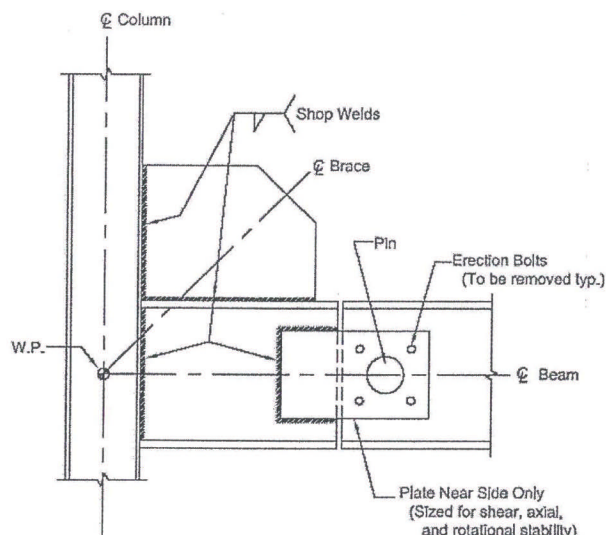


Figure 1. Connection to Minimize Distortional Forces

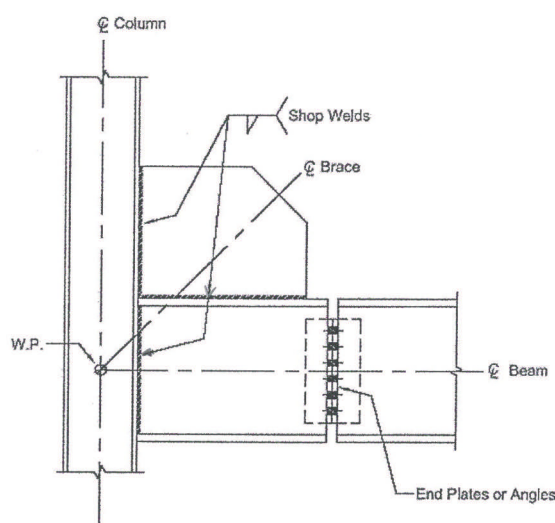


Figure 2. Shear Splice to Control Distortional Forces

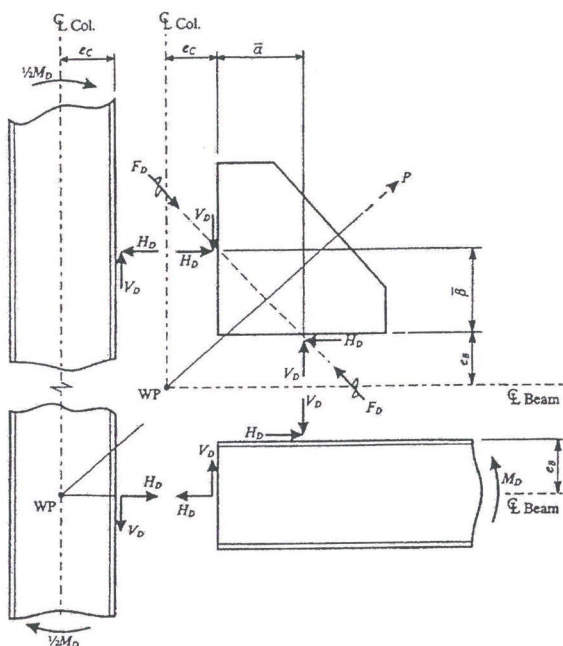


Figure 3. Admissible Distribution of Distortional Forces

This value, which is compression when the brace force is tension, can be compared to the 176-kip horizontal force of Figure 5 between the gusset and the column, which is tension when the brace force is tension. It can be seen that it is not reasonable to neglect the distortional forces.

Note that the large distortional forces may not be able to be achieved because of column and beam web yielding and crippling and gusset pinching (buckling when the brace is in tension). The AISC *Design Guide* proposes using the plate buckling theory given in the AISC *Manual* on pages 9-8 and 9-9 (2005) to control gusset pinching. The *Manual* formulation can be written as

$$F_{cr} = QF_y$$

$$Q = 1.0 \text{ for } \lambda \leq 0.7 \text{ (yielding)}$$

$$Q = 1.34 - 0.486\lambda \text{ for } 0.7 < \lambda \leq 1.41 \text{ (inelastic buckling)}$$

$$Q = \frac{1.30}{\lambda^2} \text{ for } \lambda > 1.41 \text{ (elastic buckling)}$$

$$\lambda = \frac{\left(\frac{b}{t}\right)\sqrt{F_y}}{5\sqrt{475 + \frac{1120}{\left(\frac{a}{b}\right)^2}}}$$

where

$a$  = length of "free" edge – distance between points A and B of Figure 4.

$b$  = the perpendicular distance from the "free" edge to the gusset junction point at the beam and column, point C of Figure 4. The parameters  $b/t$  (slenderness ratio) and  $a/b$  (aspect ratio) are the basic geometry parameters for plate buckling.

From the geometry of Figure 4,

$$a = 44.3 \text{ in.}, b = 21.2 \text{ in.}, t = \frac{3}{4} \text{ in.}$$

$$\frac{a}{b} = 2.09, \frac{b}{t} = 28.3$$

$$\lambda = \frac{28.3\sqrt{50}}{5\sqrt{475 + \frac{1120}{2.09^2}}} = 1.48$$

$$Q = \frac{1.30}{1.48^2} = 0.594$$

$$\phi F_{cr} = 0.9 \times 0.594 \times 50 = 26.7 \text{ ksi}$$

The actual stress is

$$f_a = \frac{609}{0.75 \times 21.2} = 38.3 \text{ ksi}$$

Since  $38.3 \text{ ksi} > 26.5 \text{ ksi}$ , the gusset will buckle in the pinching mode when the brace is in tension. This buckling will prevent the distortional moment  $M_b = 909 \text{ k-ft}$  from being achieved, but this out-of-plane buckling is undesirable because it could cause low cycle fatigue cracks to form in the gusset and its connections.

### Beam Hinges

The idea is shown in Figures 1 and 2 and has been tested in the context of buckling restrained braced frames. A completely designed example with a beam hinge is shown in Figure 6. The



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to the beam and column, in the actual examples for Figures 4, 6, and 7, are shown as fillet welds. The reason for this is twofold: First, fillets are generally less expensive than CJP welds and second, fillets are stronger than CJP welds in resisting gusset out-of-plane bending.

Out-of-plane gusset bending is an issue when low-cycle high-stress (strain) fatigue occurs due to gusset buckling out-of-plane. This is thought to have caused fracture in the tests of Lopez at el (2004). Consider Figure 9, which shows a cross section of the gusset or shear plate and the beam or column flange and web. When a moment  $M$  is induced in the gusset due to buckling, the fillet welds resist with the forces  $F$  spaced at the distance  $e = t_g + \frac{2}{3}w$  shown. With E70 electrodes and LRFD format,

$$F = (0.75)(0.6)(70)(1.5)\frac{w}{\sqrt{2}} = 33.4w$$

For the fillets to be stronger than the expected strength of the plate,

$$Fe \geq \frac{1}{4}t_g^2 R_y F_y$$

and

$$33.4w(t_g + \frac{2}{3}w) \geq \frac{1}{4}t_g^2 R_y F_y$$

Solving for the weld size  $w$

$$w \geq t_g \left( \frac{1}{2} \sqrt{2.25 + 0.045 R_y F_y} - 0.75 \right)$$

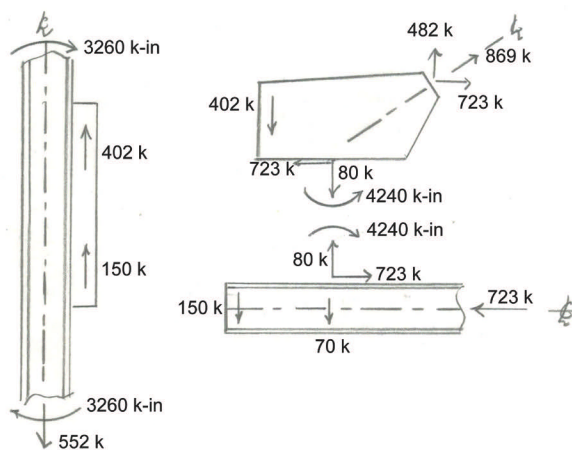


Figure 8. Admissible Force Field for the Connections of Figure 7

A weld size  $w$  that satisfies the above inequality will be stronger than the gusset in flexure.

For

$$t_g = 0.75 \text{ in. } R_y = 1.1, F_y = 50 \text{ ksi.}$$

$$w \geq 0.252 \text{ in.}$$

From Figure 7 the required gusset to beam weld of  $\frac{7}{16}$  in.  $> 0.252$  in., so the gusset (or the beam web at the  $k$  distance) will yield before the weld fractures. Also from Figure 7, the required shear plate to column weld is  $\frac{1}{4}$  in., which is within 0.8% of the flexural strength minimum of 0.252 in.

### New Guide Coming

A forthcoming AISC *Design Guide for Vertical Bracing Connections* (2009) treats many types of bracing connections and loadings. This paper, part of which is abstracted from the original *Design Guide*, presents two rational state-of-the-art treatments of the potential distortional forces induced by large seismic drifts.

In the first, the distortional forces are controlled by a beam hinge and in the second, they are controlled by work point location and detailing to prevent binding.

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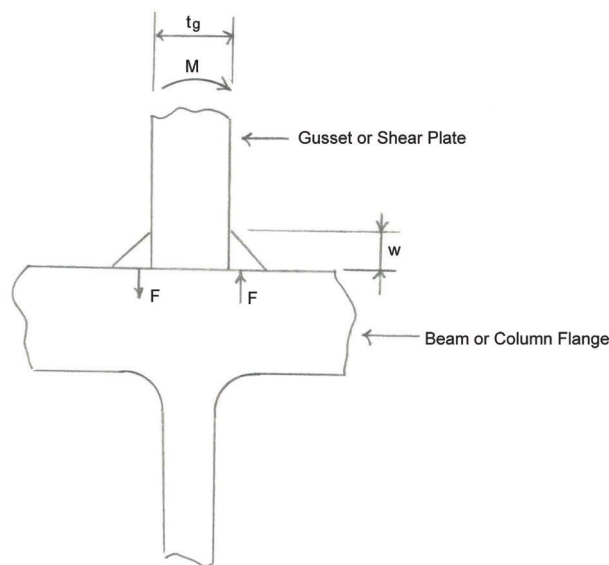


Figure 9. Section of Gusset or Shear Plate and Beam or Column

### References

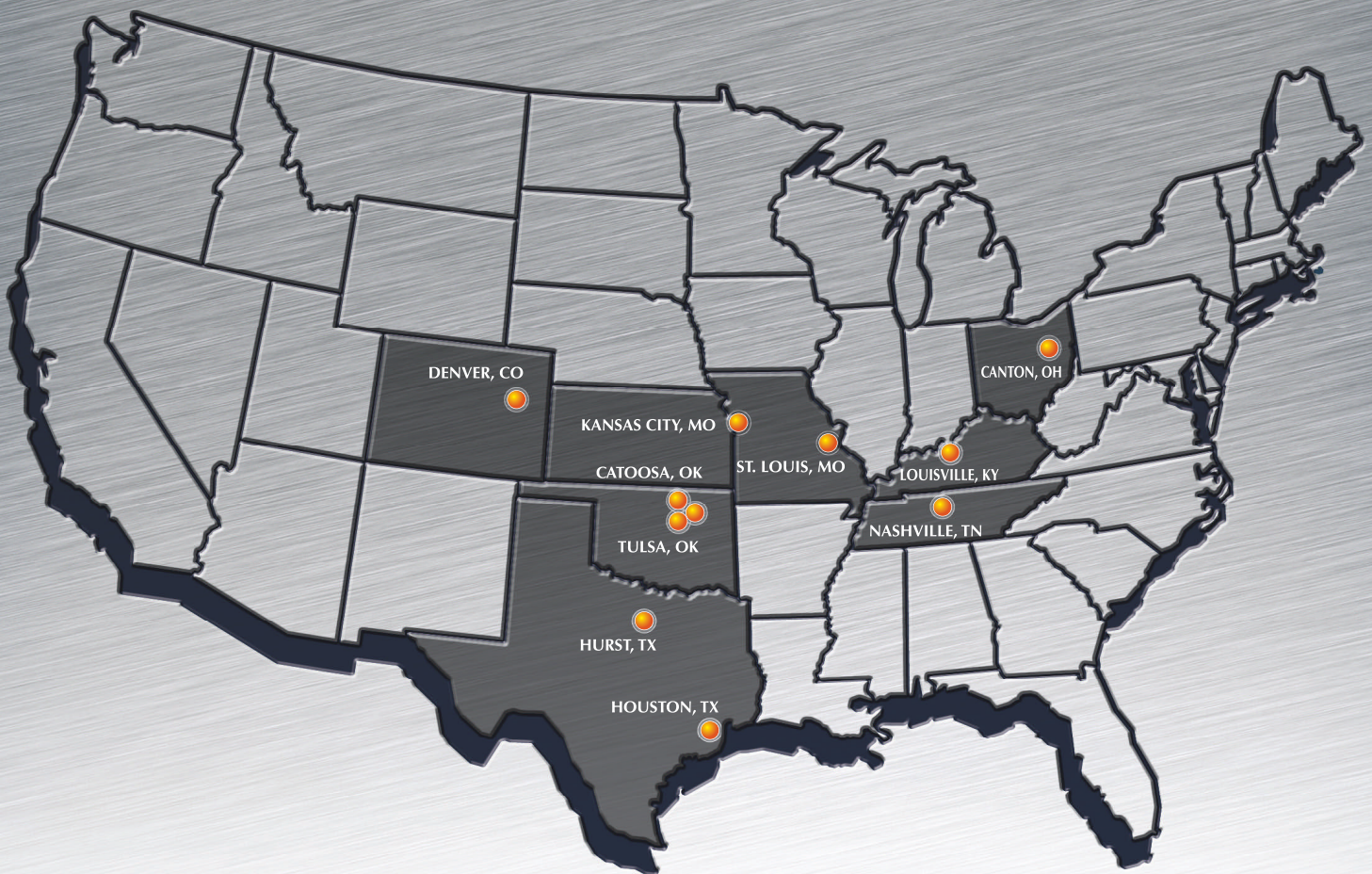
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# Steel Bridge NEWS

MARCH 2009



Photos courtesy of WYDOT

## Up and Running in No Time

BY GREGG FREDRICK, P.E.

**A severely damaged Wyoming highway bridge gets back on track within a matter of months.**

**WHEN A NORTHEAST WYOMING HIGHWAY BRIDGE** was damaged by a truck on May 13 of last year, not only were travelers faced with a long detour but also the nation's most productive coal mine was cut off from a loading facility for the trains that carry its coal to power plants around the country.

Faced with this dilemma, the Wyoming Department of Transportation (WYDOT) and Thunder Basin Coal Co. cooperated to remove the damaged bridge, build a temporary bridge, and get the highway and coal road reopened in 18 days. They also worked with Roscoe Steel and Culvert of Billings, Mont. and contractor Reiman Corp. of Cheyenne, Wyo. to get a new permanent bridge fabricated and built in just 135 days.

Wyoming Highway 450 (WYO 450) passes through the coal-rich Powder River Basin, crossing over a haul road for Thunder

Basin's Black Thunder Mine, one of the nation's leading coal producers; the 86.2 million tons of coal the mine shipped in 2007 was nearly 9% of the nation's total supply.

The damaged bridge, about 12 miles southeast of Wright, Wyo., was a simple composite-steel welded-plate-girder span with a back-to-back abutment length of 90 ft and a clear bridge roadway width of 32 ft. The bridge's exterior girder had been pulled from the deck and both bearings, ending up on the abutment slope perpendicular to the bridge's centerline. The second interior girder was severely damaged as well, and many of the intermediate cross frames were distorted. The south edge of the deck deflected approximately 2 ft, but the bridge's abut-

A bridge on Wyoming Highway 450 sustained severe damage last May (above) but was back in commission by September (inset).





This 140-ft portable prefabricated modular steel truss bridge replaced the damaged span and allows for two lanes of traffic.

ments and retaining walls were undamaged.

WYDOT inspectors found the damage too severe to allow traffic to continue using it, and the Mine Safety and Health Administration wouldn't allow mine trucks to pass beneath it. WYO 450 carries an average of 1,800 vehicles a day, and the best available detour around the damaged bridge was 32 miles long and included unpaved county roads.

Worse yet, the mine's haul trucks were no longer able to get across the highway to a

train-loading facility. The enormous trucks carry up to 320 tons of coal in a single load, enough to heat an average-sized home for more than 40 years, and they hauled as many as 300 of those loads under the highway every day. Thunder Basin shifted production to a portion of the mine on the other side of the highway, but with more than 100 power plants in 20 states depending on the mine for a steady supply of coal, it was important

to get the haul road back in service as quickly as possible. "It was evident that the most expeditious and cost-effective repair strategy would be to remove and reconstruct the entire superstructure," said Keith Fulton, WYDOT's assistant state bridge engineer.

On the day the bridge was damaged, WYDOT sent the plans of the circa-1970 superstructure details, required plate sizes, and notice to proceed for purchasing steel to Roscoe Steel.

Three days later, hydraulic excavators from Black Thunder Mine removed the damaged bridge deck and girders in about four hours. At the same time, WYDOT was beginning the design and details for the bridge replacement.

On May 19, WYDOT's maintenance crews began constructing a 140-ft portable prefabricated modular steel truss bridge manufactured by Acrow Corp. in Pennsylvania. The two-lane bridge is strong enough to carry highway loads due to its triple-single reinforced three-heavy side truss configuration. "The Acrow bridge is great," said Barry Bowersox, WYDOT's area maintenance supervisor. "It goes up quickly, it's strong, and it allows for two lanes of traffic."

With the aid of Acrow and cranes provided by the mine, the bridge was lifted into place and set on concrete footings behind the bridge abutments. Thunder Basin provided timbers for the back wall and hauled the material for the approach roadway. WYDOT maintenance crews placed and surfaced the approach ramps and bridge deck. By May 31, just 18 days after the bridge was damaged, the temporary bridge was opened to traffic and coal trucks began rolling underneath the highway again.

Roscoe had contacted mills around the country and found Chappell Steel had the required plates available for immediate shipment. They arrived in Billings 10 days after the order was placed. Roscoe used its in-house detailing staff to produce shop drawings, while WYDOT completed the field reviews, design calculations, and project plans.

"Utilizing our in-house detailing staff saved a significant amount of time" said Craig Jensen, Roscoe's bridge manager of 13 years. "Our detailer was familiar with the WYDOT shop drawing presentation and fabrication requirements."

Sending the shop plans as electronic files allowed instant access and afforded a quick review and approval of the shop drawings, said Paul Cortez, WYDOT's bridge inspection engineer. The bridge was originally constructed with weathering steel but because it was not readily available, the replacement girders were

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WYO 450 carries an average of 1,800 vehicles a day, and the best available detour around the damaged bridge was 32 miles long.

fabricated from ASTM A709 Grade 50 steel. The four girder lines were each 87 ft, 8 in. long, with K-type cross frames fabricated from angles. Fabrication began on June 13 and by the end of June, the girders and cross frames were painted and ready for delivery.

"This was not a typical project for us, and to be part of the team to help out in this situation was an opportunity we were glad to have," Jensen said. "There were some fortunate circumstances that made it possible, including an unexpected opening in our shop, the mill having the plates we needed in stock, and our working relationship with WYDOT."

WYDOT State Bridge Engineer Gregg Fredrick agreed, saying, "Our past relationship with Roscoe Steel and our confidence in their detailing and fabrication staff's abilities made it an easy decision to allow them to proceed with minimal information."

As contract plans were being developed, Thunder Basin built an at-grade detour crossing the mine's haul road, to be used when the temporary bridge was removed for construction of the replacement superstructure. WYDOT maintenance crews surfaced the detour.

On July 17 the Wyoming Transportation Commission awarded a \$473,000 contract to Reiman Corp. for construction of the new bridge superstructure, concrete deck, and approaches. The contract required work to be done by Oct. 15 and, once the temporary bridge was removed, work to proceed continuously until the new bridge opened to traffic.

After Reiman took delivery of the structural steel, stay-in-place deck forms, reinforcing steel, and bridge railing, Thunder Basin cranes removed the temporary bridge on Aug. 7 and traffic was routed onto the detour. The intersection of the detour and coal haul road was signalized, and the mine

provided a safety officer there around the clock to make sure traffic moved smoothly.

On Aug. 18 Reiman began erecting the girders, and by Sept. 26 the new bridge was opened to traffic, just 4½ months after the original bridge was damaged and 19 days ahead of schedule.

"Everything came together quickly," said Josh Jundt, the WYDOT resident engineer who oversaw the construction. "It all just clicked."

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*Gregg Fredrick is WYDOT's state bridge engineer.*

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The entertainment hot-spot of Branson, Mo. receives millions of visitors per year, prompting a second bridge over the White River to better accommodate their comings and goings.



Photos courtesy of APAC

# Twice as Nice

BY MICHAEL BANASHEK, P.E., S.E.

**THE INCREDIBLE GROWTH OF BRANSON, MO.** as a leading tourist destination in the Midwest has led to increased traffic congestion on roads into and out of the city. Branson's pairing of outdoor recreation and big-time entertainment attracts more than seven million visitors a year to a town with a population of around 6,000.

An existing two-lane bridge over the White River (Lake Taneycomo) connecting the cities of Hollister and Branson was simply no longer adequate. This developing need prompted the Missouri Department of Transportation (MoDOT) to build a new two-lane companion bridge for U.S. Route 65. The companion crossing is located just east of the existing structure and carries two lanes of northbound traffic, and the existing bridge was reconfigured to carry two lanes of southbound traffic. A limited funding window and compressed construction schedule resulted in the need for an accelerated design schedule. As

such, final plans and specifications were completed within three months.

## Built to Match

Route 65 traverses the White River, which acts as the southern border for Branson. The existing bridge is on a vertical sag curve to accommodate high bluffs on each bank. The four-span 823-ft-long structure also crosses Sunset Road and Wilshire Drive, which provide access to homeowners along the river in the project's vicinity. The span arrangement for the new structure was selected to match the existing bridge. The two main spans are 230 ft in length and the bents were skewed at 20° to match the river's flow.

The new bridge's girders feature 108-in. x ¾-in. web plates, and maximum flange sizes over the piers are 24-in. by 2-in. plates.





The two main spans are 230 ft long, and the bents were skewed at 20° to match the river's flow.

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The new bridge accommodates a 46-ft-wide roadway and consists of five continuous steel plate girders. The girders are designed composite for live load with a 9-in. concrete slab, and 3½-in.-deep composite precast concrete deck panels were used as stay-in-place elements for the slab. ASTM A709 Grade 50 weathering steel was used to reduce maintenance and eliminate the need for costly painting. The girders feature 108-in. x ¾-in. web plates, and maximum flange sizes over the piers are 24-in. by 2-in. plates. Splices are located to produce 120-ft-long girder pieces weighing 55,000 lb each. Total structural steel used on the project was 1,016 tons, and total cost of the finished bridge was \$4.7 million.

Numerous construction constraints were established in the specifications due to heavy recreational boat traffic on the White River. The design plans included a Boat Traffic Control Plan, which located buoys identifying "Keep Out" and "No Wake" zones. APAC, the contractor, had to maintain a minimum 150-ft-wide channel for watercraft during construction.

Because MoDOT had concerns about sudden water level variations due to the presence of an upstream dam at Table Rock Lake, barge construction was specified in lieu of a causeway. The 10- to 20-ft channel depth would have required significant rock placement for a causeway and further supported this decision. Barges were not allowed to tie off to the existing bridge—instead they were spudded to the river bottom.

Additional constraints also limited construction activity from the existing Route 65 structure. Lane closures on the existing bridge were minimized due to concerns about heavy traffic on the existing bridge and safety concerns for motorists. APAC was allowed to work from the existing bridge deck for concrete pumping operations for the drilled shaft foun-





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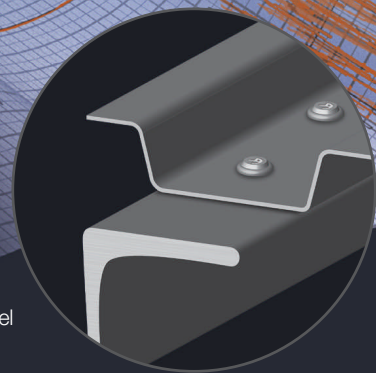
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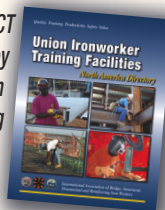
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The span arrangement for the new bridge was selected to match the existing one.

dations. In addition, steel girders were unloaded from trucks parked on the old bridge and lifted off by cranes in the river. Other heavy equipment on the existing structure, however, was prohibited.

APAC also devised a means of temporarily bracing the first new bridge girder off of the existing structure during erection. A steel wide-flange beam was used as a compression strut between the girder top flange and the existing bridge's edge of deck. Rubber mats protected the existing concrete deck from damage, and the girder flange was then hooked with a steel chain. The chain was tightened and secured to the companion bridge, effectively keeping the girder from tipping over during erection.

**MSC**

*Michael Banasbek is the assistant structural department manager with Horner and Shifrin, Inc.*

### **Owner**

Missouri Department of Transportation (MoDOT)

### **Designer**

Horner and Shifrin, Inc., St. Louis

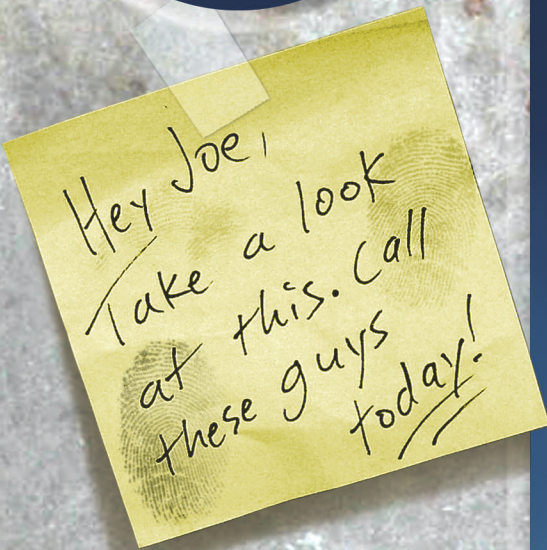
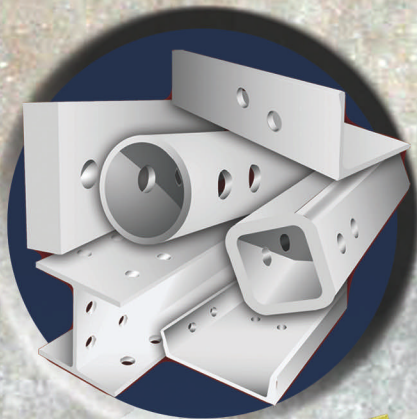
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Stupp Bridge Company, St. Louis (AISC/NSBA Member)

### **General Contractor**

APAC-Missouri, Inc., Columbia, Mo.





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# Wide River

BY STUART S. NIELSEN, P.E.

A new steel bridge in southeast Iowa is the latest in a line of crossings at this wide, flood-prone portion of the Des Moines River.



The iconic 1930s bridge, which the new Keosauqua bridge replaces, cost a mere \$86,000.

Photos: Courtesy of Iowa DOT



The new bridge is 680 ft, a bit longer than its 614-ft predecessor above.

**THE FIRST ATTEMPT** to bridge the wide Des Moines River near the picturesque town of Keosauqua, in southeast Iowa, commenced in 1850. But the project was abandoned in 1851 when a portion of the wooden span fell into the river. (A ferry was used to cross the river prior to and following the bridge's construction and demise.)

In February 1873, the Van Buren County Supervisors contracted with the Wrought Iron Bridge Company of Canton, Ohio to initiate construction of a major wagon bridge over the river at Keosauqua. This bridge fared better than its predecessor and was completed by that fall. The four-span, bow-string arch bridge featured three limestone piers, a wooden plank deck, and a posted sign that read: "Eight dollars fine for riding or driving faster than a walk across bridge." The bridge performed well for 65 years but eventually outlived its usefulness, proving too narrow for more modern vehicles and heavier loads.

In 1938, the Iowa State Highway Commission designed a new bridge, using the original (widened) stone abutments and piers of the 1873-built structure. Modern for its time, the steel truss bridge consisted of a 24-ft-wide roadway and two 5-ft-wide cantilevered sidewalks. The structure was completed in 1939 at a cost of \$86,141. The 1,039 trusses were technologically significant for their uncommon Warren web configuration. It is not known how many bridges of this design were built in Iowa, but the Keosauqua bridge is the only known polygonal-chorded Warren, and as a result was named to the National Historic Register in 1998.

The 1939-built bridge lasted longer than both of its predecessors but in early 2003, it was determined that the





More than 800 tons of structural steel was used in the construction of the bridge.



The welded plate girders range in depth from 6 ft at the center of the spans to close to 12 ft at the piers.

structural integrity of the truss was rapidly declining. Hence, a new Keosauqua bridge would have to be built.

### Detour not an Option

For a typical bridge replacement, an engineer can theoretically design a new structure without leaving the confines of his or her office. But this wasn't an option for the Keosauqua crossing because of the bridge's historic value and unique surroundings. Designers for the new bridge spent a great deal of time on-site to get a feel for the local landscape and the historical significance of the crossing. The 1939 structure was located in the heart of Keosauqua and provided a path across the river to the 1,653-acre Lacey Keosauqua State Park, one of Iowa's largest state parks and a year-round destination for tourists. It had survived numerous floods and was considered one of the scenic high points for those paddling on the river.

The first step in the process of replacing the truss bridge was meeting with the citizens of Keosauqua. The Iowa Department of Transportation (IDOT) held a series of town meetings to gauge the needs and desires for the new bridge. Aesthetics was high on the list of concerns but other

issues, such as traffic staging, also had a major impact on the concepts for the new bridge. From a practicality standpoint, closing the existing bridge's roadway would have required a 22-mile detour and was therefore deemed unacceptable. Besides creating a major inconvenience for motorists, cross-river access via the bridge was required for school buses and emergency vehicles.

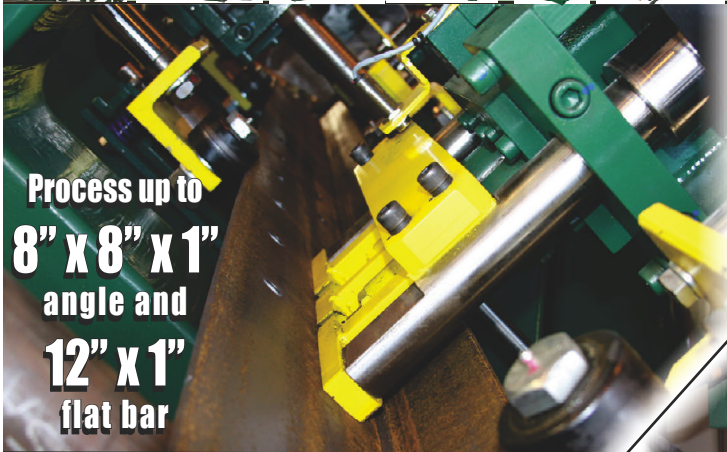
A bridge committee of local citizens and officials was formed to help guide the design of the new bridge and eventually decided on a girder-style bridge. While this would be the easiest style of bridge to stage, it was quite a change for the residents to go from a towering, above-deck structure to a lower, more subdued design.

### Three Spans

A three-span variable-depth weathering steel girder bridge was chosen for the replacement. The first stage was built along side of the existing truss bridge, using a three-girder cross section, allowing the existing truss to carry traffic. This also had the benefit of allowing residents to view the construction of the new bridge from the sidewalk of the old bridge.

Two lanes of traffic were then placed on the new bridge, the old bridge

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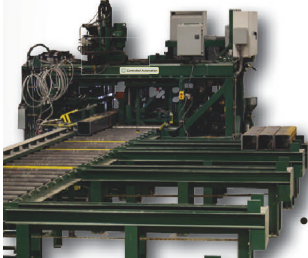
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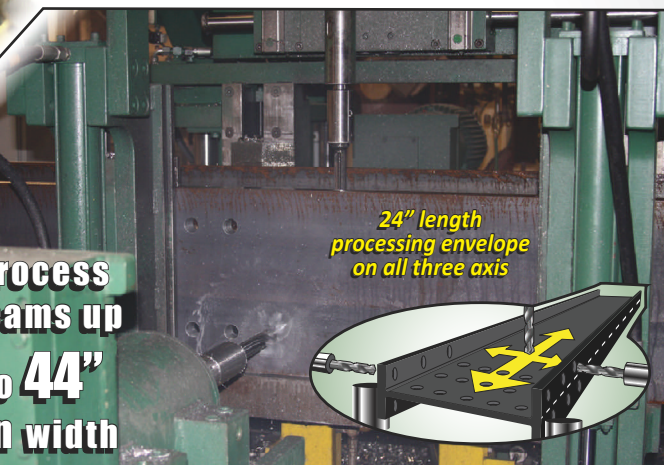


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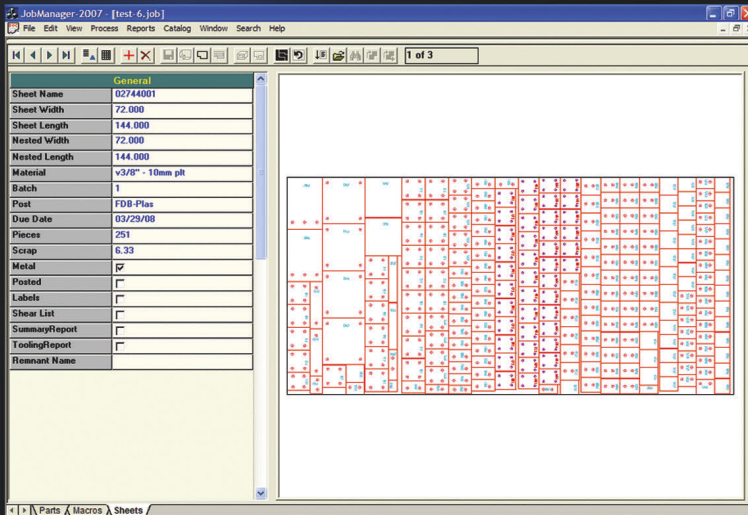
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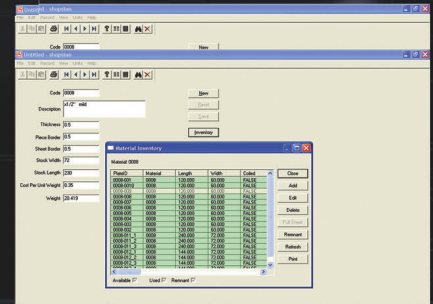
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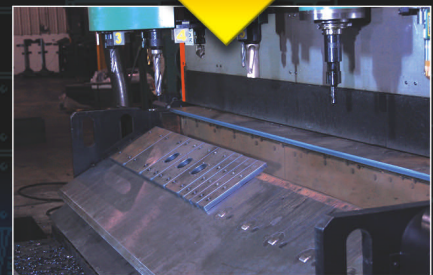
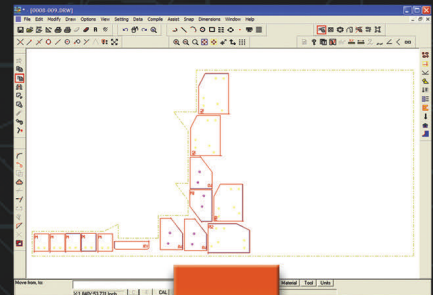
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The bridge includes a 32-ft-wide roadway, a 5-ft-wide sidewalk, and a 10-ft-wide bicycle path.



was demolished, and then the new bridge was widened to its final width by adding an additional two girders. This scenario allowed for two lanes of traffic to flow for the majority of the construction period, easing concerns of long traffic detours.

The new Keosauqua bridge has a five-girder cross-section, spaced at 11 ft, 7 in., with two 210-ft end spans and a 260-ft center span, making the new bridge 680 ft long in all, slightly longer than the 614-ft truss bridge. A 32-ft-wide roadway was chosen to reduce costs and help with traffic calming of vehicles coming down from a hill on the south end of the bridge. The bridge also features a 5-ft sidewalk and a 10-ft-wide bike path.

The welded plate girders range in depth from 6 ft at the center of the spans to close to 12 ft at the piers. Fabricated by the Stupp Bridge Company in Bowling Green, Ky., they were shipped by truck in 120-ft segments to the bridge site. More than 800 tons of structural steel was used in the construction of the bridge.

Aesthetic features of the bridge include two overlooks on the east side of the bridge, custom railings, and dramatic piers. The piers and abutments use form liners to mimic limestone and were painted using high-quality stains. Stones rescued from the limestone piers of the old truss bridge top the new pier towers, allowing visitors to actually reach out and touch the past. In fact, the old limestone piers were also reused as revetment to dress the shoreline around the new abutments.

The design team received a "Best Practices in Context-Sensitive Solutions, Notable Practice" award from the American Association of State Highway and Transportation Officials (AASHTO) in 2006 for the project. Construction was completed last fall. **MSC**

*Stuart S. Nielsen is a transportation engineer specialist with the Iowa Department of Transportation's Office of Bridges and Structures.*

#### Bridge Designer

Iowa Department of Transportation,  
Office of Bridges and Structures

#### Steel Fabricator

Stupp Bridge Company, Bowling Green,  
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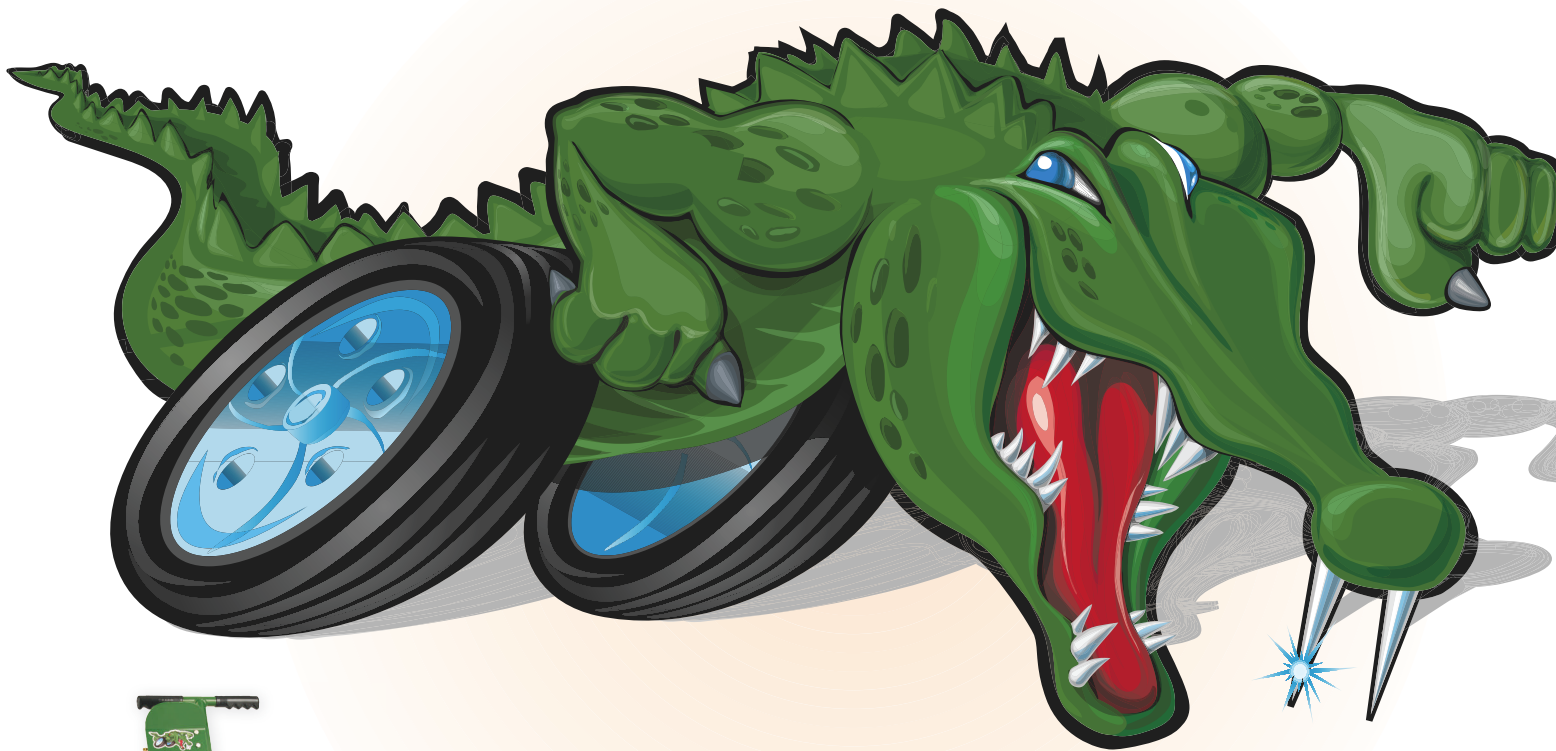


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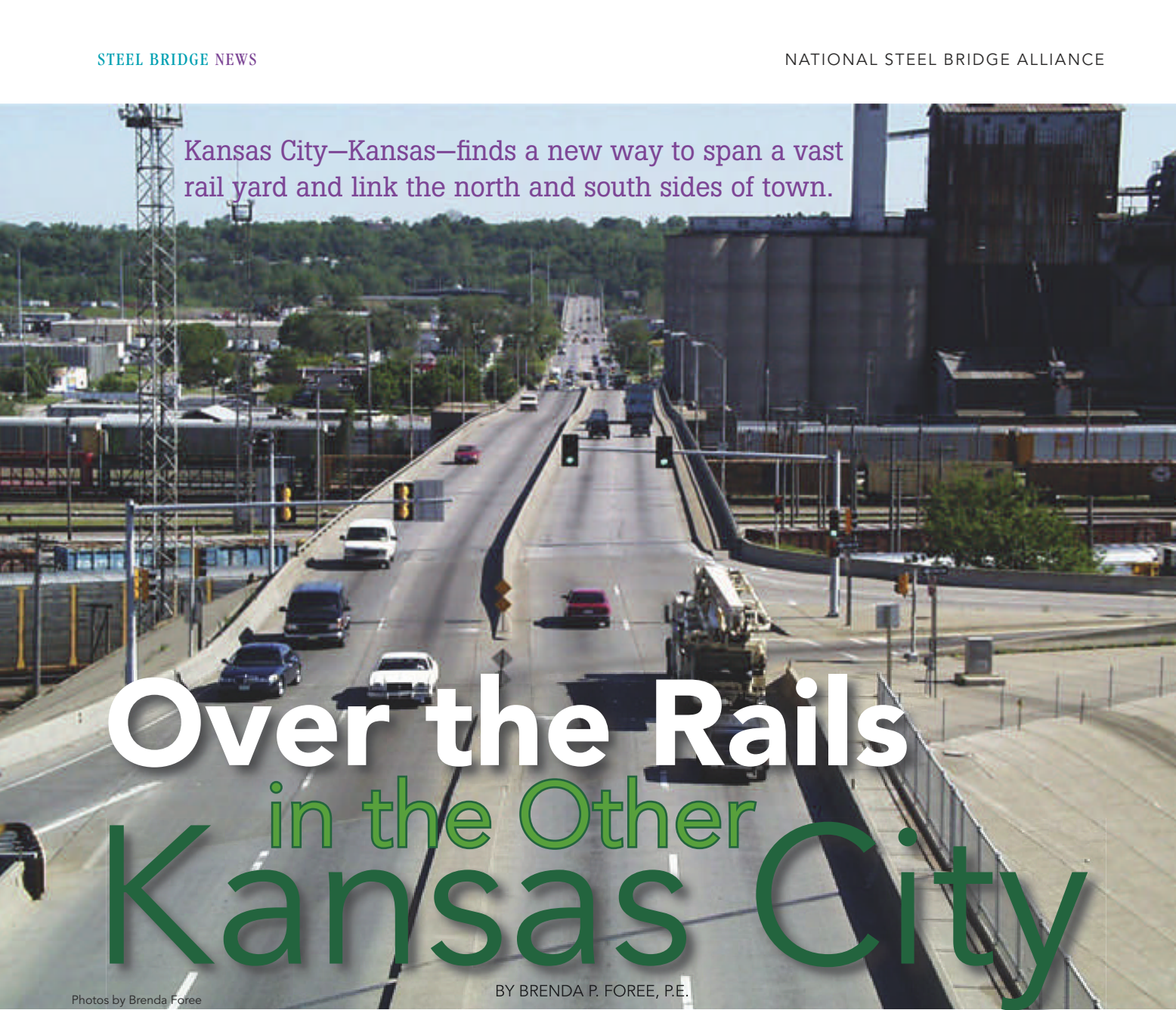


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Kansas City—Kansas—finds a new way to span a vast rail yard and link the north and south sides of town.

# Over the Rails in the Other Kansas City

Photos by Brenda Foree

BY BRENDA P. FOREE, P.E.

**THE U.S. 169 (7TH STREET) BRIDGE** in Kansas City, Kan. accomplishes quite a lot for just one bridge. Located between Kansas Avenue and Interstate 70, it spans over several Union Pacific Railroad and Kansas City Terminal Railway tracks. It serves as a primary route to the University of Kansas Medical Center - Kansas City from north of I-70. And above all, it provides a vital link between the north and south sides of town.

The original 34-span structure was designed in the early 1920s by Harrington, Howard and Ash Consulting Engineers, a predecessor of HNTB Corporation; construction was completed in 1924. To accommodate the Muncie Expressway (I-70) construction in 1959, the north five spans were buried, shortening the structure to 1,450 ft. The bridge was widened from two to four lanes in 1972.

## Rehab Time

By the late 1990s the aging bridge was at a proverbial and literal crossroads. The Kansas Department of Transportation (KDOT) contracted with HNTB in 1999 to perform a discovery phase study to evaluate repair, rehabilitation, and replacement options for the bridge. The study was completed in 2003 and established

design criteria, scope of construction improvements, and construction cost estimate; the resulting recommendation was to replace the entire bridge.

Prior to the beginning of the study, KDOT had authorized funds to replace the bridge's reinforced concrete deck girder spans only—approximately 40% of the bridge. The remainder of the bridge would remain and consisted of two spans of continuous welded structural steel plate girders and nine simple spans of riveted structural steel plate girders. The study estimated the bridge replacement cost at \$21.1 million.

HNTB completed final design and bid plans for the replacement bridge in early 2006 and the project was let for construction in September 2006, with a target completion date of December 2008. General contractor Hawkins Construction Company built the bridge's south unit and subcontracted the construction of the north unit to United Contractors, Inc.

## Features, Constraints, and Improvements

The replacement structure is a 10-span two-unit steel plate girder bridge and is designed to carry current AASHTO live load, HL-93.





The new 7th Street bridge in Kansas City, Kan. is a 10-span two-unit steel plate girder bridge.



The new bridge provides the required 23-ft 6-in. minimum vertical clearance over the below railroad tracks.

The bridge's typical section consists of northbound and southbound 30-ft-wide roadways, with a 5-ft 6-in.-wide sidewalk located on the west side of the structure. Pedestrians are separated from the southbound roadway by a 42-in.-tall concrete safety barrier. The middle one-third of the bridge tapers out to provide for 650 ft of southbound left turn storage for Kansas Avenue at the south end of the bridge. The total length of the new bridge is 1,464 ft.

The numerous railroad tracks, existing bridge foundations, and an existing sanitary sewer provided limited locations for the new bridge foundations and added complexity to the design and construction of the bridge. The number of piers in the new bridge (nine) was reduced substantially from the existing 28 piers. The continuous movement of rail cars had to be accommodated during existing bridge demolition and new bridge construction.

Span lengths in the south unit are 110 ft, 125 ft, 165 ft, 180 ft, and 126 ft, while spans in the north unit are 160 ft, 160 ft, 151 ft, 136 ft, and 146 ft. The south five piers are not skewed, but the north four piers are skewed from 10° to 26°, resulting in girder lengths that vary by as much as 10 ft in one span.

Structural steel plate girders were chosen as the preferred structure type early in the preliminary design process due to the variable structure width, unbalanced spans, and span lengths up to 180 ft. An additional benefit of structural steel is reduced dead load and corresponding lower substructure and steel pile foundation costs.

The girders are composite, with concrete deck throughout. The partially stiffened webs are 48 in. deep in the south two spans and 66 in. elsewhere. Grade 50 unpainted weathering steel was chosen to minimize future maintenance costs, and the girders are painted only at unit ends, adjacent to expansion joints.

The bridge's vertical profile is constrained by the Kansas Avenue intersection on the south, the railroad tracks, and the I-70 bridge on the north. The existing profile proceeds north from Kansas Avenue at a positive grade of 5.53%. Although this steep grade could not be reduced on the new bridge, the profile was lowered to keep standard slopes within existing right-of-way and to meet the desired design speed criteria of 50 mph. The new profile eliminates the "dip" at the abandoned railroad depot, increasing stopping sight distance and design speed. Steel handrails are provided on each side of the sidewalk to meet ADA requirements.

The new bridge provides the required 23-ft 6-in. minimum vertical clearance over the below railroad tracks, eliminating the existing bridge's substandard vertical clearances at ten of the tracks. Barriers, fences, and pier collision walls meeting current American Railway Engineering and Maintenance-of-Way Association

(AREMA) criteria are provided.

Besides the typical site constraints, the bridge was also required to stay within spatial boundaries set by agricultural infrastructure: The horizontal alignment is constrained by the Archer Daniels Midland (ADM) grain elevators located within 6 in. of the west fascia of the original bridge. The baseline of the new bridge is shifted slightly east of the existing U.S. 169 centerline to avoid impacts to the ADM elevators and to better align with the I-70 bridge north of the project and with the lanes south of Kansas Avenue. The alignment provides improved right turn radii at the I-70 entrance and exit ramps at the north end of the bridge.

In order to maintain one northbound and one southbound lane during construction, the existing structure was removed and the replacement bridge built in two phases. The east portion of the new bridge was completed in 2007 while traffic used the west half of the existing bridge. During 2008, traffic was shifted to the east portion of the new bridge while the west portion was being constructed. Erecting the phase 2 girders in the south unit between the grain elevators and the phase 1 girders presented a tight window for construction. As such, girder erection began at the south abutment and proceeded northward using the previously erected structure as a platform.

The bridge opened on time last December, providing an up-to-date structure for the vital link between north and south Kansas City, Kan.

MSC

*Brenda P. Foree is a project manager with HNTB Corporation.*

#### **Owner**

Kansas Department of Transportation

#### **Designer**

HNTB Corporation, Overland Park, Kan.

#### **Steel Fabricator and Detailer**

DeLong's, Inc., Jefferson City, Mo. (AISC/NSBA Member)

#### **General Contractor for South Unit**

Hawkins Construction Company, Omaha, Neb.

#### **Subcontractor for North Unit**

United Contractors, Inc., Johnston, Iowa



## Back to the Basics

BY JIM WARREN

**The traditional concept of apprenticeships and internships is one answer to the skilled labor shortage.**

**EVEN IN THE CURRENT ECONOMIC CLIMATE**, manufacturers across the country—regardless of size, specialty, or location—are reporting a dire shortage of skilled workers such as welders, fabricators, laser operators, electricians, press brake operators, and machinists.

To illustrate, a survey of the Fabricators and Manufacturers Association, International's (FMA) members conducted recently revealed the biggest challenge they face is the dwindling supply of skilled workers, cited by some 40% of those polled, far surpassing other concerns.

The annual talent shortage survey by Manpower, Inc. on the 10 most difficult jobs to fill corroborates the FMA's findings. The poll states that engineers, machinists, and skilled trade workers were the three positions most challenging to fill in 2008.

It may surprise many that one resolution to this shortage, and a tactic to attract the next generation of workers, is a concept employers have used for centuries: the apprenticeship and its cousin, the internship. Their value has never been so significant and appreciated; young people are exposed to the exciting opportunities in manufacturing while companies have a chance to recruit, evaluate, and hire needed employees.

Two firms exemplify how to leverage this strategy: Midwest Metal Products, a precision sheet metal fabrication company based in Cedar Rapids, Iowa, and BEGNEAUD Manufacturing, a precision sheet metal job shop located in Lafayette, La.

### Internships: A Gateway to the Future

Midwest Metal Products has employed high school students for several years through a paid internship program, with the ultimate goal of getting interns to work for the company full-time after they complete schooling.

During the 2007-08 school year, Midwest Metal employed two students who worked part time and attended classes in the press brake department at the local trade school, Kirkwood Community College. Based on the success of the program, Midwest Metal has increased the number of interns at the plant each year.

"You can't beat on-the-job training coupled with classroom training," said Bob Burgin, plant manager at Midwest Metal. "These students learn valuable skills throughout the year and oftentimes become full-time employees at our plant."

BEGNEAUD offers a summer internship program for both high school and college level students. The company works in liaison with the local schools to create a custom-

ized program for each student's specific area of study.

"We typically employ three interns per summer, and past students have participated in a variety of niches at the company, including engineering, industrial technology, IT, marketing, mechanical engineering, and even product design," said Andrée Begneaud, co-owner of BEGNEAUD.

The company also offers an internship exchange program. Last May, a trade student from France worked on an assigned project to identify international businesses that might be interested in working with BEGNEAUD.

"Like many in the industry, finding skilled labor and retaining employees are major concerns for our company," said Begneaud. "We're always short of welders/fabricators because it's a constant skill-building position, and we also seek workers who operate press brakes, cut with saws, and work with hand tools."

"The internship is designed to get more young people interested in working at our company while fulfilling their educational requirements," she added.

### Learning by Mentor

To further meet the demand for skilled labor, some employers encourage apprenticeships as a means of encouraging prospective employees and young people to enter the field. Others issue signing bonuses and incentives to skilled workers trained in apprenticeship programs.

Midwest Metal offers an apprenticeship program to as many as three local high school students per year through a program developed through the Iowa Department of Labor (DOL).

"The apprenticeship program is another pipeline to our future workforce," said Burgin. "The mentors provide these students a wealth of knowledge gained over the years and 'hands-on' training in a real-world environment."

BEGNEAUD also offers an in-house apprenticeship program that introduces employees to every metalworking process at the company on a rotating basis. Currently, four employees are involved in an apprenticeship and partner with an experienced operator or skilled craftsman mentor for three months for each specific practice.

"This initiative gives individuals the opportunity to experience all of the processes at our company and instills a well-rounded knowledge of our operation," said Mark Faul, apprentice trainer with BEGNEAUD. "It helps identify the area in which they excel so we can guide them in that direction and then ultimately offer a position at the company."



### Advanced Apprenticeships

Based on the success of the in-house apprenticeship, BEGNEAUD Manufacturing has developed a registered apprenticeship program with the Louisiana DOL similar to the in-house program but more structured. This paid program consists of 2,900 hours learning all of the different processes at the company and 155 hours of classroom instruction. It must be completed within 2½ years.

"Not only do we compensate the apprentices but they also are eligible to re-

ceive a grant from the state government," said Paul Bihm, apprenticeship program coordinator with BEGNEAUD. "Upon successful completion, employees will receive a certificate from the DOL for passing the course, and we will have the first opportunity to employ them."

To develop the program, Bihm reviewed several current apprenticeship courses and reviewed the National Institute of Metalworking Skills program for guidance in designing the apprenticeship.

Bihm then submitted a summary of

the curriculum to the Louisiana DOL and worked with a compliance officer to receive approval to commence. The first session, which includes two apprentices, began in early February.

"This program is the first advanced manufacturing apprenticeship in Louisiana, and state officials are enthusiastic about our offering," said Bihm. "By establishing a registered program that complements our long-standing in-house apprenticeship program, we are creating a win-win for both Louisiana and for BEGNEAUD."

"We also are featured on a student-accessible database that lists companies offering apprenticeship programs throughout the country, so young people can research our program and apply if interested," he added.

### Reaching Educators and Students

Reaching prospective interns and apprentices is half the battle. Education priorities today rarely position manufacturing as a preferred career choice. This is one conclusion reached by the U.S. Department of Labor when one of its economic reports stated, "Too few young people consider manufacturing careers and often are unaware of the skills needed in an advanced manufacturing environment. Similarly, the K-12 system neither adequately imparts the necessary skills nor educates students on manufacturing career opportunities."

Burgin agrees. "Our biggest challenge is getting high school counselors and principals to realize that manufacturing is a viable option for these students," he said. "For some reason, manufacturing is not a good buzz word in the schools."

"At the same time, parents don't want their kids working in manufacturing environments," said Burgin. "Yet, as high school students tour our clean, modern factory, they are thrilled to see the futuristic lasers and robotics."

Burgin believes that the industry as a whole can improve its labor prospects by reaching out to local schools.

"If more companies partner with schools and arrange factory visits that lead to apprenticeships and internships, the word will spread," he said. "Students don't come looking for us. We need to reach out and help them realize they can operate the most advanced, sophisticated equipment in the world at a highly competitive wage." **MSC**

*Jim Warren is FMA's director of education.*

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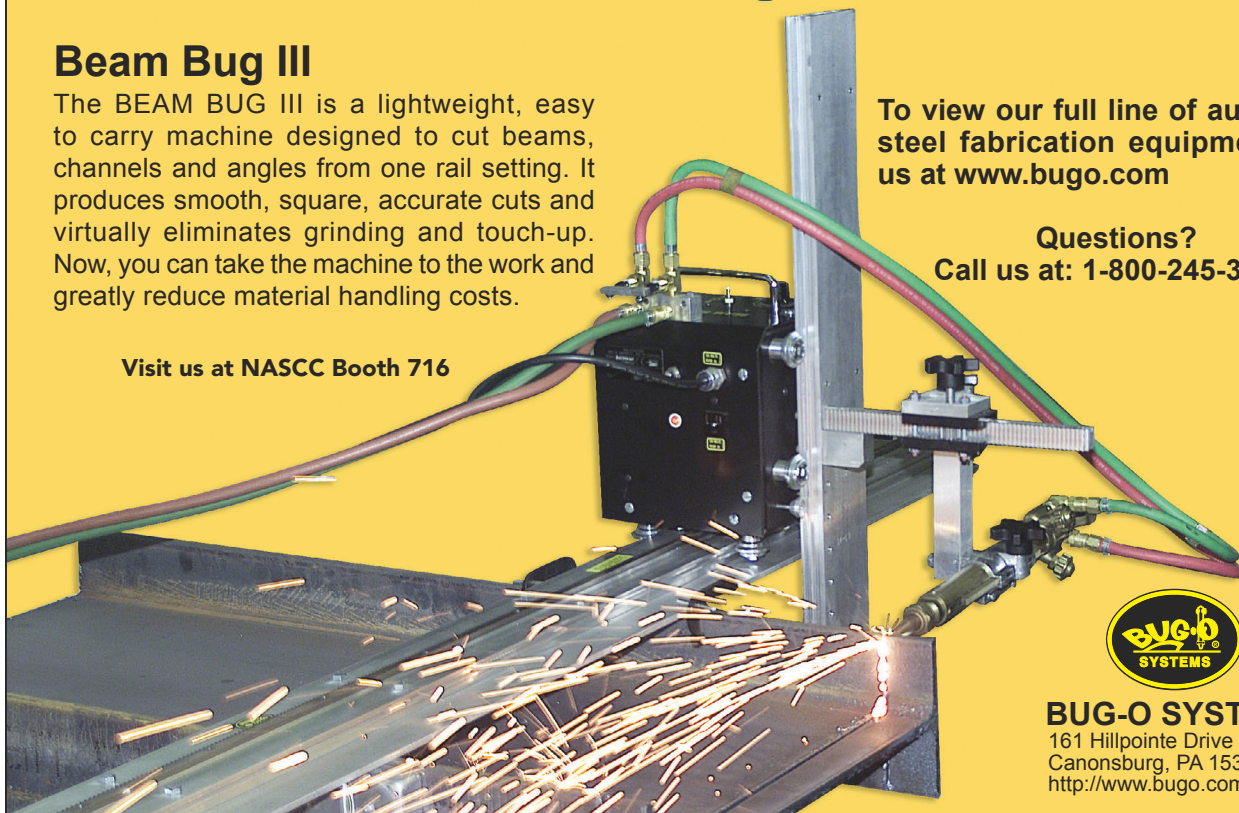
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## Setting S.M.A.R.T. Goals

BY PAT THOMASHEFSKY

*This intelligent acronym can set you on the path to quality success.*

**UNFORTUNATE OUTCOMES ARE TOO OFTEN** the product of hard work. Climbing the corporate ladder is only rewarding when it's leaning against the right building. Setting goals and objectives is an essential ingredient in a successful quality management system and is integral to AISC's certification programs—and such goals are best developed carefully to avoid less-than-satisfactory outcomes.

What is the difference between a goal and an objective? Goals are often thought of as visions or the “grand plan” whereas objectives define strategies. The two terms are often used interchangeably or together to define a purpose.

Many successful businesses use “S.M.A.R.T.” goals and define objectives to meet them. The acronym S.M.A.R.T. has a number of different variations, all of which can be used to provide a more comprehensive definition for the development of goals and objectives:

### **S - Specific, Significant, Stretching**

Goals should be straightforward and emphasize what you want to happen. They should signify what you are going to do, why you are doing it, and how you plan to do it. A goal should be achievable *and* spark action and real commitment.

### **M - Measurable, Meaningful, Motivational**

If you can't measure it, you can't manage it! It's as simple as that. Goals should be meaningful to you and motivate action. Establish criteria for measuring progress toward attainment of each goal and objective. When you measure your progress, you stay on track, reach your target dates, and experience the motivation that spurs you on to continued success.

### **A - Attainable, Acceptable, Action-Oriented**

When you identify goals that are important to you personally, you figure out ways to make them happen. Develop the attitudes, abilities, and the acceptance to accomplish your goals within your company. This process also uncovers previously overlooked opportunities to attain these goals.

### **R - Realistic, Relevant, Reasonable, Rewarding, Results-Orientated**

Keep in mind that realistic is not a synonym for easy. Goals should be attainable, but with some effort. If the goal is too difficult then you set the stage for failure but if it isn't demanding enough, it sends the message of low importance. Therefore, the learning curve should not be a vertical slope. Rather, form your goals with results in mind. Make them rewarding and relevant to your business.

### **T - Time-Based, Timely, Tangible, Traceable**

Always set a time frame; a long-range goal should have measurable milestones. Putting an endpoint gives a clear target. If you don't set a timeline, the commitment is too vague. Or, it tends not to happen at all because you feel you can start at any time; there is no urgency to start taking action. However, your timeline for accomplishing the goal must be measurable, attainable, and realistic. If you can make the milestones measurable and the path traceable, accomplishments will be more real to everyone involved.

### **Joe's Story**

How about an example? Let's say that “Joe's” phone and e-mail are ringing and pinging with field issues and customer complaints, and he is hearing the same from the rest of the team. He suggests a goal: Reduce field issues and customer complaints by 10% quarterly.

That sounds like a good plan and also relates to his company's quality policy. But is it a S.M.A.R.T. goal? Joe tests his goal against the worksheet titled “S.M.A.R.T. Goal Testing Worksheet” (located on the following page).

In Joe's case, both field issues and customer complaints are interchangeable. He wants to stop putting out fires and use his resources to build the business. Whether a 10% quarterly reduction is significant or a bit of a stretch will be determined as the results are measured. He knows it is meaningful, and everyone is certainly motivated to stop those calls! But what is the best way to measure this?

Well, it can be measured just by the sheer number of field issues and customer complaints. That would be the way to measure the success of any effort made toward the goal of reducing complaints by a specific amount. Since Joe doesn't want to make more work for himself or his team by making measuring a job in itself, he will ask for some action from the rest of the team. It is time to do some brainstorming.

Joe calls a 15-minute “stand-up” meeting—no chairs, just ideas. Even the planning is time-based. Joe sends out a memo the day before and asks one specific question: “What are our field issues and customer complaints related to?” The memo also contains a directive: “Come to the meeting prepared with a list of brief examples.” He also suggests some example categories to spur creativity: weld defects, bolting, material delivery, etc. The next day everyone



*Pat Thomashefsky is lead auditor with AISC Certification. She can be reached at [patt@qmconline.org](mailto:patt@qmconline.org).*

**Quality Corner** is a monthly feature that covers topics ranging from how to specify a certified company to how long it takes to become a certified company. If you are interested in browsing our electronic archive, please visit [www.aisc.org/QualityCorner](http://www.aisc.org/QualityCorner).



### S.M.A.R.T. Goal Testing Worksheet

Goal: Reduce field issues and customer complaints by 10% quarterly.

**S** Is it **SPECIFIC**? (Can I answer Who? What? Where? When? Why?)

Evaluation: A 10% reduction in complaints quarterly is pretty specific. Also, this process will ensure not only that we know who, what, where, and when, but it will also help us to discover why.

**M** Is it **MEASURABLE**? Will I be able to measure progress? (How many/much?)

Evaluation: We will need to develop a process to easily measure the number of complaints we receive and what they pertain to, and record our progress.

**A** Is it **ATTAINABLE**? (Can this really happen? What steps are involved?)

Evaluation: Every effort will be made to do this—or else! We are not setting the bar too high at 10%, but it will take some effort.

**R** Is it **REALISTIC**? (What knowledge, skills, and abilities are necessary to reach this goal?)

Evaluation: Once we begin measuring, we will be able to see what will be needed to resolve the issues and prevent them from occurring again. We can do this!

**T** Is it **TIME-BOUND**? (Can I set fixed timelines? What are they?)

Evaluation: We'll commit to this plan and keep it as an agenda item on our meeting schedule, taking action along the way to make the quarterly number.

shows up and the list begins. In this type of methodology, no discussion or arguments are accepted, just ideas. The purpose in brainstorming is to focus more on quantity than quality to start.

In those 15 minutes, Joe has his list to collate, chunk, and consider. Then he can shut his door and spend one hour reviewing the results. Joe also has the accumulation of complaints from the past few months. At the end of the hour he has his list of categories! Everyone gets the list. When a call or e-mail is received, it is put into a category; in this case, a "tic" mark is made next to its reference. (These are converted to numbers in the table below, which tracks complaint categories by date.)

### Field Issues and Customer Complaints

| Date    | Categories   |          |          |          |       |
|---------|--------------|----------|----------|----------|-------|
|         | Weld Defects | Delivery | Drawings | Material | Other |
| 1/8/09  | 2            | 4        | 1        | 1        | 8     |
| 1/9/09  | 1            | 1        | 1        | 1        | 5     |
| 1/12/09 | 2            | 3        |          |          | 7     |
| 1/13/09 |              | 1        | 3        |          | 3     |
| 1/14/09 |              | 5        |          |          | 6     |
| 1/15/09 | 1            | 3        | 2        | 1        | 3     |
| 1/16/09 |              |          |          |          | 9     |

Joe determines that two weeks would be a reasonable amount of time to collect the data and at the end of that time, he will

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## S.M.A.R.T. Goal Measurement Worksheet

Quality Policy: It is the policy of our company to meet customer requirements.

S.M.A.R.T. Goal: Reduce customer complaints by 10% quarterly.

| Date            | Strategy/Action Plan                             | Responsibility | Timeline       | Evidence of effectiveness   |
|-----------------|--|----------------|----------------|---|
| 1/6/09          | Brainstorm for reasons.                          | All            | 15 min on Wed. | Complete. I have the data.  |
| 1/8/09          | Develop complaint categories.                    | Joe            | 1 hour         | Complete. I spent one hour developing the categories.   |
| 1/8 to 1/20/09  | Collect data.                                    | All            | 2 weeks        | Everyone is pitching in.  |
| 1/20/09         | Review results and progress. Take needed action. | Joe            | 1 hour         | It looks like there are too many "other" categories. I need to regroup the categories. But we'll take action on the top three immediately.                          |
| 1/20 to 1/27/09 | Collect more data.                               | All            | 2 weeks        | I gave everyone a new list. They are still pitching in.   |
| 1/27/09         | Review results and progress.                     | Joe            | 1 hour         | OK, now we have it! Only a few "others," and our volume is reduced. I wonder why? What happened?  |
| 1/29/09         | Develop action plan to reduce complaints.        | Joe and All    | 2 hours        | Called a meeting to discuss results and began the action plan. The sequencing of the jobs through the shop is affecting delivery. Update at morning meetings daily. |

review the results. Joe really thought that welding defects would be most prevalent, but it looks like that issue comes in third, with delivery issues topping the list. Of course, everyone continues collecting data so that the organization can measure the success of their goal to reduce the overall number of complaints by 10% this quarter. The next step is to use this data to determine a strategy and an action plan to make it happen. Joe uses the worksheet above to keep track of the

action plan, responsibilities, timeline, and evidence of effectiveness.

Whatever your strategy in applying the S.M.A.R.T. methodology—be it Joe's or otherwise—setting goals and objectives is an integral part of planning in a quality management system. Not to confuse you with another acronym, but it is the P in the PDCA cycle—Plan, Do, Check, Act. But that's a whole other Quality Corner article.

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## Migrating South

BY GENE MARTIN, P.E.

For the past couple of years, AISC's Southeast regional engineer—a lifelong Northerner—has been discovering the challenges and opportunities for steel in the lower-right corner of the U.S.

**MY FAMILY AND FRIENDS** will tell you that I am a low-risk guy. I measure twice and cut once, I check the water depth before I jump in, and I've been known to wear suspenders along with my belt.

That's why most acquaintances were surprised when my wife, Lynda, and I put out the "For Sale" sign and told them we were moving to Florida so I could take on the duties of Southeast regional engineer (RE) with AISC. After spending all my life in central Ohio and the last four years as AISC's Upper Midwest RE, I was certainly enjoying life in a business and personal comfort zone.

### The Southeast

For the past two-and-a-half years, I've been enjoying my new climate and region. All REs will tell you that their region is unique, and I am no different. With hundreds of miles of coastline and an abundance of sunshine, there are strong market opportunities for hotels, resorts, and vacation destinations. With almost 20% of the non-single family construction market in the U.S., the Southeast region is the largest. While the national market numbers for steel finished 2008 with a 55% share, the Southeast finished at 47%. A closer look at the diversity within the region shows that North Carolina, South Carolina, and Georgia all handily beat the national market share numbers. Florida completed 2008 with a 29% market share for steel.

I can't forget to mention Puerto Rico when I discuss the Southeast. We have a strong steel presence there, with four active steel fabricator members. This is a professional group of quality fabricators that have formed a fabricator association and promote the steel industry on their island.

### Florida in Particular

One state in the region, Florida, stands out for a

couple of major reasons. First, it has the lowest market share of steel of any state in the continental U.S. Second, it ended 2008 with 8% of the construction market in the U.S., placing it as the second largest state in volume

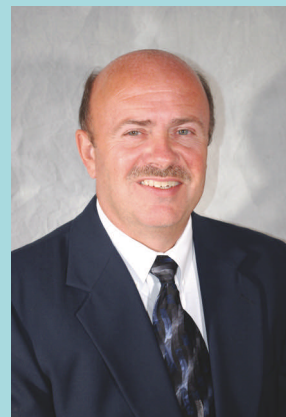
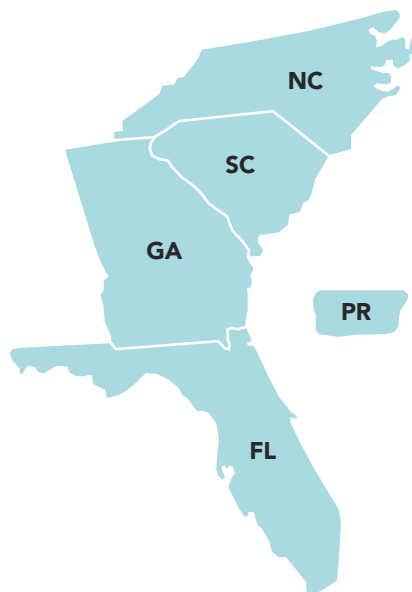
of construction, and accounted for about one-half of the construction in the entire Southeast region.

The combination of these two factors presents a big opportunity for steel, and three years ago the Marketing Committee, made up of nine AISC board members, voted to launch the Florida Initiative. Walt Primer was hired as the area marketing representative to increase market share as well as the general awareness of steel as a viable and economical framing option in Florida. Thanks to Walt's efforts, we have seen positive results, with market share increases and a higher level of understanding about the benefits of steel. In the last few years we have seen the market

share increase in offices, warehouses, hospitals, and parking garages, including five steel towers that have changed the skyline in southeast Florida.

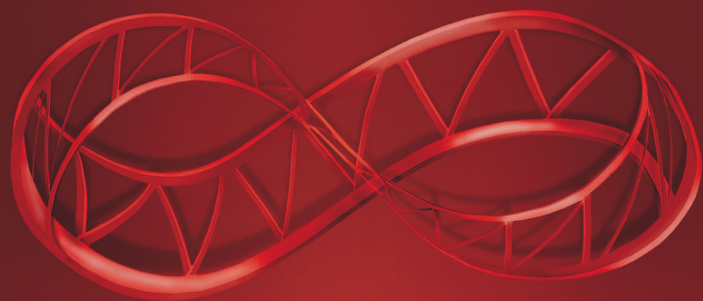
### Market Outlook

Of course, the downturn in the economy has really hit the Southeast hard. The region finished 2008 with a 25% drop in construction volume; Florida alone experienced a 35% drop. Most economists point to the housing collapse as the catalyst for the economic downturn and since 2005, the Southeast numbers reflect a 79% reduction in single-family and multi-story family construction dollars. Further stifling the Southeast's economy,



Gene Martin is AISC's Southeast regional engineer and can be reached at [martin@aisc.org](mailto:martin@aisc.org).





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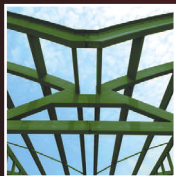
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North Carolina, South Carolina, Georgia, and Florida are all in the top ten states with the highest unemployment rates. On the positive side we are seeing some good activity with hotel, university, military base, power distribution, hospital, and industrial facilities. I am also seeing more steel fabricators looking to become AISC Certified to compete in these markets.

## **See you in Arizona (and Florida)**

At this year's North American Steel Construction Conference in Phoenix (April 1-4), I will be joining Brian Miller, AISC's director of certification, in hosting a session titled "Estimating Rules of Thumb." This session will provide information on how fabricators can gain an edge by helping the engineer accurately prepare an estimate.

In addition, Walt and I will host a Florida Initiative meeting in the second quarter of this year, and I will be participating in the MIAGREEN Conference in Miami June 11-12 and also in the Florida Engineering Society Conference August 6-7 in West Palm Beach.

## **Worthwhile Risk**

Before coming to AISC, I'd worked at a fab shop, owned and operated a steel erection company for twelve years, managed a steel detailing office, worked for a steel joist and deck manufacturer, and acted as business development manager for a network of more than 150 fabricators. My experience as an RE has given me a broader view of the industry, and my time in the Southeast region has been very rewarding. With the help of our members, the fabricator associations, steel suppliers, and other steel industry professionals, we have increased the market share in the region by 7%, grown our membership, steered people toward the Steel Solutions Center, and influenced multiple projects towards steel.

Sometimes, even a low-risk guy like me has to leave their comfort zone. I still measure twice and cut once—that hasn't changed—but one must remember that once in a while, opportunities come along that bring with them the rewards of new experiences, new relationships, and new challenges—not to mention warmer weather.

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Ph: 615.316.9200

Toll Free: 877.273.5679

Fax: 615.316.9800

[www.aspenational.org](http://www.aspenational.org)

International Trade Association serving all construction estimating professionals. Since 1956, ASPE has promoted ethics, standards, certification, education, networking, and career enhancement. 72 chapters service most major cities in the USA.

### American Subcontractors Association, Inc.

#### Booth 1130

Alexandria, VA

Ph: 703.684.3450

Fax: 703.836.3482

[www.asaonline.com](http://www.asaonline.com)

Founded in 1966, ASA amplifies the voice of, and leads, trade contractors to improve the business environment for the construction industry and to serve as a steward for the community. ASA's vision is to be the united voice dedicated to improving the business environment in the construction industry. The ideals and beliefs of ASA are ethical and equitable business practices, quality construction, a safe and healthy work environment, and integrity and membership diversity.

### American Welding Society

#### Booth 1133

Miami, FL

Ph: 305.443.9353

Toll Free: 800.443.9353

Fax: 305.443.7259

[www.aws.org](http://www.aws.org)

The American Welding Society (AWS) was founded in 1919 as a multi-faceted, non-profit organization with a goal to advance the science, technology, and application of welding and related joining disciplines. From factory floor to high-rise construction, from military weaponry to home products, AWS continues to lead the way in supporting welding education and technology development. Among the American Welding Society's activities are standard development, personal certification, trade show management, a magazine, and much more.

### Amtel Ltd., Inc.

#### Booth 457

Anaheim, CA

Ph: 714.956.2700

Fax: 714.956.2727

[www.amtekltd.com](http://www.amtekltd.com)

Manufacturer of industrial machines including beam copers, pipe copers, burn tables, etc. We also customize material handling for individual floor plans to meet the needs of each customer's shop layout.

### Applied Bolting Technology, Inc.

#### Booth 922

Bellows Falls, VT

Ph: 802.460.3100

Toll Free: 800.552.1999

Fax: 802.460.3104

[www.appliedbolting.com](http://www.appliedbolting.com)

Applied Bolting makes direct tension indicators (DTIs) user friendly. With the introduction of Squirter DTIs, made in accordance with ASTM F959, we have all but eliminated the need for feeler gages. By eye, one can tell when the bolts are tight. Erectors ask for them by name. Millions of Squirters have been spec'ed and installed on power plants, HRSGs, SCRs, LNG facilities, DOT bridges, commercial buildings, and stadiums.



### ArcelorMittal International

#### Booth 1014

Chicago, IL

Ph: 312.899.3500

Fax: 312.899.3766

[www.arcelormittal.com](http://www.arcelormittal.com)

ArcelorMittal is the world's largest producer of structural steel shapes, having served the U.S. market for over 75 years. Our ASTM A913 Grade 50 and Grade 65 steel offer superior beam characteristics, including higher yield strength, excellent toughness, and outstanding weldability—in most cases without preheating. We produce all domestically rolled WF beams in addition to numerous deep W36, W40, and heavy W14s unavailable domestically.

### Arcmatic Column Welding

#### Booth 357

Los Angeles, CA

Ph: 213.749.3411

Fax: 213.741.8620

Arcmatic Welding Systems manufactures equipment for electroslag welding (ESW) and for metal powder submerged arc welding. All the welding equipment is computer controlled and some linked to manipulators for long seam welding. The equipment is unique in that there are several patents that cover its unique design. Additionally, there are several patents that cover welding design, which are applicable for box column seam welding, stiffener plate welding, and field welding of box and W columns.

### ASTM International

#### Booth 514

West Conshohocken, PA

Ph: 610.832.9585

Fax: 610.832.9585

[www.astm.org](http://www.astm.org)

A trusted source of technical standards for over a century, ASTM continues to play an international leadership role in the standardization needs of the global marketplace. More than 12,000 standards and related technical information address the standardization needs of a diverse range of industries, including construction, metals, corrosion of materials, the environment, and many more. ASTM standards are available online, in print, and on CD-ROM.



# exhibitors

**Atema, Inc.**  
**Booth 1041**  
 Chicago, IL  
**Ph:** 312.861.3000  
**Fax:** 216.373.7297  
[www.atema.com](http://www.atema.com)

Want to be prepared for the new infrastructure bill being signed next year? Atema can help you prepare for any challenges with AISC certification assistance. We can help create the documentation necessary either on-site or through web conferences. If you already have the quality management system and need help in implementation, we can train your employees for success. Our programs address ongoing quality concerns which fit the needs of fabricators and DOTs across industry lines.

**Atlas Tube, Inc.**  
**Booth 751**  
 Harrow, ON  
 Canada  
**Ph:** 519.738.5000  
**Toll Free:** 800.265.6912  
**Fax:** 519.738.3537  
[www.atlastube.com](http://www.atlastube.com)



With the largest size range and the shortest cycle times in the industry, Atlas Tube has four manufacturing plants strategically located in the USA and Canada and can supply all of your HSS tubing requirements delivered on time when you want it. 33 different rounds sizes, 21 squares, and 56 rectangles are available in a variety of gauges and lengths. Atlas Tube is ISO 9001-2000 certified manufacturing to North American specifications A500, A252, A847, and CSA G40.21.

**Azco Steel Co.**  
**Booth 823**  
 S. Plainfield, NJ  
**Ph:** 908.754.8700  
**Fax:** 908.754.8728  
[www.azcosteel.com](http://www.azcosteel.com)

Service center specializing in large jumbo beams, A588 and A992 structurals, and hard-to-find items. We deliver to all parts of North America. With locations in Blytheville, Ark., S. Plainfield, N.J., Pomona, Calif., and Birmingham, Ala.

**AZZ Galvanizing Services**  
**Booth 756**  
 Fort Worth, TX  
**Ph:** 817.810.0095  
**Fax:** 817.336.5354  
[www.azzgalvanizing.com](http://www.azzgalvanizing.com)



AZZ Galvanizing Services, a division of AZZ, Inc., headquartered in Fort Worth, Texas, owns and operates 20 hot-dip galvanizing plants throughout the USA, with kettles ranging from 25 ft to 58 ft in length. With Aztec's network of plants, they are able to accommodate the largest projects with customized turnaround time at a competitive price. Aztec has implemented "Galvextra," their nickel-zinc alloy process providing the high-quality standards necessary in the highly competitive after-fabrication steel market.

**BDS Vircon**  
**Booth 735**  
 Phoenix and Tempe, AZ  
**Ph:** 480.615.1700  
**Fax:** 480.615.1717  
[www.bdsglobal.com](http://www.bdsglobal.com)

With more than 165 detailers in eight offices, in seven countries, BDS Vircon is one of the biggest and most technically advanced steel detailing companies in the world. The group has the capacity, technology, and technical ability to undertake major assignments requiring teams of detailers and to successfully manage multiple projects across different offices in different time zones while meeting strict deadlines and quality standards. The BDS Group is one of the largest licensed users of Tekla Structures in the world. The Tekla software is rapidly becoming the de facto standard for complex building and construction modelling, and BDS Vircon is widely acknowledged as one of the most advanced users of the software.

**Behringer Saws, Inc.**  
**Booth 340**  
 Morgantown, PA  
**Ph:** 610.286.9777  
**Toll Free:** 1.888.BEHRINGER  
**Fax:** 610.286.9699  
[www.behringersaws.com](http://www.behringersaws.com)



Behringer Saws is a manufacturer of high-quality vertical and horizontal band saws, circular cold saws, and steel fabricating equipment. Behringer saws are available in automatic and semi-automatic versions, for both straight and miter cutting applications. In addition, Behringer supplies a full array of material-handling equipment to help make your sawing operations highly efficient. Behringer, located in Morgantown, PA, maintains a large inventory of machines and parts and houses the industry's most modern sawing showroom.

**Bentley Systems, Inc. - RAM/STAAD Solution Center**  
**Booth 809**  
 Exton, PA  
**Ph:** 610.458.5000  
**Toll Free:** 800.Bentley  
[www.bentley.com/structural](http://www.bentley.com/structural)

Now with RAM, STAAD, and ProSteel on the Bentley team, we offer the most comprehensive structural solutions in the industry. Bentley's flexible and scalable products allow seamless workflow of analysis, design, detailing, documentation, and BIM for building, plant, and civil applications. Completely integrated solutions are available for reinforced concrete, post-tensioned concrete, steel, wood, cold-formed steel, aluminum, and masonry.

**BIMSoft, Inc.**  
**Booth 802**  
 Milton, ON  
 Canada  
**Ph:** 514.731.0008, x21  
**Toll Free:** 905.875.2982  
**Fax:** 514.739.0002  
[www.bimsoftinc.com](http://www.bimsoftinc.com)



BIMSoft is a developer of Autodesk-based applications running on Revit, Inventor, and AutoCAD platforms. BIMSoft is recognized for providing engineering software with particular focus on the engineering, detailing, and fabrication of wood, steel, and light-gauge structures. Our BIM-compliant and integrated applications allow the user to seamlessly take a project from conceptual architecture all the way to fabrication and construction. Our CMS application works stand-alone or with Autodesk Inventor. It creates and manipulates DSTV files and supports W, C, T, Angle, and plate steel shapes for cutting and drilling operations.

**Birmingham Fastener, Inc.**  
**Booth 545**  
 Birmingham, AL  
**Ph:** 205.595.3511  
**Toll Free:** 800.695.3511  
**Fax:** 205.591.7107  
[www.bhamfast.com](http://www.bhamfast.com)

Birmingham Fastener is a full-line distributor of structural fasteners, both domestic and foreign. We have a manufacturing facility that enables us to provide you with non-standard structural bolts as well as any type of welded assembly, threaded rod, or bent anchor bolt you may need.

**Brafer Steel Structures**  
**Booth 1121**  
 Curitiba, Parana  
 Brazil  
**Ph:** 55.41.3640.4640  
**Fax:** 55.41.3641.4615  
[www.brafer.com](http://www.brafer.com)

Brafer is a major steel structure fabricator in Brazil, founded in 1976. Skilled to perform all phases of the steel structure supply, from design, detail, manufacturing, hot-dip galvanizing, painting, and erection. Experienced in both national and international supply, having exported to USA, Canada, Chile, Paraguay, Uruguay, Argentina, and Angola. Monthly production capacity of 2,500 tons of fabricated steel.

**Bridge Street Toys**  
**Booth 762**  
 Weston, MA  
**Ph:** 781.237.5005  
**Fax:** 781.237.5445  
[www.bridgestreettoys.com](http://www.bridgestreettoys.com)

Bridge Street Toys is a privately owned toy company that manufactures and sells educational building sets. The original Girder and Panel, Bridge and Turnpike, and Hydrodynamic buildings sets were made in the late 1950s. We decided that it would be fun to start a business and put these toys back into production. We introduced the first of the "new" Girder and Panel building sets in November 2005. We are thrilled to be able to make these toys available once again for young engineers and architects (and their moms and dads)! We have something for every boy and girl; even the young at heart will enjoy our girder and panel play sets, Hydrodynamic building sets, and our newest addition: the Boston Manor. All of our products will engage young minds with the wonder of building!

**Brown Consulting Services, Inc.**  
**Booth 757**  
 Houston, TX  
**Ph:** 281.260.9749  
**Toll Free:** 888.728.2272  
**Fax:** 281.260.9771  
[www.steelconnectiondesign.com](http://www.steelconnectiondesign.com)

Professional structural engineering firm specializing in connection design calculations for structural steel, steel stairs, and miscellaneous metals. Licensed in 46 states and the U.S. Virgin Islands, Brown also offers structural design services, shop drawing review/engineering supervision, forensic engineering, expert witness testimony, project pricing, professional liability insurance (\$2 million), and quick turnaround. Contact: [al@steelconnectiondesign.com](mailto:al@steelconnectiondesign.com) for a quote on your next project. Make Brown "Your Engineering Connection."

**Buckner Companies**  
**Booth 952**  
 Graham, NC  
**Ph:** 336.376.8888  
**Fax:** 336.376.8855  
[www.bucknercompanies.com](http://www.bucknercompanies.com)

Since 1947, Buckner Companies has provided workmanship, met demanding schedules, and completed complex projects. We are ranked number six by ENR's listing of Top Steel Erectors. Buckner Steel Erection is an AISC and PCI Certified Erector. Over 600 years of experience is encompassed in Buckner's management supervisory, and administrative teams. Buckner Heavy Lift Cranes has one of the largest and most versatile equipment fleets in the nation. Ranked by *International Cranes* as one of the Top Crane Companies in the world.

**Bug-O Systems/Cypress Welding Equipment**  
**Booth 716**  
 Canonsburg, PA  
**Ph:** 412.331.1776  
**Toll Free:** 800.245.3186  
**Fax:** 412.331.0383  
[www.bugo.com](http://www.bugo.com)

Bug-O Systems/Cypress Welding Equipment, a manufacturer of welding and cutting automation equipment, will display its newest innovations for increasing productivity. The Bug-O Gantry and Side Beam Units are custom-designed assemblies that are used in a variety of applications such as beam and stiffener fabrication. The Mini-Vert is a trackless battery powered fillet welder. The Uni-Bug III can produce stitch or continuous welds and will run on a variety of structural steel profiles.

**Burlington Automation**  
**Booth 451**  
 Burlington, ON  
 Canada  
**Ph:** 905.681.9622  
**Fax:** 905.333.1477  
[www.pythonx.com](http://www.pythonx.com)



Burlington Automation manufactures PythonX, a fully automated, robotic system using high-definition plasma cutting to fabricate beams, channels, HSS, angles, and strip plate. Producing AISC-approved bolt holes, copes, slots, cutouts, miter cuts, bevel cuts, cut-to-length, and piece/layout marks, one PythonX replaces beam drill lines, band-saws, angle lines, and plate burning centers. It greatly reduces material handling, saves floor space, and produces accurate cuts with almost no operator programming. PythonX automates all your structural steel drilling and cutting.





## CAMBCO

### Booth 435

Houston, TX

**Fax:** 713.781.0193

[www.cambcoinc.com](http://www.cambcoinc.com)

CAMBCO developed the first commercially available cambering machine for the structural steel fabricating industry in 1984 to camber beams at a fraction of the cost of mill or heat cambering. Eight models are available to fulfill any cambering requirement, from small commercial buildings to highway bridges. CAMBCO is a division of Hydradyne Hydraulics, LLC. We manufacture CAMBCO Cambering Machines and can provide all 8 models as "Do-It-Yourself" Cambering Machine Hydraulic Kits. Please contact Chris Raschke for any information.

## CAMBCO, Inc.

THE ORIGINAL CAMBERING MACHINE

## Canam Steel Corporation

### Booth 1001

Point of Rocks, MD

**Ph:** 301.874.5141

**Toll Free:** 800.648.4293

**Fax:** 301.874.3357

[www.canam.ws](http://www.canam.ws)

Canam Steel Corporation is a leading designer and fabricator of open-web steel joists, girders, and bridging at our four U.S. plants certified by SJI, AISC, AWW, and CWB. Complex joists, including barrel, bowstring, scissor, double- and triple-pitched, and long spans up to 130 ft, are our feature products. Our joists are formed of small cold-formed channels to provide individual web members for most steel joists spanning more than 30 ft.

## Carboline Company

### Booth 1056

St. Louis, MO

**Ph:** 314.644.1000

**Toll Free:** 800.848.4645

**Fax:** 314.644.4617

[www.carboline.com](http://www.carboline.com)

Carboline Company offers the most in-depth product line-up for solving steel corrosion problems through protective coverings, coatings, and linings. Carboline product lines include permanent zinc primers, rapid-cure shop primers and intermediate coats and long-term weathering finishes. Single- or multiple-coat shop-friendly systems are our specialty. Coating systems can be selected to last 3 months or 30 years. Stop by our booth to see how Carboline can solve your steel painting problems.

## Cast Connex Corporation

### Booth 1118

Toronto, ON

Canada

**Ph:** 416.806.3521

**Fax:** 416.978.6052

[www.castconnex.com](http://www.castconnex.com)

Whether standardized or customized, Cast Connex Corporation is the North American leader in structural steel castings. Cast Connex standardized products include a range of connectors for hollow structural section SCBF bracing as well as pin connectors for architecturally exposed structural use. Cast Connex also offers design and manufacturing services for custom cast steel structural components.



# -Cast Conne-™

## Cerbaco Ltd.

### Booth 926

Frenchtown, NJ

**Ph:** 908.996.1333

**Fax:** 908.996.0023

[www.cerbaco.com](http://www.cerbaco.com)

Cerbaco will provide samples from its line of 500+ configurations of non-metallic weld backings that permit finished-quality, full-penetration welds from one side. Where one-sided welding is not desirable, the backings eliminate the need for arc gouging or heavy grinding prior to second-side welding. The company specializes in furnishing custom configurations and formulations. Technical assistance and free custom design services will be offered.

## Chatham Steel Corporation

### Booth 437

Savannah, GA

**Ph:** 912.233.5751

**Toll Free:** 800.546.2650

**Fax:** 912.044.0236

[www.chathamsteel.com](http://www.chathamsteel.com)

Chatham Steel Corporation serves more than 3,000 customers throughout the Southeast from its five (soon to be six) strategically located service centers. Chatham stocks a breadth and depth of product lines for full-line service. Primary product lines include carbon, stainless, aluminum, high-strength, and alloy steel. Our complete in-house processing capabilities include plasma and flame shape burning and beveling, shearing and bending, sawing, drilling, and more.

## Chicago Clamp Company

### Booth 961

Broadview, IL

**Ph:** 708.343.8311

**Fax:** 708.343.0215

[www.chicagoclampcompany.com](http://www.chicagoclampcompany.com)

Chicago Clamp Company provides an innovative method for framing roof openings and suspending loads from joists with no welding or drilling. This standardized method for connecting joists and beams allows structural engineers to focus on load distribution rather than attachment apparatus or welding concerns. Working with engineers, architects, general contractors, HVAC installers, plant managers, and roofing contractors, Chicago Clamp offers an economical, safe, flexible solution for joist and beam projects.

## Chicago Metal Rolled Products

### Booth 957

Chicago, IL

**Toll Free:** 800.798.4504

Kansas City, MO

**Ph:** 816.483.7575

[www.cmrp.com](http://www.cmrp.com)

Curving of every size of angle, bar, channel, tee, and beam up to W44x290 the hard way (x-x axis) on the world's largest beam bender. Tube and pipe bending up to 20 in. OD. Tight bends (radius = 2 x pipe OD; W6x12 hard way to 14 in. inside radius) to large sweeps. Rectangular tubing up to 20 in. x 12 in. Low deformation, thin-wall bending for weight-sensitive applications. Single-radius bending in one plane, as well as off-axis and multi-axis bends; multi-radius bends; true, helical coils; and plumb, circular stair stringers. Hard way, easy way, and every way in between.



## Cleveland City Forge

### Booth 553

Wellington, OH

**Ph:** 440.647.5400

**Fax:** 440.647.4185

[www.clevelandcityforge.com](http://www.clevelandcityforge.com)

Cleveland City Forge is a world leader in structural steel hardware. Products include clevises, turnbuckles, turnbuckle assemblies, threaded rod, adjustable yokes, eye nuts, eyebolts, and rod ends.

## Cleveland Punch and Die Company

### Booth 431

Ravenna, OH

**Ph:** 330.296.4342

**Toll Free:** 800.451.4342

**Fax:** 800.451.6877

[www.clevelandpunch.com](http://www.clevelandpunch.com)

The Cleveland Punch and Die Company has been serving fabricators of steel joists, bridging, girders, and all other forms of steel fabricating for 129 years! We have developed and earned the respect of owners, engineers, and general contractors in the punching industry. Original equipment manufacturers continue to trust and recommend our products to meet and surpass our customers' expectations. We are convinced that the quality, tradition, and reliability we have built in manufacturing punches, dies, and shear blades will lead to future opportunities for another 129 years.

## CMC (Commercial Metals Co.)

### Booth 815

Irving, TX

**Ph:** 214.689.4300

[www.cmc.com](http://www.cmc.com)

Commercial Metals Co. (CMC) and its subsidiaries manufacture, recycle, and market steel and metal products and related materials and services through a network of steel mini-mills, fabrication plants, construction-related product warehouses, a copper tube mill, metal recycling facilities, and trading offices in the U.S. and overseas. CMC Mills, Joist and Deck, and Steel Products representatives are ready to discuss your construction needs.

## CMC Joist and Deck

### Booth 815

Houston, TX

**Ph:** 281.496.4100

**Toll Free:** 800.987.0029

**Fax:** 281.496.1236

[www.cmcjd.com](http://www.cmcjd.com)

CMC Joist and Deck manufactures steel joists, joist girders, and steel deck in the US and Mexico at 10 strategically located facilities. CMC Engineering Centers offer detailing and engineering services in addition to construction solutions. The program accounts department provides multi-unit commercial building owners with an efficient alternative for their joist and deck needs. CMC Joist and Deck's goal is to build products that exceed customer expectations and provide on time delivery, every time, NO EXCUSES.

## CMC Steel Products

### Booth 815

Rockwall, TX

**Ph:** 972.772.0769

**Toll Free:** 800.308.9925

**Fax:** 972.772.0882

[www.cmcsteelproducts.com](http://www.cmcsteelproducts.com)

CMC Steel Products manufactures the SMARTBEAM, an innovative, economical, and sustainable alternative to other structural systems. SMARTBEAM offers versatility and economy for all types of floor and roof structures. These beams are lightweight, have superior load/deflection characteristics, and are manufactured from recycled steel. The SMARTBEAM has superior vibration characteristics and its ability to accommodate MEP equipment makes it an ideal product for any floor application.

## Combilift

### Booth 610

Greensboro, NC

**Ph:** 336.378.8884

**Toll Free:** 877.COMBI.56

**Fax:** 336.378.8842

[www.combilift.com](http://www.combilift.com)

The Combilift is an engine-powered 4-directional forklift designed primarily for handling long loads in confined areas. Suitable for use both inside and out, the machine can operate in aisles as narrow as 80 in. The fully synchronized 4-way steering system provides excellent maneuverability. Capacities range from 5,000 lb to 30,000 lb, with a variety of attachments to cater to individual customer requirements.

## COMEQ, Inc.

### Booth 423

White Marsh, MD

**Ph:** 410.933.8500

**Fax:** 410.933.1600

[www.comeq.com](http://www.comeq.com)

World-renowned US distributor for a wide range of metal fabricating machinery, including GEKA Ironworkers and Automated Punching and Feeding Systems; ROUNDO Angle, Section, Beam, and Plate Bending Rolls; AMERICOR Angle and Plate Bending Rolls; ADIRA and PRIMELINE Press Brakes and Shears, and much more. We offer sales, service, and parts with over 70 years of knowledge to assist in the purchase of an efficient and productive machine. Our mobile demo trucks travel throughout the country bringing Ironworker demonstrations to your business door. Call and schedule a visit today.



# exhibitors

## Computers and Structures, Inc.

**Booth 717**  
Berkeley, CA  
**Ph:** 510.649.2200  
**Fax:** 510.649.2299  
[www.csiberkeley.com](http://www.csiberkeley.com)

Founded in 1975, Computers and Structures, Inc. (CSI), is recognized worldwide as the pioneering leader in the development of software tools for the analysis and design of structures. CSI products—SAP2000, ETABS, and SAFE—are used by thousands of engineering firms involved in the design of buildings, bridges, and other major projects in over 160 countries. Reflecting three decades of development and research, CSI's innovations continue to set the industry standard. CSI software products integrate all aspects of engineering modeling, analysis, design, detailing, and drawing within consistent and easy-to-use interfaces. From the Burj Dubai in the United Arab Emirates to the Centario Bridge over the Panama Canal and the Bird's Nest Stadium in Beijing, China, CSI products do it all with an unmatched balance of practicality and functionality.

## Connected Structural Group

**Booth 1111**  
Las Vegas, NV  
**Ph:** 702.804.1535  
**Fax:** 702.405.1229  
[www.connectedsg.com](http://www.connectedsg.com)

Connected Structural Group offers full-service steel detailing and structural engineering. We provide 3D modeling, erection, and shop drawings using SDS/2 steel detailing software. We have licensed structural and professional engineers to provide complete structural design. Whatever materials are used, our structures are designed with fabrication and erection in mind to save the owner, fabricator, and contractor both money and time. We support and encourage building information modeling (BIM) projects.

## Controlled Automation, Inc.

**Booth 117**  
Bauxite, AR  
**Ph:** 501.557.5109  
**Fax:** 501.557.5618  
[www.controlledautomation.com](http://www.controlledautomation.com)

Controlled Automation specializes in the manufacture of automated structural steel drilling, punching, and shape cutting machinery. Material handling systems are also available to complement each type of machine we offer. As well as new machinery, Controlled Automation is the industry leader in retrofitting control systems and remanufacturing existing structural steel fabricating machinery. All machines and controls are designed and manufactured entirely in the United States of America. All software is developed in and supported from the USA as well.



## Core Brace, LLC

**Booth 825**  
West Jordan, UT  
**Ph:** 801.280.0701  
**Fax:** 801.280.3231  
[www.corebrace.com](http://www.corebrace.com)

CoreBrace is a proven, proprietary buckling restrained brace. These unique structural steel braces have been independently tested and implemented in numerous buildings. The CoreBrace technology is technically superior, more cost-effective, and more readily available than other buckling restrained systems.

## Corus International Americas

**Booth 750**  
Schaumburg, IL  
**Ph:** 847.619.0400  
**Toll Free:** 800.542.6244  
**Fax:** 847.619.0468  
[www.corusamericas.com](http://www.corusamericas.com)

Corus, a subsidiary of the Tata Steel Group, is one of the world's largest steel producers and a leading manufacturer of structural shapes. Corus also provides many innovative steel construction solutions such as Slimdek, Bi-Steel, and a large range of cold- and hot-formed HSS. Corus International Americas specializes in delivering product and service packages to contractors and designers throughout the world, blending industry knowledge and expertise that is specific to North, Central, and South America.

## CSC, Inc. - Chicago

**Booth 800**  
Chicago, IL  
**Ph:** 877.710.2053  
**Fax:** 312.321.6489  
[www.cscworld.com](http://www.cscworld.com)

Structural software solutions from CSC include TEDDS and FASTRAK. See how TEDDS uniquely automates detailed calculations in MS Word whilst being specifically focused on the needs of structural engineers. Not all steel buildings are square boxes! See how FASTRAK will speed-up the detailed design of buildings, no matter what the geometry. Visit Booth 800 to find out more about TEDDS and FASTRAK.

## DACS, Inc.

**Booth 615**  
Portsmouth, VA  
**Ph:** 757.393.9461  
**Toll Free:** 866.286.6215  
**Fax:** 757.393.9461  
[www.dacsinc.com](http://www.dacsinc.com)

DACS, Inc. is a full-service metal deck supplier with plants located in Baltimore, MD and Portsmouth, VA. Serving the industry since 1987 and members of the Steel Deck Institute, DACS has a full line of decking products to meet your needs. Roof deck, composite, and non-composite decks and our revolutionary cellular decking that utilizes mechanical fasteners in lieu of spot welds. Visit [www.dacsinc.com](http://www.dacsinc.com) for more information.

## DAITO U.S.A., Inc.

**Booth 232**  
Elk Grove Village, IL  
**Ph:** 847.437.6788  
**Fax:** 847.437.6789  
[www.daitousa.com](http://www.daitousa.com)

DAITO is focused on metal cutting and drilling machines and has become the most technologically advanced machine producer in its field. Along with being the world's top manufacturer in its field, DAITO is geared towards customer satisfaction by supporting our customers with our knowledgeable and responsive sales personnel.

## Decon USA, Inc.

**Booth 1048**  
[www.deconusa.com](http://www.deconusa.com)

## Delta Structural Steel Services Group

**Booth 707**  
Idaho Falls, ID  
**Ph:** 208.528.6110  
**Fax:** 208.529.5621  
[www.degroupp.com](http://www.degroupp.com)

Delta Structural Steel Services was established in 1991 to meet the detailing and engineering needs of local steel fabricators and erectors. Since 1991, Delta has expanded its customer base across the country, from Alaska to South Carolina. Delta uses state-of-the-art computer technology, including SDS-2 software, to provide accurate detailing and design to our customers, while striving to lower the overall project costs. Delta's projects are as varied as the Arizona Cardinal Stadium to wastewater facilities and range in size from 50 tons to 2,400 tons.



## Design Data

**Booth 635 and 801**  
Lincoln, NE  
**Ph:** 402.441.4000  
**Toll Free:** 800.443.0782  
**Fax:** 402.441.4045  
[www.sds2.com](http://www.sds2.com)

Design Data produces innovative software for the steel industry's fabrication, detailing, and engineering sectors. Design Data's SDS/2 steel detailing software is the only product with the built-in intelligence to automatically design connections using a 3D model, with a multitude of options for beams, columns, bracing, and joists. The EAD/2 engineering system, Design Data's newest product, is a quick, easy way to perform simple finite element analysis and design on steel structures in the comfortable environment of SDS/2.



# nascc: the steel conference

Phoenix • April 1-4, 2009 [www.aisc.org/nascc](http://www.aisc.org/nascc)

## DetailCAD

**Booth 947**  
Whitefish, MT  
**Ph:** 406.862.7906  
[www.detailcad.com](http://www.detailcad.com)

DetailCAD is an AutoCAD-based steel detailing software. DetailCAD has the ability to accept input as framing plan data to be used in generating details and a 3D model, or you can do piece-by-piece input for those smaller jobs. Both methods will generate remarkably clear and concise shop details. You can download another one of our products the "DetailCAD Genie" for free at our website. The Genie is very useful software for detailers and engineers alike. It has a complete database of all member shapes and their properties, plus many other utilities needed in the steel industry. Even if you don't need detailing software, you need to look at the Genie!

## Detailed Design Drafting Services, Ltd.

**Booth 929**  
Parksville, BC; Surrey, BC  
Canada  
**Ph:** 250.248.4871 (Parksville)  
**Ph:** 604.574.7097 (Surrey)  
**Fax:** 250.248.4826  
[www.detailedesign.com](http://www.detailedesign.com)

Detailed Design Drafting is an industry leader in structural steel detailing. We utilize Tekla Structures detailing software. We currently have 105 staff and have detailed a wide variety of projects including, design-build projects, coal boilers, gas plants, international airports, hospitals, schools, and transit buildings. We offer all data for fully automated shops including .kss files, CNC data, point-to-point lists for bolts, and many custom reports for the shop and field.

## DGS Technical Services, Inc.

**Booth 651**  
Roselle, IL  
U.S. and India  
**Ph:** 630.872.5000, x8277  
**Fax:** 630.582.3700  
[www.dgsts.com](http://www.dgsts.com)

DGSTS is an Illinois-based ISO 9001:2000 certified company with multiple steel detailing locations in India. Employees: 200; software used: Tekla Structures, PRO Steel, and AutoCAD. Detailing experience in high-rise buildings, bridges, connection design, and miscellaneous. We can provide on-site detailers when needed and set up dedicated teams in India.

## Diversakore

**Booth 512**  
Atlanta, GA  
**Ph:** 404.459.9007  
**Toll Free:** 866.863.6300  
**Fax:** 866.721.8353  
[www.diversakore.com](http://www.diversakore.com)

DIVERSAKORE is a structural engineering products and services company headquartered in Atlanta, GA. The DIVERSAKORE structural system is based upon a composite, U-shaped beam (aka the DIVERSAKORE Versa-T: Beam) that offers a stronger, faster, and more cost-effective solution to structural framing. DIVERSAKORE supports engineers, architects, designers, building owners, and construction companies who specify its monolithic framing solution with a full range of design, pre-installation, and construction advisory services.

## Dowco Consultants, Ltd.

**Booth 835**  
Surrey, BC  
Canada  
**Ph:** 604.606.5800  
**Toll Free:** 866.773.6926  
**Fax:** 604.574.3827  
[www.dowco.com](http://www.dowco.com)

Fabrication shops and engineering firms all over the world rely on Dowco Consultants, Ltd. for pre-construction, detailing, 3D modeling, and connection design services. In just under 40 years, Dowco Consultants has grown from a three-man operation in Vancouver, Canada to become one of the largest fully automated steel detailing companies in the world. Founder Hugh Dobbie attributes this success largely to the ability to recognize change and to embrace new processes and technologies early. The company currently employs more than 250 people in five offices across Canada and one in Kolkata, India. In 1998, Dowco received ISO 9001 certification and the quality management system is an integral part of daily routine.





## Dynamic Fastener

### Booth 511

Kansas City, MO

Ph: 800.821.5448

[www.dynamicfastener.com](http://www.dynamicfastener.com)

Dynamic Fastener is a leading supplier to the steel construction industry. We offer several lines of power tools, hands tools, safety equipment, fall protection, and much more, all geared toward steel construction. We have a full line of self-drilling fasteners for steel construction, as well as anchor bolts and structural and tension control bolts. We have 7 stocking warehouses to ship from.

## Eastern Pneumatics and Hydraulics, Inc./McCann Equipment, Ltd.

### Booth 731

Salem, NH

Ph: 603.893.7662

Toll Free: 800.356.5624

Fax: 603.893.7745

[www.ephtools.com](http://www.ephtools.com)

Specializing in steel erectors' torque-related tools. Tone TC shear tools and a complete line of electric, hydraulic, and pneumatic torque wrenches, Skidmore torque tension testers, erectors' reamers, drift pins, and structural wrenches. Repairs, rentals, sales, calibrations, and certifications to ISO 17025 standards.

## eCADsystems, LLC

### Booth 951

Rochester Hills, MI

Ph: 248.564.5600

Fax: 248.844.0335

[www.ecadsystems.com](http://www.ecadsystems.com)

eCADsystems, LLC is an engineering service provider offering a comprehensive range of services that are delivered from concept to manufacturing. Our services include structural steel detailing, mechanical design, product data management, software customization, and electronic design services. We support various industry segments including construction, automotive, industrial automation, consumer appliances, medical equipments, ship building, agricultural equipment, and general engineering. Our construction projects include airports, automobile plants, convention centers, hospitals, office buildings, and industrial and power plant projects.

## Engineering Ministries International (eMI)

### Booth 1132

Colorado Springs, CO

Ph: 719.633.2078

Fax: 719.633.2970

[www.emiusa.org](http://www.emiusa.org)

Engineering Ministries International (eMI) is an organization of engineers and architects who offer a free technical design service to Christian missionaries serving the poorest of the poor in third world countries. The volunteers pay their own trip expenses, don't charge for their design services, and come alongside a missionary who wants to build something that is complicated enough to require professional expertise. The services are offered on short-term mission trips.

## ESAB Welding and Cutting Products

### Booth 1013

Florence, SC

Ph: 843.669.4411

Toll Free: 800.ESAB.123

Fax: 843.664.4459

[www.esabna.com](http://www.esabna.com)

With more than 100 years of experience, ESAB Welding and Cutting Products is one of the world's largest and most knowledgeable manufacturers of welding and cutting equipment and welding filler metals. To ensure customer satisfaction, many ESAB products carry a 100% satisfaction guarantee. Recognized as the technological leader in the industry, ESAB is committed to providing customized solutions for its customers.

## ESJ Steel Joist

### Booth 747

Aldama, Chihuahua

Mexico

Ph: 52.614.419.92.00

Toll Free: 800.523.0789

Fax: 52.614.419.92.29

[www.esjoist.com](http://www.esjoist.com)

ESJ Steel Joist is a Mexican company dedicated to the fabrication of steel joist and steel joist girders. We have more than a decade in the Mexican market and we are beginning to work in the U.S. market. We also have the SJI certification and we have two facilities; the biggest one is located 200 miles away from the U.S. border.

## Essar Steel Algoma

### Booth 535

Sault Ste. Marie, ON

Canada

Ph: 905.331.3471

Toll Free: 800.387.9495

Fax: 905.331.3408

[www.algoma.com](http://www.algoma.com)

Essar Steel Algoma is dedicated to being North America's leading supplier of hot-rolled sheet, plate, and welded shape products through continuing innovation and improvement of our products, processes, and people. Our mission is to deliver quality products that meet or exceed our customers' expectations and support their success in the markets they serve.



## Fabreeka International, Inc.

### Booth 613

Stoughton, MA

Ph: 781.341.3655

Toll Free: 800.322.7352

Fax: 781.341.3983

[www.fabreeka.com](http://www.fabreeka.com)

Fabreeka's experience in vibration control includes the dynamic response of steel fabrications and support structures. Services include measuring building floor vibration, displacement response of floors/mezzanines, and modeling of structures to predict performance. Fabreeka's capabilities include NASTRAN and finite element analysis programs to analyze the static and dynamic conditions of our customers' vibration problems.

## FabSuite, LLC

### Booth 808

Williamsburg, VA

Ph: 757.645.0842

Fax: 757.645.0896

[www.fabsuite.com](http://www.fabsuite.com)



FabSuite is a collection of steel fabrication management software programs that can help you expedite and improve your speed and efficiency with regards to your everyday challenges that you face as a steel fabricator. FabSuite offers customizable programs to meet your needs at every stage of the steel fabrication process. The programs included are: Estimating, Project Management, Production Control, Combining (Multi/Nest), Inventory, Purchasing, and Order Entry. Each program can be customized to meet your specific needs as an individual company, and can be easily integrated into your existing company job procedures. FabSuite delivers a smooth and continuous flow of information from a project's inception all the way through its final completion and job-costing.

## Fabtool, LLC

### Booth 549

Coal Valley, IL

Ph: 309.799.8707

Fax: 309.799.8717

[www.fabtool.com](http://www.fabtool.com)

Fabtool LLC is a distributor of metalworking, fabricating, and general construction equipment. Fabtool sells the complete line of Jancy products including magnetic based drills, metal cutting saws, pipe and tube notchers and benders, abrasive belt grinders, and welding positioners. Fabtool carries products from Diamond Products including core drills, concrete saws, and diamond saw blades. Fabtool also sells products from Midwest Snips, Stout cordless band saws, Ironclad work wear, Malco products, and Flange Wizard welding accessories.

## FabTrol Systems, Inc.

### Booth 1007

Eugene, OR

Ph: 541.485.4719

Fax: 541.485.4302

[www.fabtrol.com](http://www.fabtrol.com)

FabTrol MRP is the global leader in steel fabrication management software. With integrated estimating, drawing management, material management, production control, and shipping, FabTrol MRP automates the steel fabrication process. FabTrol MRP was designed by steel fabricators for steel fabricators, and is proven to help increase revenues, reduce costs, improve quality, and shorten project schedules.

## Faccin USA, Inc.

### Booth 532

Tampa, FL

Ph: 813.664.8884

Fax: 813.664.4544

[www.faccin.com](http://www.faccin.com)

A world leader in the production of heavy-duty bending rolls for plate and structural sections, as well as dished-end equipment.

## Ficep Corporation

### Booth 109

Forest Hill, MD

Ph: 410.588.5800

Fax: 410.588.5900

[www.ficepcorp.com](http://www.ficepcorp.com)

Ficep manufactures and sells the world's largest CNC product line for the fabrication of structural steel and plate with over 65 different lines. In addition to this comprehensive product line, Ficep also offers an extensive range of integrated software packages to enhance the productivity of the CNC systems. This ranges from nesting to an interface that permits a user to import from the 3D model, not just the cut length and hole locations from Tekla, but also all the layout locations for detail placement automatically.

## Fisher and Ludlow Grating Products

### Booth 846

Florence, KY

Ph: 859.282.7767

Toll Free: 800.334.2047

Fax: 859.282.7702

[www.fisherludlow.com](http://www.fisherludlow.com)

Fisher and Ludlow is a full line manufacturer of bar grating, safety grating, and expanded metal products. Our 10 locations provide rapid delivery of both standard panels and custom gratings that are fabricated specifically for your project. Fisher and Ludlow manufactures bar grating in more North American locations than any other grating company ensuring timely delivery to your jobsite, wherever it is located.

## G.W.Y., Inc.

### Booth 623

Greenfield, NH

Ph: 603.547.3800

Toll Free: 888.838.6500

Fax: 603.547.3801

[www.gwyinc.com](http://www.gwyinc.com)

G.W.Y., Inc. is celebrating its 34th year of distributing installation tools for structural bolting. G.W.Y. has a full line of installation wrenches for both TC bolts and standard structural bolts. Like the TC wrenches, G.W.Y.'s installation wrenches for heavy hex head structural bolts are constant-speed electric tools that allow the bolts to be tightened from one side by one person. The new Turn of Nut Installation Wrench automatically shuts down when the pre-set degree of rotation is reached. In addition to new wrench sales, G.W.Y. also rents installation tools. G.W.Y.'s extensive spare parts inventory enables us to provide same-day service for most tool repairs.

## Gantrex, Inc.

### Booth 1103

Pittsburgh, PA

Ph: 412.655.1400

Toll Free: 800.242.6873

Fax: 412.655.3814

[www.gantrex.com](http://www.gantrex.com)

GANTREX provides solutions for heavy-duty crane runways. With more than 30 years in the steel industry, Gantrex is the trusted source for product and engineering support. As the leading supplier of crane rail clips, crane rail pad, crane girder tie-back assemblies, and hydraulic bumpers, we are 100% focused on crane runway solutions. Stop by our booth to discuss proper crane rail system design and problem crane rail solutions.

## Gaule Detailing

### Booth 640

Creston, IA

Ph: 641.352.5334

Fax: 641.352.5335

[www.gauledetailing.com](http://www.gauledetailing.com)

Gaule Detailing details structural and miscellaneous steel per your standards. We use eight SDS/2 stations and AutoCAD when the situation dictates. Our group of 10 employees has 117 years of experience in the steel fabrication industry. We were incorporated in 1981 and are a member of AISC and NISD. Give us a call. We'd appreciate the opportunity to do business with you.



## Gerdau Ameristeel

**Booth 840**  
Midlothian, TX  
**Ph:** 800.527.7979  
**Fax:** 972.779.1236  
[www.gerdauameristeel.com](http://www.gerdauameristeel.com)

Gerdau Ameristeel is helping to shape the world as a leader in the steel industry in production, service, and quality and as one of the largest concrete reinforcing steel fabricators in North America. We manufacture a diverse and balanced mix of recycled steel products for use in a variety of industries including construction, cellular and electrical transmission, automotive, mining, and equipment manufacturing.

## Girder-Slab Technologies, LLC

**Booth 741**  
Cherry Hill, NJ  
**Ph:** 856.424.7880  
**Toll Free:** 888.478.1100  
**Fax:** 856.424.6880  
[www.girder-slab.com](http://www.girder-slab.com)

Recipient of the 2007 AISC Special Achievement Award, Girder-Slab Technologies, LLC has continued to make great strides in bringing the Girder-Slab System to the multi-story residential market throughout North America. This technology is offered only through steel contractors and is ideal for design-build. The steel contractor should think of this as their system, and Girder-Slab Technologies as their national representative, supplying everything needed to promote the system, while continuously educating more architects, engineers, and owners about Girder-Slab each day.

## Graitec, Inc.

**Booth 723**  
Laval, QC  
Canada  
**Ph:** Sales: 877.464.3366  
**Toll Free:** Support: 877.464.5046  
**Fax:** 450.628.0400  
[www.graitec.com](http://www.graitec.com)

Graitec is one of the largest worldwide developers of structural construction software. Advance - Steel is used by design professionals, detailing offices, and steel construction companies that require a comprehensive and completely integrated package in AutoCAD. Advance is a high-end yet user-friendly affordable 3D solution that automates the entire design process (engineering, detailing, and erection drawings, various reports, etc.) and produces NC fabrication drawings and code in AutoCAD.

## Grating Fasteners, LLC

**Booth 848**  
Harvey, LA  
**Ph:** 504.361.3471  
**Toll Free:** 800.227.9013  
**Fax:** 504.361.9059  
[www.gclips.com](http://www.gclips.com)

Grating Fasteners, LLC specializes in manufacturing and distributing the G-Clip line of grating clips, which are used to fasten bar grating to structural members. Our G-Clips are a family of devices that are designed to be installed from above the grating surface quickly, easily, and economically. With G-clips, power tools are not needed for installation, as they can be installed with simple hand tools. Certain G-Clips feature materials that resist damage in highly corrosive environments.

## GT STRUDL - Georgia Tech CASE Center

**Booth 1109**  
Atlanta, GA  
**Ph:** 404.894.2260  
**Fax:** 404.894.8014  
[www.gtstrudl.gatech.edu](http://www.gtstrudl.gatech.edu)

GT STRUDL Structural Design and Analysis software program from the Georgia Tech-CASE Center offers a wide range of frame and finite element capabilities. Linear/nonlinear static and dynamic analysis features include moving load generation, response spectrum analysis, transient analysis, pushover analysis, plastic hinges, tension and compression-only members, and nonlinear connections. The software includes extensive steel design, graphical modeling, and result-display capabilities. V30's enhanced solvers enable the solution of static and dynamic models with over 300,000 DOF.

## Haydon Bolts, Inc.

**Booth 1018**  
Philadelphia, PA  
**Ph:** 215.537.8700  
**Fax:** 215.537.5569  
[www.haydonbolts.com](http://www.haydonbolts.com)

Haydon Bolts, Inc. has been serving structural fabricators and large construction companies for 145 years. We are a major distributor of a full line of heavy hexagon and tension control structural bolts. Haydon specializes in custom manufactured anchor bolts, tie rod assemblies, U-bolts, etc., in diameters from 1/2 in. through 4 in. and up to 40 ft in length and in various grades of steel. Haydon operates out of its 45,000-sq.-ft manufacturing and distribution facility in Philadelphia. Haydon is a charter member of the Industrial Fasteners Institute (IFI), the trade organization of the leading fastener manufacturers in North America, as well as an associate member of AISC.

## Hercules Bolt Company

**Booth 503**  
Madison, TN  
**Ph:** 615.321.5020  
**Toll Free:** 877.321.5020  
**Fax:** 615.321.2401  
[www.herculesbolt.com](http://www.herculesbolt.com)

Since 1998, Hercules Bolt Company has been a leading source for anchor rod assemblies, fasteners, and accessories for the structural steel industry throughout the United States. We manufacture anchor bolts to your specifications in all material grades, including ASTM F1554 Grades 36, 55, and 105. We also stock a wide range of A325 and A490 bolts and tension-control bolt assemblies, anchors, studs, and epoxy.

## High Steel Structures, Inc.

**Booth 619**  
Lancaster, PA  
**Ph:** 717.207.4303  
**Fax:** 717.399.4102  
[www.highsteel.com](http://www.highsteel.com)

Lancaster, PA-based High Steel Structures, Inc. is one of the largest fabricators of structural steel in the United States. AISC Certified for major bridges and buildings, High Steel fabricates a wide range of steel plate components for transportation, building, industrial and manufacturing projects. The company welcomes requests from steel fabricators and erectors for supplemental fabrication of heavy building components, such as plate girders, crane steel, and building frames.

## Hilti, Inc.

**Booth 917**  
Tulsa, OK  
**Ph:** 800.879.8000  
**Toll Free:** 800.879.5000  
[www.us.hilti.com](http://www.us.hilti.com)

Hilti is the global leader of quality, innovative products and services for engineering and construction professionals, focusing on the needs of steel fabricators and erectors with over 50 engineers and 1,000 trained salespeople in the U.S. and Canada, and additional staff in more than 120 countries. Call now for design software, free submittals, design, and install training for metal decking with mechanical fastening as well as anchor or powder-actuated safety training and custom CEU courses.

## Holtec Consulting Pvt. Ltd.

**Booth 629**  
Gurgaon, Haryana  
India  
**Ph:** 91.124.4693200  
**Fax:** 91.124.4693103  
[www.holteconet.com](http://www.holteconet.com)

Holtec is an ISO-9001 certified engineering and detailing company with over 500 professionals. From its main engineering center in India, it offers a wide range of services in civil/structural, mechanical, and electrical engineering and detailing to its customers, who are located in over 67 countries. Its structural steel detailing group uses Tekla Structures, SDS/2, and AutoCAD to cost-efficiently detail projects ranging from 50 to 30,000 tons for leading US and Canadian fabricator clients.

## Hougen Manufacturing, Inc.

**Booth 501**  
Swartz Creek, MI  
**Ph:** 810.635.7111  
**Toll Free:** 800.426.7818  
**Fax:** 810.635.8277  
[www.hougen.com](http://www.hougen.com)

Hougen Manufacturing produces a full line of portable magnetic drills, Rotabroach annular cutters, and other hole-making products for use in fabrication, production, and maintenance applications. Hougen's products are for use on-site or in the shop to help make holes easier, faster, and safer.

## IMPACT Engineering Solutions

**Booth 643**  
Brookfield, WI  
**Ph:** 262.317.8100  
**Toll Free:** 866.317.8100  
**Fax:** 262.317.8101  
[www.impactengsol.com](http://www.impactengsol.com)

IMPACT Engineering Solutions has been in business over the last 20 years with offices around the world. We specialize in the AEC market, plant engineering, and mechanical engineering. Our structural steel detailing group uses SDS/2, Tekla Structures, and AutoCAD.

## Indiana Gratings Pvt. Ltd. - INDIA

**Booth 744**  
Mumbai, Maharashtra  
India  
**Ph:** 00.91.22.28504743  
**Fax:** 00.91.22.28505154  
[www.indianagrating.com](http://www.indianagrating.com)

Indiana Gratings Pvt. Ltd. - INDIA is one of the leading electro forge grating manufacturers in the world and a reputed manufacturer for handrails and cable trays/ladders. The company has an experience of 4 decades and has a capacity to manufacture over 200 metric tons of gratings per day. The company has executed projects for leading EPCs like Bechtel, CB&I, and Technip and has supplied its products all over the world.

## Industrial Galvanizers America

**Booth 1024**  
Petersburg, VA  
**Ph:** 804.733.0808  
**Fax:** 804.733.2274  
[www.ig-usa.net](http://www.ig-usa.net)

Industrial Galvanizers America (IGA) is a supplier of high-quality hot-dip galvanizing. IGA has five plants conveniently located throughout the southeastern US. Your steel is galvanized according to the IGCMs, IGA America's own compliance management system, based on three international standards. Visit us on the web at [www.ig-usa.net](http://www.ig-usa.net) for more information about IGA, your best choice for high-quality galvanizing, fast turn, times and responsive customer service.



## Infasco

**Booth 1128**  
Marieville, QC  
Canada  
**Ph:** 450.658.8741  
**Fax:** 450.447.0114  
[www.ifastgroupe.com](http://www.ifastgroupe.com)

Infasco's vertically integrated manufacturing process encompasses all aspects of fastener production, from annealing to heat-treating. Its extensive range of high-quality structural fasteners includes A325 heavy hex bolts in plain, mechanical, or hot-dip galvanized finishes; A490 heavy hex bolts; A325 and A490 tension control bolts, as well as heavy hex structural nuts. Also, Infasco has recently added a line of A490 tension control bolts in 1 1/8 in. diameter. Infasco is ISO 9001-2000 registered.

## InfoSight Corporation

**Booth 604**  
Chillicothe, OH  
**Ph:** 740.642.3600  
**Fax:** 740.642.5001  
[www.info-sight.com](http://www.info-sight.com)

InfoSight provides solutions with their tags, products, and systems for online, automatic product marking along with manual identification for various industries including steel, fabricators, galvanizers, power plants, automotive, etc. Reliable identification of products through company processes is essential. InfoSight has an unique tagging system that survives hot-dip galvanizing. We barcode difficult stuff.



## Infra-Metals Co.

### Booth 407

Langhorne, PA  
**Toll Free:** 800.899.3432  
**Fax:** 215.741.5973  
[www.infra-metals.com](http://www.infra-metals.com)

Infra-Metals, with 6 stocking locations throughout the eastern United States, is strategically positioned to fulfill the structural carbon steel needs of fabricators, OEMs, plate shops, and miscellaneous fabricators. Infra-Metals has a vast inventory of all carbon steel structural tube, plate, and long products, including exotics and jumbo structural sections. Call your nearest sales office for more information.

## Ingenieria Tecnica Steel Detailing

### Booth 1049

Providencia, Santiago  
 Chile  
**Ph:** 56.2.2640306  
**Fax:** 56.2.2357531  
[www.ingenieriatecnica.cl](http://www.ingenieriatecnica.cl)

Ingenieria Tecnica is a steel detailing company that so far has completed 25 years of uninterrupted operation, providing services for different projects in several markets such as mining and metals, industrial, commercial, and many others areas. Our main business area has been focused on structural steel, platework, and reinforced concrete detailing. We have constantly upgraded our systems to follow the market trends on steel detailing technology, and currently our main platform is Tekla Structures. The quality and excellence of our work is reflected in the technical quality of our team as well as effective project management practices that allow us to develop projects on time.

## International Design Services, Inc.

### Booth 1053

Maryland Heights, MO  
**Ph:** 314.872.1791  
**Fax:** 314.872.8531  
[www.ids-inc.net](http://www.ids-inc.net)

IDS is dedicated to delivering the highest quality detailing and connection design services. All of our shop drawings and calculations are produced under the direct supervision of licensed professional engineers. We produce CNC, DXF, DSTV, and KSS files for 100% of our work. IDS currently employs nearly 300 detailers, connection engineers, and support staff; 21 of our detailers are NISD certified. We detail using AutoCAD and Tekla Structures.

## Intsel Steel Distributors

### Booth 600

Houston, TX  
**Ph:** 713.937.9500  
**Toll Free:** 800.762.3316  
**Fax:** 713.937.1091  
[www.intselsteel.com](http://www.intselsteel.com)

Intsel Steel Distributors, RandS Steel, Alta-Steelco, and their parent company, Triple S Steel, are committed to the steel industry in providing the range and grades of material from stock to facilitate your immediate and long-term requirements. Offering expertise from years of service, our employees accept the challenge to compete in the ever-changing world dynamic. Stocking over 150,000 tons in a full range of structurals, plate, and tubing, our processing services including flame-cutting, saw-cutting, blasting and painting, bending, forming, slitting, edge-conditioning, plate-punching and leveling. Our 600 dedicated staff serve customers in the US and around the world from plants located in Texas, Colorado, Utah, and Tennessee.

## Ironworker Management Progressive Action Cooperative Trust

### Booth 508

Washington, DC  
**Ph:** 202.393.1147  
**Toll Free:** 800.545.4921  
**Fax:** 202.393.1507  
[www.impact-net.org](http://www.impact-net.org)

A Labor Management Taft Hartley Trust, whose primary mission is to expand job opportunities for union ironworkers and their signatory contractors through progressive and innovative labor management cooperative programs.



## ISD - International Steel Detailing

### Booth 927

Santiago  
 Chile  
**Ph:** 56.2.4843100  
[www.isd.cl](http://www.isd.cl)

ISD is one of the largest detailing companies in the Americas. With highly qualified detailers and engineers, ISD provides 3D detailing, estimating, scheduling, project management, and BIM modeling services. Our clients include a wide range of steel fabricators, contractors, and engineering firms across the United States. We have worked on several multi-billion dollar industrial projects and our experience spans from power plants and refineries to cement plants and mining structures.

## J. B. Long, Inc.

### Booth 447

Fleetwood, PA  
**Ph:** 610.944.8840  
**Fax:** 610.944.0789  
[www.jblong.com](http://www.jblong.com)

J. B. Long, Inc. has supplied structural steel and miscellaneous iron details to the fabrication industry for over 20 years. The firm is certified under the NISD Quality Procedures Program (QPP). All those qualified of the total staff of 25 are certified under the NISD Individual Detailer Certification (IDC) program. J. B. Long, Inc. uses SteelLogic and Tekla Structures to create details. The focus is on small to mid-sized structural and miscellaneous iron projects.

## Kee Safety, Inc.

### Booth 644

Buffalo, NY  
**Ph:** 716.896.4949  
**Toll Free:** 800.851.5181  
**Fax:** 716.896.5696  
[www.keesafety.com](http://www.keesafety.com)

Kee Safety, Inc. is a leading global supplier of components and custom systems for railings, roof edge protection, and fall prevention. Kee Safety, Inc. offers a full range of solutions for building tubular structures, easy clamping of steel to steel, and OSHA-compliant fall protection. Kee Safety is able to offer a complete design and installation service to give customers the most cost-effective solutions and ensure all applications conform to relevant standards.

## Kottler Metal Products, Inc.

### Booth 857

Willoughby, OH  
**Ph:** 440.946.7473  
**Toll Free:** 800.678.0808  
**Fax:** 440.946.7655  
[www.kottlermetal.com](http://www.kottlermetal.com)

Established in 1915, Kottler Metal Products, Inc. rolls pipes, HSS, and structural shapes. A new facility and experienced craftsmen allow Kottler Metal to supply customers with one of the largest bending capacities in the United States. Kottler rolls up to 48-in. channel and I-beam easy/hard way, 20-in. pipe tube, rail, pipe, and tee with minimal distortion.

## Kubes Steel, Inc.

### Booth 740

Stoney Creek, ON  
 Canada  
**Ph:** 905.643.1229  
**Toll Free:** 877.327.8357  
**Fax:** 905.643.4003  
[www.kubesteel.com](http://www.kubesteel.com)

Kubes Steel, Inc. is Canada's premier provider of structural, section rolling, forming, and prefabrication services. We offer Canada's largest multi-section roll and specialized section bending capacity. We can form sections to 40 in. both ways and tube to 42 in. diameter, which is among the best in North America. We offer ISO quality assurance and have provided services to many of North America's preeminent fabricators. Call us to help you make your next project take shape.

## LeJeune Bolt Company

### Booth 915

Burnsville, MN  
**Ph:** 952.890.7700  
**Toll Free:** 800.872.2658  
**Fax:** 952.890.3544  
[www.lejeunebolt.com](http://www.lejeunebolt.com)

Are bolting issues a point of frustration? Wish you had more knowledge available on structural fastening? Let our expert staff manage your next project. Find out why fabricators, erectors, and contractors insist on LeJeune every time! The most comprehensive inventory in the industry includes structural fasteners in all types, grades, and sizes, anchoring systems, stud welding, and industrial/OEM fasteners. LeJeune is the

largest distributor of TONE shear wrenches and Torqon tools in the world! New tools, rentals, parts, and expert repair. Same-day shipments can deliver anywhere in the U.S. in 1-3 days. Custom packaging and electronic certifications. International? Yes we can!

## Lincoln Electric

### Booth 928

Cleveland, OH  
**Ph:** 216.481.8100  
[www.lincolnelectric.com](http://www.lincolnelectric.com)

The Lincoln Electric Company, headquartered in Cleveland, Ohio, is the world leader in the design, development and manufacture of arc welding products, robotic arc-welding systems, plasma, and oxyfuel cutting equipment and has a leading global position in the brazing and soldering alloys market.

## Lincoln Structural Solutions

### Booth 631

Lincoln, NE  
**Ph:** 402.464.4433  
**Toll Free:** 800.571.6884  
**Fax:** 402.464.4855  
[www.lincolnstructural.com](http://www.lincolnstructural.com)

Lincoln Structural Solutions is a commercial and nuclear structural steel and fastener supplier. ISO 9001:2000 registered and compliant to ASME Section 3 NCA-3800, ANSI N45.2, NQA-1, 10 CFR 50 Appendix B, and 10 CFR 21. Our fastening systems include structural bolts, nuts, and washers; tension-indicating fasteners, hex head cap screws, anchors, and threaded rods. Full certification and rotational capacity tests are offered at no cost. Custom labeling provided to customer specification.

## Lindapter North America

### Booth 536

Ann Arbor, MI  
**Ph:** 888.724.2323  
**Fax:** 734.677.2339  
[www.lindapterna.com](http://www.lindapterna.com)

Lindapter North America provides pre-engineered mechanical steel connections that offer advantages for the addition of structural steel members in existing buildings. With no need to drill or weld on site, Lindapter connections can be assembled using simple hand tools so installation costs are kept to a minimum. For more than 70 years, the Lindapter reputation for pre-engineered clamp systems that provide the quality, strength, and economies customers come to expect has grown worldwide.

## Lohr Structural Fasteners, Inc.

### Booth 925

Humble, TX  
**Ph:** 281.446.6766  
**Fax:** 281.446.7805  
[www.lohrfasteners.com](http://www.lohrfasteners.com)

Stop by Lohr Fasteners booth and see the patented Lohr SMART-HEX TC, the Thick Washer Face 1-1/8 A490 SMARTHEX, and our newest product, the Lohr Hex Traceables—all with our exclusive Head "ID" Code. At Lohr, we are committed to total customer support. Let our experienced staff help ensure that your next project goes smoothly. Look for the Lohr motorcycles and stop by to see why Lohr Fasteners is the leader in tension control fasteners.

## LS Industries Inc.

### Booth 411

Wichita, KS  
**Ph:** 316.265.7997  
**Toll Free:** 800.835.0218  
**Fax:** 316.265.0013  
[www.lsindustries.com](http://www.lsindustries.com)

LS Industries is a first choice alternative. Established in 1977, the company engineers, designs, and manufactures turnkey shot blast and coating equipment. Working with you and your engineers, LS can provide innovative solutions that meet your fabricated and structural steel cleaning requirements. Our systems integrate with your manufacturing processes. A full range of equipment includes cleaning equipment for automotive/diesel, bridge, construction, fabricators, finishing, foundry, parts remanufacturing, coatings, steel mills, service centers, and surfacing preparation. Services include custom systems, parts, rebuilding, and technical support. LS Industries is an associate member of AISC.





**LTC, Inc.**  
**Booth 657**  
 West Salem, WI  
**Ph:** 608.786.1761  
**Fax:** 608.786.1768  
[www.ltcsteeletailers.com](http://www.ltcsteeletailers.com)

LTC, Inc. is an innovative, progressive structural steel detailing company that has provided quality shop drawings to the fabrication industry since 1985. We are committed to creating and maintaining strong customer relationships through quality and professionalism. We use Tekla Structures to prepare shop drawings for commercial projects including hospitals, stadiums, high-rise structures, multi-story office buildings, schools, airports, churches, and industrial buildings. We offer all electronic data necessary for fully automated shops. Stop by Booth 657 to discuss making LTC part of your team.

**MandD Drafting, Ltd.**  
**Booth 929**  
 Surrey, BC; Edmonton, AB  
 Canada  
**Ph:** 604.576.8382  
**Fax:** 604.576.8371  
[www.mddrafting.com](http://www.mddrafting.com)

MandD Drafting Ltd.'s Mission Statement: It is our mission to continue to display all of the leadership qualities that make us one of the leading structural steel detailing companies in Canada. The heart of our mission, or quality policy, is captured in one word: LEADERSHIP. Every activity we are engaged in is encompassed by this word. Leadership describes our position in the structural steel industry, all of our employees, our programs, and our commitment to customer satisfaction.

**Madden Bolt and Galvanizing**  
**Booth 1116**  
 Houston, TX  
**Ph:** 713.939.9999  
**Toll Free:** 800.375.2658  
**Fax:** 713.939.7200  
[www.maddenbolt.com](http://www.maddenbolt.com)

Celebrating 20 years in 2008, Madden Bolt and Galvanizing is renowned for their exceptional quality and noteworthy performance history within the transportation, gas pipeline, industrial, and steel structure industries. Specializing in custom threaded products such as anchor bolts, U-bolts, J-bolts, plate bolts, and threaded rods, Madden Bolt and Galvanizing handles orders as small as one piece to orders of thousands. We love demanding customers!

**Marks Metal Technology**  
**Booth 1136**  
 Clackamas, OR  
**Ph:** 503.656.1985; 503.794.5629  
**Toll Free:** 800.526.1031; 877.638.6365  
**Fax:** 503.656.1985; 503.794.5632  
[www.marksmetal.com](http://www.marksmetal.com)

Custom stainless steel, aluminum, and carbon steel fabrication including circular stairs, rolling and shaping architectural and structural profiles, wide-flange beams, hollow structural shapes, pipe, channels, angles, and splitting and straightening beams all to AESS quality—in addition to the introduction of water-jet cutting. Specialty products through Robertson Grating, Inc. including all requirements for steel, aluminum, and stainless steel bar grating, grip strut, and fiberglass grating.

**Marubeni-Itochu Steel America, Inc. (MISA)**  
**Booth 703**  
 New York, NY  
**Ph:** 212.450.0333  
**Fax:** 212.450.0790  
[www.misteel.com](http://www.misteel.com)

Marubeni-Itochu Steel America, Inc. (MISA) is a fully integrated network of subsidiary and affiliated processing facilities and sales and service offices strategically located in the U.S., Canada, and Mexico, with liaison offices in South America. At MISA we are dedicated to understanding and exceeding your needs and expectations for effective, responsive, and dependable quality, delivery, and service. MISA is committed to being the best and most innovative metal supply chain solution.

**Max Weiss Co., Inc.**  
**Booth 602**  
 Milwaukee, WI  
**Ph:** 414.355.8220  
**Toll Free:** 888.649.3477  
**Fax:** 414.355.4698  
[www.maxweiss.com](http://www.maxweiss.com)



Our unique structural rolling/forming process and skilled craftsmen provide exceptional quality and tight radius bending with very minimal distortion or marring. We have the capability of rolling and forming a wide variety of sizes of structural steel sections and tubing easy way, hard way, and off-axis to accommodate the most difficult and unique projects. We also offer many value added fabrication services including splitting, notching, straightening, trimming, drilling, and much more.

**Metal Dek Group, a unit of CSI**  
**Booth 601**  
 Columbia, SC  
**Ph:** 803.771.7920  
**Fax:** 803.744.6189  
[www.csisteel.com](http://www.csisteel.com)

Metal Dek Group, a unit of CSI, continues to specialize in partnering with the design community to provide engineered solutions. Curve-Dek, Deep-Dek Composite, Access Panels, and Rhino-Dek are examples of extraordinary solutions MDG has introduced to the marketplace. The Dek-Selector feature, along with technical information, is available 24/7 at [www.metaldek.com](http://www.metaldek.com)

**Metal Improvement Company**  
**Booth 1123**  
 Paramus, NJ  
**Ph:** 201.843.7800  
**Fax:** 201.843.3460  
[www.metalimprovement.com](http://www.metalimprovement.com)

Metal Improvement Company is a world leader in providing metal treatment services for critical components operating in aerospace, automotive, power generation, chemical processing, and specialty industrial applications. The metal treatment services we offer enhance the performance and extend the life of critical components by helping prevent premature fatigue and corrosion failures. The services we provide are shot peening, laser peening, shot peen forming, heat treating, engineered coatings, and anodizing through a network of 66 facilities in North America and Europe.

**Metals USA**  
**Booth 806**  
 Langhorne, PA  
**Ph:** 267.580.2100  
**Toll Free:** 800.523.3340  
**Fax:** 267.580.2121  
[www.metalsusa.com](http://www.metalsusa.com)

Metals USA inventories, processes, and distributes structural steel products throughout the United States. Material Grades supplied include ASTM A992, ASTM A572, ASTM A588, ASTM A500, and ASTM A36. Our inventories of shapes, bars, plates, and hollow structural members are commonly used in building and bridge applications. Services include cutting to length, tee splitting, cambering, forming, connection materials, and project management. Metals USA inventories, combined with tailored services and know-how, provide steel fabricators with supply solutions supporting schedule requirements.

**Michelman-Cancelliere Iron Works, Inc.**  
**Booth 953**  
 Bath, PA  
**Ph:** 610.837.9914  
**Fax:** 610.837.7939  
[www.mcironworks.com](http://www.mcironworks.com)

Michelman-Cancelliere is a steel fabrication and painting firm located in Bath, Pa. We provide these services for new bridges, bridge renovations, new buildings, building renovations, and utilities. We are AISC Certified - Major Steel Bridges, with Fracture Critical Endorsement and Sophisticated Paint Endorsement-Enclosed.

**Mi-Jack Products, Inc.**  
**Booth 506**  
 Hazel Crest, IL  
**Ph:** 708.596.5200  
**Fax:** 708.225.2312  
[www.mi-jack.com](http://www.mi-jack.com)

Mi-Jack Products is the leader in providing equipment to the steel construction industry, with unsurpassed service for over 40 years. Mi-Jack Travelift rubber tired gantry cranes possess the precision to transport the largest prefabricated steel structures, while maintaining the durability to haul the bulkiest steel slabs. Regardless of your requirements, Mi-Jack is the solution for all of your steel handling needs.

**Modern Steel Construction**  
**Booth 659**  
 Chicago, IL  
**Ph:** 312.670.8318  
**Fax:** 312.896.9022  
[www.modernsteel.com](http://www.modernsteel.com)



Modern Steel Construction (MSC) is the official publication of AISC. MSC brings its readership in-depth information on the newest and most advanced uses of structural steel in building and bridges by focusing on innovative and cost-effective steel designs and the products that help bring them to life. MSC is directed exclusively to professionals in the construction industry who make and influence purchasing decisions—whether they are engineers, architects, building owners, contractors, fabricators, detailers, or erectors.

**Moldtek Technologies, Ltd.**  
**Booth 709**  
[www.moldtekindia.com](http://www.moldtekindia.com)

**National Commission for the Certification of Crane Operators (NCCCO)**  
**Booth 1137**  
 Fairfax, VA  
**Ph:** 703.560.2391  
**Fax:** 703.560.2392  
[www.nccco.org](http://www.nccco.org)

The National Commission for the Certification of Crane Operators (NCCCO) is an independent, nonprofit organization that has developed accredited certification programs for crane operators and other construction personnel. By providing thorough, independent assessments of knowledge and skills, NCCCO seeks to enhance lifting equipment safety and reduce workplace risk, improve performance records, stimulate training, and give due recognition to the professional skill of crane operation.

**National Institute of Steel Detailing**  
**Booth 1028**  
 Oakland, CA  
**Ph:** 510.568.3741  
**Fax:** 510.568.3781  
[www.nisd.org](http://www.nisd.org)

The National Institute of Steel Detailing (NISD) is an international association that advocates, promotes, and serves the interests of the steel detailing industry. NISD is an association of unified company owners and individuals at the local, regional, and international levels. It promotes to fabricators, architects, engineers, and contractors a better understanding of the importance of detailing services in the construction process. NISD fosters a professional approach to business by advocating improved quality through member networking, education, and certification.

**National Steel Bridge Alliance**  
**Booth 761**  
 Chicago, IL  
**Ph:** 606.724.2347  
**Fax:** 606.724.2504  
[www.steelbridges.org](http://www.steelbridges.org)

The National Steel Bridge Alliance is a non-profit alliance of companies and individuals who are dedicated to developing and promoting the best in steel bridge design and construction.



**Neilsoft**  
**Booth 617**  
 Naperville, IL  
**Ph:** 630.357.7430  
**Fax:** 630.357.7485  
[www.neilsoft.com](http://www.neilsoft.com)

Neilsoft is an engineering services provider with over 50 detailers and professional engineer on staff providing detailing, connection design, and project management to fabricators nationwide. Founded in 1993, Neilsoft has successfully completed hundreds of projects of all sizes including commercial, industrial, health-care, and education using SDS2, Tekla Structures, and StruCAD. We are AISC and NISD members and we're ISO certified. All project communications are handled by our highly experienced PMs in our Chicago headquarters.



# nascc: the steel conference

Phoenix • April 1-4, 2009

[www.aisc.org/nascc](http://www.aisc.org/nascc)

## exhibitors

### Nelson Stud Welding, Inc.

#### Booth 507

Elyria, OH

Ph: 440.329.0400

Toll Free: 800.635.9353

Fax: 440.329.0492

[www.nelsonstudwelding.com](http://www.nelsonstudwelding.com)

Nelson offers new, extra-long, cold-formed shear connector and anchor studs meeting AWS, AISC, and ASSHTO specifications. They eliminate more expensive alternatives such as piggy-backing or using expensive, hot-forged studs. Nelson also will demonstrate the Nelweld stud welding system. The system can monitor and/or adjust more than 30 welding parameters for the highest quality and most reliable stud welds available. The unique process monitoring will also be demonstrated, assuring a quality weld every time, with complete traceability of all welds on a project.

### New Millennium Building Systems

#### Booth 607

Butler, IN; Continental, OH; Salem, VA;  
Lake City, FL

Ph: 260.868.6000

Fax: 260.868.6002

[www.newmill.com](http://www.newmill.com)

Striving to anticipate customer needs and proactively working to meet them is the essence of our company. We exhibit AGILITY, the physical and mental nimbleness to achieve goals, by being dynamic and personal, promoting team, and living up to higher standards. We know our partners and customers count on us to be reliable and trustworthy. It is our agility, integrity, and hard work that make the difference in supplying steel joist and deck products—so we remain "Flexible to the Finish."

### Nippon Steel Corporation

#### Booth 701

Tokyo

Japan

Ph: 212.207.0178

Fax: 212.593.3049

[www.nssc.co.jp/en/](http://www.nssc.co.jp/en/)

Established in 1901, Nippon Steel is one of the world-leading steel manufacturers and boasts the world's most advanced steelmaking technologies. Our products have been applied to numerous buildings and plants around the world. We produce various structural steel plates and wide-flange H-shapes standardized by ASTM, as well as jumbo H-shapes with the dimensions beyond conventional products.

### Nitto Kohki U.S.A., Inc.

#### Booth 518

Hanover Park, IL

Ph: 630.924.9393

Toll Free: 800.323.8828

Fax: 630.924.0303

[www.nittokohki.com](http://www.nittokohki.com)

Nitto Kohki is a leading manufacturer of the automatic-feed magnetic base drills that use self-regulated feed systems to optimize cutting performance with a number of safety features. Used with JetBroach tungsten carbide-tipped annular cutters, it can significantly increase production while reducing labor hours and hazardous work. We also manufacture many other steel working tools including portable hydraulic punches, bevelers, and pneumatic and electric power tools.

### North American Galvanizing Company

#### Booth 401

Tulsa, OK

Ph: 918.488.9420

Fax: 918.488.8172

[www.nagalv.com](http://www.nagalv.com)

North American Galvanizing Company is a leading provider of coating for corrosion protection. Headquartered in Tulsa, OK, North American Galvanizing Company currently conducts its galvanizing and coating business through a network of plants located in Canton, Denver, Houston, Hurst, Kansas City, Nashville, St. Louis, Louisville, and Tulsa. Hot-dip galvanizing provides metal corrosion protection for many product applications used in commercial construction and industrial markets.



## North American Galvanizing Company

We make steel last longer

### Nucor Corporation

#### Booth 901

Charlotte, NC

Ph: 704.366.7000

Fax: 704.362.4208

[www.nucor.com](http://www.nucor.com)

Nucor and affiliates are manufacturers of steel products, with operating facilities primarily in the U.S. and Canada. Products produced include: carbon and alloy steel bars, beams, sheet, plate; steel joists and joist girders; steel deck; fabricated concrete reinforcing steel; cold-finished steel; steel fasteners; metal building systems; light-gauge steel framing; steel grating and expanded metal; wire and wire mesh. Nucor is North America's largest recycler.



### Nucor - Vulcraft Group

#### Booth 901

Brigham City, UT

Ph: 435.734.9433

Fax: 435.723.5423

[www.vulcraft.com](http://www.vulcraft.com)

Steel joists, joist girders, composite floor joists, special profile steel joists, and floor and roof deck. Vulcraft facilities are located in South Carolina, Nebraska, Alabama, Texas, Indiana, Utah, and New York.



### Nucor - Yamato Steel Company

#### Booth 901

Blytheville, AR

Ph: 870.762.5500

Toll Free: 800.289.6977

Fax: 870.763.9107

[www.nucoryamato.com](http://www.nucoryamato.com)

Steel manufacturer of wide-flange structural steel shapes up to W14x730, H-piles, sheet piling, angles, channels, and car building shapes. Grades include ASTM A36, ASTM A572, ASTM A588, ASTM A690, ASTM A709, and ASTM A992.



### Nucor Fastener Division

#### Booth 901

St. Joe, IN

Ph: 260.337.1600

Toll Free: 800.955.6826

Fax: 260.337.1726

[www.nucor-fastener.com](http://www.nucor-fastener.com)

Manufacturer of 100% made-in-USA carbon and alloy steel hex head cap screws, heavy hex structural bolts, dome head Tru-Tension tension control assemblies, nuts, and build-to-print specials in inch and metric sizes in various grades with finishes and thread coatings to meet fastening requirements.



### Ocean Machinery, Inc.

#### Booth 125

Fort Lauderdale, FL

Ph: 954.956.3131

Toll Free: 800.286.3624

Fax: 954.956.3199

[www.oceanmachinery.com](http://www.oceanmachinery.com)

Ocean Machinery provides compact affordable and versatile fabricating solutions for small to medium fabricators. Our CNC machines are ideal for small shops looking to improve productivity, reduce man-hours, and eliminate errors and back charges. With more than 500 installations in North America, our products include the Ocean Avenger CNC beam drill line, the Ocean Clipper CNC angle line, the Ocean Liberator CNC beam coping machine, the Ocean Terminator structural band saws, and the Ocean Eliminator modular material handling system.



### Omnitech Associates

#### Booth 1022

Piedmont, CA

Ph: 510.658.8328

Toll Free: 888.8DESCON

Fax: 510.595.0373

[www.desconplus.com](http://www.desconplus.com)

Omnitech Associates (a California Corporation) develops steel structures seismic and non-seismic connection design software DESCON-WIN and DESCONBRACE, based on the ANSI/AISC 360-05 Specification. Both programs are available in ASD and LRFD in metric and U.S. customary measurement units. Prequalified seismic moment connections using ANSI/AISC 358-05 and FEMA-350 design procedures, and seismic design of braced frame connections based on ANSI/AISC 341s1-05 Seismic Provisions, are available.

### P2 Programs

#### Booth 712

Dripping Springs, TX

Ph: 512.858.2007

Toll Free: 800.563.6737

Fax: 512.858.2008

[www.p2programs.com](http://www.p2programs.com)

P2 Programs sets the industry standard when it comes to bar coding and tracking your structural steel. With 20+ years experience using Auto-ID technology to improve manufacturing process tracking and warehouse operations, P2 Programs is the company with the knowledge you should look to for answers. With our core products, industry contacts and hardware suppliers, you could not make a better decision than to call us first to help solve your information road blocks!

### Pan Gulf Technologies, Pvt. Ltd.

#### Booth 648

Mumbai, Maharashtra

India

Ph: 0091.22.67107085

Fax: 0091.22.67107089

[www.pangulftech.com](http://www.pangulftech.com)

Pan Gulf Technologies Pvt. Ltd. is a professionally managed engineering firm located in Mumbai, India, with team of 70 detailers and engineers having expertise in structural analysis as per AISC, BS and IS code, connection design and detailing of structural steel detailing of structures for industrial structures, as well as commercial structures such as petrochemical complexes, power plants, shopping malls, schools, office buildings, multi-storie buildings, airports, etc. We have detailing capacity of 4,000 tons per month.

### Pannier Corporation

#### Booth 516

Pittsburgh, PA

Ph: 412.323.4900

Toll Free: 877.PANNIER;

877.726.6437

Fax: 412.323.4962

[www.pannier.com](http://www.pannier.com)

Pannier offers a wide variety of marking systems for permanent identification of structural steel. Automatic, heavy-duty stampers make deep marks that remain legible after cleaning and coating. Embossed metal tags withstand galvanizing and painting. Industrial ink-jet systems ensure easy, reliable piece marking. With over 100 years of experience, we can help you solve your most challenging product identification needs. Visit [www.pannier.com/steelfab](http://www.pannier.com/steelfab) for more information.



### Paramount Roll and Forming, Inc.

#### Booth 850

Santa Fe Springs, CA

Ph: 562.944.6151

Fax: 562.941.8102

[www.paramount-roll.com](http://www.paramount-roll.com)

Since 1963, PRandF has provided structural steel rolling, forming and bending for aerospace, architectural, industrial, transportation and commercial uses. We bend tubes, pipes, channels, beams, tracks, and railings and specialize in spiral staircases. Our heavy industrial structural rolling and bending company serves various markets in the US and Mexico.





# exhibitors

## PDM Steel Service Centers, Inc.

**Booth 836**  
Stockton, CA  
Ph: 209.943.0555  
Toll Free: 800.800.4736  
Fax: 209.943.1606  
[www.pdmsteel.com](http://www.pdmsteel.com)

PDM Steel Service Centers, Inc. is a heavy-carbon, structural service center with eight locations serving northern California, Nevada, Utah, Colorado, Oregon, and Washington and parts of Idaho and Wyoming. Our inventories include a wide range of steel products, including wide-flange beams, channels, HSS, pipe, angles, bars, plate, and sheet. Our in-house processing capabilities include plasma and flame burning and saw cutting.

## Peddinghaus Corporation

**Booth 101**  
Bradley, IL  
Ph: 815.937.3800  
Toll Free: 800.786.2448  
Fax: 815.937.4003  
[www.peddinghaus.com](http://www.peddinghaus.com)



Peddinghaus Corporation, established in 1903, is the premier manufacturer of fabrication machine tools for the steel construction and heavy plate fabrication industries. Peddinghaus is the acknowledged global technology leader in providing structural drilling machines, angle and flat (Anglemaster) processing, structural burning systems, automated band saws, and heavy plate processing centers. With over twenty global patents, Peddinghaus pursues excellence in design, manufacture, and customer service—dedicated to the steel construction industry.



## Peerless Industrial Equipment Corp.

**Booth 241**  
Oshkosh, WI  
Ph: 920.231.41  
Toll Free: 800.558.0246  
Fax: 920.231.4303  
[www.peerlessusa.com](http://www.peerlessusa.com)

For over 105 years Peerless has a proud tradition of producing some of the finest metal cutting saws in the market. Peerless offers a wide range of saws from small to mammoth to fit your specific application. Peerless also offers a superior array of CNC plate processing machines along with CNC angle rolls and plate rolls. Peerless is the largest source of Daito CNC drill lines, structural saws, robotic coping machines, and material handling packages in North America. If your requirement is to cut, bend, roll, or drill metal, Peerless is the answer!

## Piersearch

**Booth 832**  
Arlington, TX  
Ph: 817.265.0980  
Toll Free: 800.342.2409  
Fax: 817.275.2335  
[www.piersearch.com](http://www.piersearch.com)

The sole purpose of our products, Centralizer pier sleds and Hijacker pier bolsters, is to keep a reinforcing steel cage centered and off of the floor of a drilled shaft to insure proper alignment and concrete cover in accordance with the engineer's specification. Our products are made of 8,500-psi high-strength grout so that they will not break, shatter, or come apart, and are secured to the cage with galvanized integrated tie wires. Because of their function, our products provide quality assurance and are thus potential contingent liability reducers.

## Plasma Automation, Inc.

**Booth 433**  
Bohemia, NY  
Ph: 631.563.7234  
Toll Free: 800.563.8510  
Fax: 631.563.7239  
[www.plasma-automation.com](http://www.plasma-automation.com)

Plasma Automation, Inc. is a full-service machine manufacturer specializing in plasma cutting systems for the fabrication and precision markets. Product line includes the Fabricator, Edge King, Elite Precision, and Monarch Heavy Duty Precision I-Beam cutting systems, as well as our our VISOFT Cutting Software. We pride ourselves on our impeccable support handled in-house for the machines as well as software. One Source. One Solution.

## Pneutek, Inc.

**Booth 513**  
Hudson, NH  
Ph: 603.883.1660  
Toll Free: 800.431.8665  
Fax: 603.882.9165  
[www.pneutek.com](http://www.pneutek.com)

Pneutek is the established leader in the mechanical attachment of steel roof and floor decking. Pneutek's revolutionary Air/Safe design is completely pneumatic and uses no explosives. It is safer, faster and more reliable than other methods of steel deck attachment. To build the strongest structures, engineers worldwide turn to Pneutek's tools and fasteners. Pneutek is dramatically improving the quality, safety, stability, and cost of major construction projects across the globe.

## PPG Protective and Marine Coatings

**Booth 645**  
Pittsburgh, PA  
Toll Free: 888.9PPGMC  
[www.ppgpmc.com](http://www.ppgpmc.com)

PPG Protective and Marine Coatings (PMC) is a world leader in protective and marine coatings. PMC products protect customers' assets in some of the world's most demanding conditions and environments. PMC is uniquely positioned with proven products and technologies in Amercoat, Sigma Coatings, PPG High Performance Coatings, and other brand families.

## Precision Steel Detailing, LLC

**Booth 956**  
Bakersfield, CA  
Ph: 661.862.5790  
Fax: 661.862.5791  
[www.psdllc.net](http://www.psdllc.net)

Full-service structural and misc. detailing company that provides 3D Modeling, CNC, DSTV, and DXF files, as well as BIM modeling for all trades. Teams experienced in SDS-2, Tekla Structures, Strucad, Pro-Steel, Soft Steel 3D Modeling, and BIM modeling. Full AutoCAD department for misc. and small parts detailing. Also, full-service joist and deck detailing as well as engineering services in California.

## Prothious Engineering Services

**Booth 724**  
Ventura, CA  
Ph: 310.589.6200  
Fax: 310.362.8899  
[www.prothious.com](http://www.prothious.com)

Prothious Engineering Services is one of the largest and most successful detailing companies in the world. Prothious has over a thousand engineers, detailers, and estimators, one of the most experienced and well-respected teams in the industry, and an annual detailing capacity of several hundred thousand tons. Our services include steel connection design, BIM modeling, steel joist, and steel deck detailing.

## PSDesign Engineers and Constructors

**Booth 641**  
Baton Rouge, LA  
Ph: 225.756.8629  
Fax: 225.756.8631  
[www.psdengr.com](http://www.psdengr.com)

PRECISION Engineers and Constructors is your EDPC solution provider. Engineering disciplines consist of civil/structural, mechanical and electrical. EDPC solution provides superior detailing and connection design being performed in the same house, saving you and your customer time and money on the project. Provider of pipe design and pipe stress analysis. Look to PRECISION for added value of always using a THINKABILITY FACTOR to ensure the collaborative efforts are in place for cost savings and meeting your timelines.

## Quality Management Company, LLC

**Booth 761**  
Chicago, IL  
Ph: 312.670.7521  
Fax: 312.896.9202  
[www.qmconline.com](http://www.qmconline.com)

Quality Management Company provides independent, quality audits for AISC's Certification Program. With experience in fabrication and/or erection, QMC auditors conduct rigorous examinations to evaluate a company's quality management system (rather than the specific product). This process provides specifying engineers with the assurance that an AISC Certified fabricator or erector encompasses the proper procedures, personnel, organization, experience, knowledge, equipment, capability, and commitment needed to successfully fabricate or erect their project.



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## Quebec Detailing Connection

**Booth 517**  
Montreal, Canada  
Toll Free: 866.677.6161  
[www.quebecconnection.com](http://www.quebecconnection.com)

Make your dream of precise, flawless shop drawings come true, using the Quebec Detailing Connection. In-house qualified and experienced detailing staff, numbering close to 200, managed and supported by North American steel industry veterans, guarantee that quality, speed, and hassle-free management are what you get, TIME AFTER TIME. Catch your dream by calling 866-677-6161.

## Quincy Joist Company

**Booth 830**  
Quincy, FL  
Ph: 850.875.1075  
Toll Free: 800.277.1075  
Fax: 850.875.5826  
[www.quincyjoist.com](http://www.quincyjoist.com)

Manufacturer of open-web steel joists and joist girders, located in Quincy, FL and Buckeye, AZ. Our company has sales offices located throughout the U.S. to assist our customers with design, value engineering, and assistance with their joist and deck needs. We provide complete joist/deck packages for all size projects.

## Radley Corporation

**Booth 1112**  
Grand Rapids, MI  
Ph: 616.554.9060  
Toll Free: 800.968.8208  
Fax: 616.554.9008  
[www.radley.com](http://www.radley.com)

Providing instant access to accurate information, Radley's mobile computing data collection system, integrated with FabTrol MRP, simplifies data entry, provides real-time progress tracking, and validates shipping processes to ensure that the right material, in the right quantity, is sent to the right job site, at the right time—every time. Steel fabricators: One-up the competition with Radley's WorkForce Productivity Solutions.

## Real Technology, LLC

**Booth 1140**  
Houston, TX  
Ph: 832.251.9400  
Fax: 713.456.2513  
[www.realtchcad.net](http://www.realtchcad.net)

Real Technology has taken an advanced approach to detailing structural, miscellaneous steel and joist. We offer Tekla-certified detailers, with all workstations running Tekla Structures and AutoCAD software. With a modern reproduction and digital archival center, we are equipped to handle almost any industrial/commercial project. In fact, we are capable of detailing up to 2,000 tons of steel per month.

## RISA Technologies

**Booth 941**  
Foothill Ranch, CA  
Ph: 949.951.5815  
Toll Free: 800.332.RISA  
Fax: 949.951.5848  
[www.risa.com](http://www.risa.com)

RISA Technologies has been developing leading-edge structural design and optimization software for over 20 years. Our products are used by 24 of the top 25 US design firms in over 70 countries around the world for towers, skyscrapers, airports, stadiums, petrochemical facilities, bridges, roller-coasters, and everything in between. The seamless integration of RISAFloor, RISA-3D, and RISAFoundation creates a powerful, versatile, and intuitive structural design environment, ready to tackle almost any design challenge.

## Ronstan Cable and Rod Systems

**Booth 612**  
Portsmouth, RI  
Ph: 401.293.0539  
Fax: 401.293.0538  
[www.ronstan.com/arch\\_us](http://www.ronstan.com/arch_us)

Ronstan manufactures cable and tie rod systems for structural architectural applications. Stainless steel and carbon systems up to 5 in. in diameter for cable and rod systems are available. All systems are pre-engineered and load rated. Innovative tamper-resistant cable rail designs are unique, preventing sagging cables and theft. Finished cable and rod systems are available for easy installation by your team. See [www.ronstan.com](http://www.ronstan.com)





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## exhibitors

### Rosler Metal Finishing

**Booth 415**

Battle Creek, MI  
**Ph:** 269.441.3000  
**Fax:** 269.441.3001  
[www.rosler.us](http://www.rosler.us)



The Rosler group is the leading supplier of surface finishing equipment and consumables in the world and our products have been setting new technical standards in surface preparation and surface finishing for the past 40 years. These products include: blasting/peening equipment, vibratory finishing equipment, and vibratory finishing consumables.

### SandJ Steel Structures, Inc.

**Booth 1139**

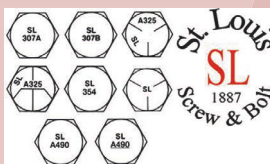
Flat Rock, MI  
**Ph:** 734.782.6260

We are commercial and industrial SDS/2 3D steel detailing company. We offer full CNC and DXF files with all of our projects, along with advance bill of materials for mill ordering or any report that our customers may request—sub materials, bolts, etc. We have also had great success in speeding up our detailing process by dealing directly with architects and engineers, model reviews, design, clash, etc., also thoroughly keeping proper documentation for all parties if required.

### St. Louis Screw and Bolt

**Booth 1019**

Madison, IL  
**Ph:** 314.389.7500  
**Toll Free:** 800.237.7059  
**Fax:** 314.389.7510  
[www.stlouisscrewbolt.com](http://www.stlouisscrewbolt.com)



St. Louis Screw and Bolt is the oldest structural bolt manufacturer in the USA. We specialize in the manufacture of A325 and A490 structural bolts in types 1 and 3, A449 Hex Bolts, F1554 anchor bolts, sag and brace rods, and A325 and A490 TC bolts. We sell direct to structural steel fabricators and offer complete project support.

### Schuff Steel Company

**Booth 429**

Phoenix, AZ  
**Ph:** 602.252.7787  
**Fax:** 602.251.0335  
[www.schuff.com](http://www.schuff.com)

Founded as a turnkey steel fabrication and erection company in 1976, Dave and Scott Schuff's vision of being a total steel contractor has become a household name within the steel industry. While wide market growth continued in the design-build/assist market, our in-house detailing, engineering, fabrication, and erection expertise allowed Schuff Steel Company to emerge as the largest steel fabricator and erector in the United States. Let us show you how "We Make It Happen" on your next project.

### Seismic Structural Design Associates

**Booth 357**

Los Angeles, CA  
**Ph:** 213.494.0446  
**Fax:** 213.741.8620  
[www.slottedweb.com](http://www.slottedweb.com)

Seismic Structural Design Associates hold U.S. and foreign patents for technology created to achieve the lowest Stress Concentration Factors of any moment frame design, removing the cause of seismically induced failure of the pre-Northridge beam-to-column moment frame connection and nearly all shear from girder flanges. Requires no end bracing, used in deep columns, less field flange welding, and the most economical seismic structural steel moment frame connection available. SlottedWeb, the connection keeping steel construction competitive.

### Sen Consulting Corp.

**Booth 827**

Hicksville, NY  
**Ph:** 516.248.9501  
**Fax:** 516.248.9502  
[www.sen-group.com](http://www.sen-group.com)

We are proud to announce that our team has reached a total of 30 employees, including 3 checkers and 2 P.E.s. Our clients include contractors, fabricators, and engineering and architectural firms. We are involved in all kinds of detailing services, as well as 3D modeling and 2D drafting services for engineers and architects. We use Tekla Structures, AutoCAD, and AutoCAD Revit.

### Sharon Stairs

**Booth 847**

Akron, OH  
**Ph:** 330.777.5377  
**Toll Free:** 800.792.0129  
**Fax:** 330.777.5350  
[www.sharonstair.com](http://www.sharonstair.com)

"Sharon Stair," a Worthington Industries Company, has nearly 50 years of experience in the manufacture of steel stairs systems, providing a pre-engineered product with a systems approach to egress stair requirements, which offers superior service, quality, and bottom-line value. With its world class manufacturing facility of 200,000 sq. ft, Sharon Stair has the capacity, staff, technical resources, and financial stability to service both projects domestically and internationally.

### Sherwin-Williams

**Booth 722**

Cleveland, OH  
**Ph:** 800.524.5979  
**Toll Free:** 800.534.5979  
**Fax:** 440.826.1989  
[www.sherwin-williams.com/protective](http://www.sherwin-williams.com/protective)

From fast-drying primers to extreme chemical- and abrasion-resistant coatings, we have the solutions you need that protect against corrosion and extend the life of steel structures.



### Shop Data Systems, Inc.

**Booth 505**

Garland, TX  
**Ph:** 972.494.2719  
**Fax:** 972.272.7062  
[www.shopdata.com](http://www.shopdata.com)

Shop Data Systems (SDS) has been servicing the steel fabrication industry for more than 30 years with CAD/CAM software solutions. The system will import flat plate components directly from your structural design software. System features: import file-embedded quantity and material; import multiple files in seconds; Import DSTV or DXF files; machine tool paths are applied automatically; tools with or without piece mark; automatic shape nesting; chain cutting; common line cutting; automatic plate trim; and personalized training and support.



### SidePlate Systems, Inc.

**Booth 1101**

Laguna Hills, CA  
**Ph:** 949.305.7889  
**Toll Free:** 800.475.8077  
**Fax:** 949.305.6395  
[www.sideplate.com](http://www.sideplate.com)

SidePlate Systems engineers superior GSA blast-tested steel connection technologies. Developed in response to the 1994 Northridge earthquake, SidePlate unites enduring structural integrity with maximum design versatility—all while exceeding the most stringent building codes. SidePlate is the leading choice of forward-thinking hospitals, government institutions, schools, and commercial enterprises who want to protect lives—and their significant investments—against natural and manmade catastrophes. SidePlate connection technologies are value engineered, decreasing construction time while creating stronger, more ecologically sound steel frames. The company's engineering experts are readily accessible to coach engineers, contractors, and fabricators through every step of the simple, highly effective SidePlate process.



### Skidmore Wilhelm

**Booth 760**

South Euclid, OH  
**Ph:** 216.481.4774  
**Fax:** 216.481.2427  
[www.skidmore-wilhelm.com](http://www.skidmore-wilhelm.com)

Skidmore Wilhelm manufactures bolt tension calibration equipment and torque measuring tools.

### Society for Protective Coatings, The (SSPC)

**Booth 1131**

Pittsburgh, PA  
**Ph:** 412.281.2331  
**Toll Free:** 877.281.7772  
**Fax:** 412.281.9993  
[www.sspc.org](http://www.sspc.org)

Visit SSPC for information on the benefits of membership – which include its monthly magazine, *The Journal of Protective Coatings and Linings*, access to standards, and discounts on products and services. Information on other resources will also be available, including our training and certification programs and our new web portal, the SSPC Marketplace.

### Soft Steel, Inc.

**Booth 1105**

Highland, CA  
**Ph:** 909.863.9191  
**Fax:** 909.863.9168  
[www.softsteelinc.com](http://www.softsteelinc.com)

Soft Steel is proud to announce the release of TakeOff 3D, the industry's 1st model-based 3D takeoff and material listing system that exports directly to your estimating/MRP system. Softscan produces reports and export files from any DWG or DXF file. Softburn produces files for your plate burner from any DWG or DXF file. Our flagship product, Soft Steel, is the fully automated, easy to use, AutoCAD-based 3D modeling detailing system, with only a 3-day learning curve.

### SOFTEK Services, Ltd.

**Booth 1033**

Richmond, BC  
Canada  
**Ph:** 604.273.7737  
**Fax:** 604.273.7731  
[www.s-frame.com](http://www.s-frame.com)

Since 1981, SOFTEK Services, Ltd. has produced analysis and design software for structural engineers, establishing a solid reputation for quality and ease of use. Using the latest technology, we continue to deliver powerful and cost-effective solutions. Our products S-FRAME, S-STEELTM, and S-CONCRETETM Version 9.x set new standards for simple to advanced analysis and integrated steel design. Please visit our booth for more information.

### Southern Chapter NISD

**Booth 1030**

Pinson, AL  
**Ph:** 205.681.3487, x100  
**Fax:** 205.681.3493

The Southern Chapter NISD consist of these firms: DDuck, Inc. (David Duckworth, 205-680-6500), Drafting Service (Morris T. Crow, 205-655-2168), K. Edward Byrd, P.E. (Ed Byrd, 662-844-9688), Nationwide Detailers, Inc. (Alan Blankenship, 205-681-3487), and Structural Technics (Joel Hicks, 205-956-4501).

### Southwest Detailers Association

**Booth 1031**

Garland, TX  
**Ph:** 972.226.6433  
**Toll Free:** 800.340.8542  
**Fax:** 214.271.4725

The SDA consists of the following NISD chapter firms: Alpha Fabrication Services, Inc. (dmerrifield@alphasteelusa.com), Heartland Detailing, Inc. (bgaede@cox.net), Don Pope and Associates (donpope@sbcglobal.net), M.D. Bowers, Inc. (mike@mdbowers.com), Fabricators Service, Inc. (fab-serv@swbell.net), Quality Drafting, Inc. (wesley@qitydraft.com), Glenn Ihde and Co. (glenn@gihde.com), Roberson's Detailing (dr-detail@tx.rr.com), Hargrave Detailing, Inc. (reggie@hargravedetinc.com), and Webber-Rookes Detailing, Inc. (wrdetinc@wrdet.com).

### Spencer Reed Group, LLC

**Booth 627**

Mission, KS  
**Ph:** 913.327.2906  
**Fax:** 913.671.8898  
[www.srgonesource.com](http://www.srgonesource.com)

SRG originated in 1996 to assist conventional steel fabricators and metal building manufacturers with additional workloads for structural detailing and engineering. Our projects range from 5 - 2,500 tons utilizing SDS/2 software. Our diverse expertise, NISD QPP and IDC certifications, advanced computer technologies, experienced personnel, and client commitment make us a valuable resource to our clients. We are a member of AISC. Please refer to our website, [www.srgonesource.com](http://www.srgonesource.com), for further clarification and examples of our projects.



# exhibitors

## SSDCP

**Booth 742**  
Charlotte, NC  
**Ph:** 704.370.0840  
**Fax:** 704.358.1801  
[www.ssdcp.com](http://www.ssdcp.com)

SSDCP is the most comprehensive AutoCAD add-on you can get. More than 190 automated programs for detailing stairs, rails, beams, columns, embeds, roof frames, anchor bolts, vertical and horizontal bracing, and everything in between! Written by a steel detailer with over 40 years of experience, SSDCP shows you an on-screen picture of what you're detailing, then you enter dimensions that match the picture. It's quick and easy! Use it alone or in tandem with 3D software.

## Star Seismic

**Booth 634**  
Park City, UT  
**Ph:** 435.940.9222  
**Fax:** 435.655.0073  
[www.star seismic.net](http://www.star seismic.net)

Star Seismic designs and manufactures the PowerCat and WildCat buckling restrained braces, the nation's most rapidly growing seismic system for structures. Not only do you get a superior seismic performance with the PowerCat and WildCat buckling restrained braces, but you save money with the system as well. Let the professionals at Star Seismic reduce your risk by assisting you as you step through the use of this superior seismic system on your next project.

## Steel Business Briefing

**Booth 1050**  
Pittsburgh, PA  
**Ph:** 412.431.4370  
**Fax:** 412.431.4371  
[www.steelbb.com](http://www.steelbb.com)

Steel Business Briefing (SBB) is an independent publisher dedicated to providing quality news and information to the global steel industry. It offers the most extensive international coverage of any steel publication. SBB has offices in London, Shanghai, Singapore, USA, Germany, Turkey, Brazil, and Japan. The editorial team is headed by the well-known Roger Manser, and Patrick Flockhart, MD also brings great steel industry experience to the team.

## Steel Cast Connections, LLC

**Booth 1017**  
Seattle, WA  
**Ph:** 206.250.7035  
**Fax:** 206.622.0115  
[www.steelcastconnections.com](http://www.steelcastconnections.com)

The Kaiser Bolted Bracket is a special moment frame connection that reduces costs significantly in comparison to other methods such as the RBS "dogbone." The retrofit and new construction versions are bolted at installation and require no field welding, allowing fast erection rates without costs associated with welding and special inspections. The KBB is now a prequalified connection contained in the AISC/ANSI 358-05 S1 supplement, which was recently released and published on the AISC website.

## Steel Deck Institute

**Booth 1115**  
Fox River Grove, IL  
**Ph:** 847.458.4647  
**Fax:** 847.458.4648  
[www.sdi.org](http://www.sdi.org)

Trade association of manufacturers of steel floor and roof decks and manufacturers of related products used in the production or erection of steel decks. SDI provides uniform industry standards for the engineering, design, manufacture, and field usage of steel decks.

## Steel Erectors Association of America (SEAA)

**Booth 551**  
Greensboro, NC  
**Ph:** 336.294.8880  
**Fax:** 413.208.6936  
[www.seaa.net](http://www.seaa.net)

Founded in 1972, the Steel Erectors Association of America (SEAA) is the largest non-profit trade organization of its kind for steel erectors, bringing members access to the industry's most essential technical information, networking opportunities, and career development tools. The Steel Erectors Association of America provides support and representation on steel erection issues that serves the global needs of industry, government, and the public. Because of its strong membership, the SEAA is proactive in meeting industry needs and responsive to worldwide steel erection and construction issues.



## Steel Founders' Society of America

**Booth 1117**  
Crystal Lake, IL  
**Ph:** 815.455.8240  
**Fax:** 815.455.8241  
[www.sfsa.org](http://www.sfsa.org)

Steel Founders' Society of America (SFSa) is a not-for-profit trade association whose mission is to promote and develop steel castings. SFSa's membership is limited to steel casting producers. We strive to serve by developing new technology, exchanging technical and operating experience, and expanding the steel casting marketplace.

## Steel Joist Institute

**Booth 1046**  
Forest, VA  
**Ph:** 434.525.7377  
**Fax:** 434.525.7747  
[www.steeljoist.org](http://www.steeljoist.org)

Besides setting standards for steel joist industry, SJI, a not-for-profit organization, works closely with major building code bodies to develop regulations regarding steel joists and joist girders. We also invest thousands of dollars annually in ongoing research and offer a complete library of publications and other training and research aids. Our Technology, Engineering, and Education Office is located in Myrtle Beach, SC and be reached at 843.293.1995 or [psgreen@steeljoist.org](mailto:psgreen@steeljoist.org)

## Steel Projects

**Booth 109**  
Vienne  
France  
**Ph:** 33.474.311.730  
**Fax:** 33.474.780.410  
[www.steel-projects.com](http://www.steel-projects.com)

Steel Projects is a steel construction software editor. Our different modules can offer various solutions to the steel market actors from drawing office conception to stock, purchasing, and job estimating management to production, handling, and shipping supervision. Our offerings are defined by modules according to each client's needs, so customization is part of our work. For more information, please email us at: [info@steel-projects.com](mailto:info@steel-projects.com).

## Steel Recycling Institute

**Booth 1141**  
Pittsburgh, PA  
**Ph:** 412.922.2772  
**Toll Free:** 800.876.7274  
**Fax:** 412.922.3213  
[www.recycle-steel.org](http://www.recycle-steel.org)

The Steel Recycling Institute (SRI) is an industry association that promotes and sustains the recycling of steel products, including construction materials. In conjunction with the American Iron and Steel Institute and the American Institute of Steel Construction, the SRI educates architects, engineers, designers, and specifiers about the sustainable benefits of steel through the United States Green Building Council and other venues. Visit the SRI Website to download our brochure, "Steel Takes LEED With Recycled Content."

## SteelCad Consulting Corporation

**Booth 834**  
Parrish, FL  
**Toll Free:** 800.456.7875  
[www.steelcad.com](http://www.steelcad.com)

SteelCad offers automated steel detailing and fabrication software. SteelCad complies with AISC and CISC standards and detailing methods. It details beams, columns, vertical and horizontal bracing, stairs, and ladders. It produces erection drawings, gather sheets, material lists, cut lists, and production control or CNC data.

## SteelDay2009

**Booth 963**  
Nationwide, U.S.  
**Ph:** 813.401.1594  
[www.steelday.org](http://www.steelday.org)

September 18 is SteelDay 2009—an interactive day with the structural steel industry. Events/seminars will occur across the nation and online. Fabricators, service centers, mills, and other members of the structural steel industry nationwide will provide guided, interactive tours of their facilities. It's a unique opportunity for other members of the construction industry to understand what we do and how we do it, witness the technology we use, and see how design affects production and efficiency. Visit our booth to host an event, attend an event, or just find out more.



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## Stinger Welding, Inc.

**Booth 923**  
Coolidge, AZ  
**Ph:** 520.723.5383  
**Fax:** 520.723.7084  
[www.deckjoint.com](http://www.deckjoint.com)

Stinger Welding, Inc. is the premier major bridge fabricator of the Southwest. We specialize in fabrication of steel vehicle, rail, and pedestrian bridges and bridge deck joints. Our productive group allows us to be the fabricator of choice for fast-track or emergency projects. Stinger can detail, fabricate, deliver, and erect any bridge or bridge component per specifications and on time. Visit our facility at any time, as we are expanding with a new 158,000-sq.-ft building in 2009 to support our growing bridge division.

## Strand7 Pty. Ltd.

**Booth 728**  
Sydney, NSW  
Australia  
**Ph:** 252.504.2282  
[www.strand7.com](http://www.strand7.com)

Strand7 Pty Ltd researches and develops state-of-the-art engineering analysis software and provides consulting and training services to the engineering community worldwide. The Strand7 software is an advanced, general purpose, FEA system used worldwide by engineers, designers, and analysts for a wide range of structural analysis applications; it includes linear and nonlinear static and dynamic capabilities. A notable recent example is the structural optimization of the Water Cube for the 2008 Olympic Games, which was completely analysed with Strand7.

## Structural Desktop, Inc.

**Booth 713**  
Van Buren, AR  
**Ph:** 479.471.5227  
**Toll Free:** 866.269.8394  
**Fax:** 479.471.5225  
[www.structuraldesktop.com](http://www.structuraldesktop.com)

Structural Desktop fully integrates the analytical modeling process with AutoCAD. Structures can be rearranged from the analytical model to a realistic representation of the actual structure, and material listings, plans, elevations, sections, starting points for details, and solid models for rendering can be extracted from this model in a few seconds. Reduced costs, improved accuracy, minimum personnel, and minimum miscommunication permit Structural Desktop to pay for itself in a single project. Now with Version 4.0.

## Structural Engineer magazine/Zweig White

**Booth 1134**  
Chicago, IL  
**Ph:** 312.628.5870  
**Fax:** 312.628.5878  
[www.gostructural.com](http://www.gostructural.com)

Structural Engineer serves as a design and specification resource for practicing structural engineers. Because *Structural Engineer* is the only magazine published exclusively for structural engineers that is not affiliated with a member-driven organization or association, it serves as an unbiased voice and an agent of change through editorial leadership. It fulfills its mission by including contributed articles covering many aspects of structural design, well-researched news stories, current product applications, and technology innovations into each issue.

# Structural Engineer

Your resource for design & specification

## Structural Engineering Institute of ASCE

**Booth 1114**  
Reston, VA  
**Toll Free:** 800.851.2723  
**Fax:** 703.295.6361  
[www.seinstitute.org](http://www.seinstitute.org)

SEI is a vibrant, 21,000-plus community of structural engineers within the American Society of Civil Engineers that strives to serve the unique needs of the structural engineering community, both technical and professional. Members of SEI can take advantage of discipline-specific products, services, and activities while also receiving all of the benefits of ASCE membership. For more information on the hundreds of committees within SEI, please visit our website.



## Structural Stability Research Council

### Booth 1047

Rolla, MO

Ph: 573.341.6610

Fax: 573.341.4476

[stabilitycouncil.org](http://stabilitycouncil.org)

The council provides support and technical counsel for stability research, holds regular meetings to report on research activities, and publishes the definitive work, *Guide to Stability Design Criteria for Metal Structures*. The SSRC Annual Stability Conference provides up-to-date information and identifies how efficiencies exist in present understanding of structural behavior. Conference proceedings represent a primary source of highlights of the latest solutions to structural problems before they are eventually published in technical journals.

## Stud Welding Associates/Pro Weld

### Booth 546

Strongsville, OH

Ph: 440.783.3160

Toll Free: 800.874.7860

Fax: 440.783.3178

[www.studwelding.com](http://www.studwelding.com)

Stud Welding Associates/Pro Weld offers a full line of shear connectors, headed anchors, deformed bar anchors, weld studs, stud welding equipment, and accessories. On display is the Dual Gun Arc 3000 one-inch capacity stud welder. This easy-to-use, reliable stud welding system is suitable for all construction and fabrication applications.

## Taylor Devices, Inc.

### Booth 1029

North Tonawanda, NY

Ph: 716.694.0800

Fax: 716.695.6015

[www.taylordevices.com](http://www.taylordevices.com)

Taylor Devices is the world-leading manufacturer of fluid viscous dampers, lock-up devices, shock transmission units, shock absorbers, cable dampers, and custom tuned mass damping systems. These devices and systems can be used to protect building and bridge structures from the devastating vibrations caused by earthquakes, wind, hurricanes, and other vibrational disturbances.

## TDS Industrial Services, Ltd.

### Booth 733

Prince George, BC

Canada

Ph: 250.561.1646

Fax: 250.562.8549

[www.tdsindustrial.com](http://www.tdsindustrial.com)

For 30 years, TDS has been providing structural and miscellaneous steel detailing services to fabrication shops across North America. Based on what suits our customers' systems best, projects are modeled using Strucad 3D or Tekla Structures. We are also offering expertise in plate-work detailing, development, and layout using AutoCAD.

## Techflow, Inc.

### Booth 1035

Duluth, GA

Ph: 770.495.1446

Fax: 770.495.1448

[www.techflowengg.com](http://www.techflowengg.com)

With 100 Tekla Structure licences and 200 engineers, Techflow, Inc. group of Techflow Engineers (I) Pvt Ltd. has emerged to serve better services to our existing clients and to expand service area in the US and Canada. We are the service provider for automated structural steel detailing and designing to civil engineering project in the public and private sector worldwide. At present we are an organized and motivated team of 200 personnel. Our professionals are qualified, experienced, and conversant with AISC, BIS, IS, and OSHA standards, having a capacity of 12,000 tons per month.

## Tectonix Steel

### Booth 1043

Mesa, AZ

Ph: 480.834.0169

Fax: 480.834.0814

[www.tectonixsteel.com](http://www.tectonixsteel.com)

Tectonix Steel is a structural steel detailing firm headquartered in Mesa, AZ, with a branch in Orem, UT. Tectonix uses Tekla Structures for all projects, allowing each project a BIM certification. Tectonix collaborates with its team of 15 detailers between UT and AZ using a VPN to work simultaneously on projects anywhere from the size of a Walgreen's to the size of a skyscraper.

## Tekla, Inc.

### Booth 935

Kennesaw, GA

Ph: 770.426.5105

Toll Free: 877.835.5265

Fax: 770.919.0574

[www.tekla.com/us](http://www.tekla.com/us)

Tekla Structures is Building Information Modeling (BIM) software that streamlines the delivery process of design, detailing, fabrication, and construction organizations. The software easily integrates with other systems such as architectural and MEP process layouts, as well as analysis and design solutions. Use the same model to save time and ensure quality projects. Thousands of Tekla Structures users have successfully delivered BIM-based projects in more than 80 countries around the world.

## Tennessee Galvanizing

### Booth 853

Jasper, TN

Ph: 423.942.1020

Toll Free: 877.242.5848

Fax: 423.942.1040

[www.tennesseegalvanizing.com](http://www.tennesseegalvanizing.com)

We are a leading provider for high-quality corrosion protection. We offer same-day service. With four lines, we can work with any lead time customers need. We ship and receive a minimum of 18 hours a day. ISO 9001-2000 Quality Control and ISO 14001-2004 Environmental. We use special high-grade zinc. Upon request, Tennessee Galvanizing will provide certification that your component or project was galvanized without producing hazardous waste.

## Totten Tubes, Inc.

### Booth 543

Azusa, CA

Ph: 626.912.0220

Toll Free: 800.882.3748

Fax: 626.812.0113

[www.tottentubes.com](http://www.tottentubes.com)

Established in 1955, Totten stocks the largest range of HSS in North America and every unusual size shown in the AISC *Steel Construction Manual*. Services offered include saw and laser cutting, bending, and galvanizing. Free delivery anywhere in California and Arizona. Job Control accounts are welcome.

## Tracer Software, LLC

### Booth 949

Belton, MO

Ph: 913.709.2540; 248.875.9800

Fax: 248.844.0335

[www.steeltracer.com](http://www.steeltracer.com)

Steel Tracer is the newest advance in software technology in managing drawings. With amazing tracking capability, Steel Tracer produces reports for drawing status, drawings back from approval, drawings not back from approval, and transmittal logs. It can also create transmittals and transmittal report summaries, trace history of drawings, group drawings by category, current revision status of drawings, advance filtering options to sort, and prioritize and group data within one screen and much more.

## TradiantCAD.com

### Booth 1045

Memphis, TN

Ph: 901.881.1250

Fax: 360.851.5129

[www.tradiantcad.com](http://www.tradiantcad.com)

TradiantCAD.com is an emerging leader in the steel detailing industry, helping clients successfully complete major construction and engineering projects in the U.S. and all over the world. TradiantCAD.com's state-of-the-art technology, combined with its ability to efficiently and consistently deliver on client's specific ordering, fabrication, and erection needs, has made it the industry's "Steel Detailing Outsourcing Partner of Choice." TradiantCAD.com is committed to providing the highest quality, lowest cost, fastest turnaround, and most dedicated customer service in the steel detailing industry. For your next steel detailing project, please consider TradiantCAD.com. Visit us at [www.TradiantCAD.com](http://www.TradiantCAD.com) or call 901.881.1250 for more information.

## Trystar Cables

### Booth 522

Faribault, MN

Ph: 507.333.3990

Toll Free: 866.879.7827

Fax: 507.334.1683

[www.trystar.com](http://www.trystar.com)

Trystar is a manufacturer of welding and generator cable. Colored cable, custom printing, complete assemblies with connectors, holders, and grounds. Trystar also manufactures distribution equipment. Spider panels, splitters, transformers, I-Lines, etc.

## TurnaSure, LLC

### Booth 541

Langhorne, PA

Ph: 215.750.1300

Toll Free: 800.525.7193

Fax: 215.750.6300

[www.turnasure.com](http://www.turnasure.com)

TurnaSure's legacy company invented Direct Tension Indicators (DTIs) nearly half a century ago. Recently, TurnaSure radically redesigned DTIs and expanded the product line. For structural bolts they are covered under ASTM standard F959; a new ASTM F2437 covers anchor bolts, etc. TurnaSure is the world's largest manufacturer. Their ingenious patented curved protrusion design enables DTIs to be inserted directly under the nut, eliminating the cost or need of a hardened washer for greater convenience for properly tensioning bolts.



## United Rentals

### Booth 1127

Toll Free: 800.UR.RENTS

[www.unitedrentals.com](http://www.unitedrentals.com)

United Rentals is your one-stop source for equipment rentals, sales, service, and supplies. We have what it takes to complete your jobs faster, smarter, better. We offer the most popular names in the industry, so you know you will be getting a trustworthy, reliable brand. And with over 14,000 employees and 2,500 sales specialists, we have the resources and expertise to service you, from selection to delivery. Let us help you meet your challenges head on. Stop by one of our 740+ branches or visit our web site: [unitedrentals.com](http://unitedrentals.com), or call 800-UR-RENTS

## VandS Galvanizing

### Booth 529

Columbus, OH

Ph: 614.449.8281

Fax: 614.449.8851

[www.hotdipgalvanizing.com](http://www.hotdipgalvanizing.com)

VandS Galvanizing is a leader in the hot-dip galvanizing industry, with many locations on the East Coast and Midwest, and over 70 locations worldwide. Specializing in corrosion protection of steel with zinc by hot-dip galvanizing. We offer the DUROZINQ program of galvanizing, packaging, tagging, and guaranteed service. We also offer our COLORZINQ system (paint over galvanizing) that adds brilliant color to a base of corrosion protection. VandS offers trucking and many other value added services. Call us for all of your corrosion protection needs.

## Verco Decking, Inc.

### Booth 901

Phoenix, AZ

Ph: 602.272.1347

Fax: 602.269.1758

[www.vercodeck.com](http://www.vercodeck.com)

Verco Decking, Inc. is a manufacturer of steel roof and floor deck products, located in the western United States. Verco currently has manufacturing plants in Phoenix, AZ and the California cities of Fontana (near Los Angeles) and Antioch (near San Francisco). Verco features the PunchLok system, which utilizes the patented PunchLok tool to achieve higher shear values at a lower cost through high quality side seam attachments.



**VERCO DECKING, INC.** a Nucor company  
Innovations in Steel Deck



## **Voortman Corporation**

### **Booth 249**

Manteno, IL

**Ph:** 815.468.6300

**Fax:** 815.468.6333

[www.voortmancorp.com](http://www.voortmancorp.com)

Voortman Corporation is one of the world's leading manufacturers of CNC fabricating systems such as band saws, high-speed drills, plasma/gas coping systems, angle lines, plate punching and shearing systems, plate processing systems, shot blasting systems, and unmanned fully automated beam and plate processing systems. Voortman also produces approx. 30,000 tons per year in its own fully automated fabrication/demonstration facility.

# Voortman

## **Voss Engineering, Inc.**

### **Booth 1119**

Lincolnwood, IL

**Ph:** 847.673.8900

**Toll Free:** 800.323.3935

**Fax:** 847.673.1408

[www.vossengineering.com](http://www.vossengineering.com)

Voss Engineering, Inc. provides expansion/slide bearing assemblies, bearing pads, and isolation materials for highway bridges, industrial structures, machines, process piping, and commercial buildings. Our product line includes the following structural bearing pad materials: SORBTEX (preformed fabric pad/cotton duck pad/CDP), NEOSORB (AASHTO grade polychloroprene), VSB Slide Bearings (PTFE and steel plate), and FIBERLAST or VOSSCO (random oriented fiber pads).

## **Walker Magnetics**

### **Booth 510**

Worcester, MA

**Ph:** 508.853.3232

**Toll Free:** 800.962.4638

**Fax:** 508.353.8649

[www.walkermagnet.com](http://www.walkermagnet.com)

Walker Magnetics is the industrial leader in manufacturing magnetic lifting systems for the steel industry. They are designed to lift plates, slabs, and billets of all sizes. Walker magnets are used in shipyards, metalworking plants, and service centers, moving large plates to and from cutting tables, fabricating areas, welding departments, and receiving/shipping areas.

## **Wheeling Corrugating Company**

### **Booth 829**

Wheeling, VA

**Ph:** 304.234.2300

**Toll Free:** 800.922.3325

**Fax:** 304.234.2330

[www.wheelingcorrugating.com](http://www.wheelingcorrugating.com)

Choose a proven leader in steel decking! Wheeling Corrugating has the distinction of being our nation's most experienced decking manufacturer, with over 117 years of quality and performance and a future focused on innovation and customer service. Wheeling Corrugating has grown to 14 facilities nationally, which are strategically located throughout the country. Our NASCC booth in Phoenix will feature The Gator, our new ICC Approved Seismic ShearLoc System for pneumatically crimping decking side laps.



## **World Engineering Services Pvt. Ltd.**

### **Booth 746**

Mumbai, Maharashtra

India

**Ph:** 91.22.66960415

**Fax:** 91.22.66960418

[www.worldengg.com](http://www.worldengg.com)

WES provides structural steel detailing services from its center in Mumbai, India. All our detailers and checkers are engineers specially trained to AISC and OSHA standards. For our N. American clients, we use latest version 7.122 of SDS/2 and are continually expanding our team. StruCad detailing is offered to our European clients. Apart from detailing, we also provide rebar detailing, machine design, and a host of other engineering services

## Exhibitors

arranged by booth number

101 Peddinghaus Corporation  
109 Ficep Corporation  
109 Steel Projects  
117 Controlled Automation, Inc.

125 Ocean Machinery  
232 DAITO U.S.A., Inc.  
241 Peerless Industrial Equipment Corp.  
249 Voortman Corporation  
340 Behringer Saws, Inc.  
357 Arcmatic Column Welding  
357 Seismic Structural Design Associates  
401 North American Galvanizing Company  
407 Infra-Metals Company  
411 LS Industries  
413 Allied Machine & Engineering Corporation  
415 Rosler Metal Finishing  
417 American Punch Company  
423 COMEQ, Inc.  
429 Schuff Steel Company  
431 Cleveland Punch & Die Company  
433 Plasma Automation, Inc.  
435 CAMBCO, Inc.  
437 Chatham Steel Corporation  
447 J. B. Long, Inc.  
451 Burlington Automation  
457 Amtek LTD, Inc.  
501 Hougen Manufacturing, Inc.  
503 Hercules Bolt Company  
505 Shop Data Systems, Inc.  
506 Mi-Jack Products, Inc.  
507 Nelson Stud Welding, Inc.  
508 IMPACT  
510 Walker Magnetics  
511 Dynamic Fastener  
512 Diversakore  
513 Pneutek, Inc.  
514 ASTM International  
516 Pannier Corporation  
517 Quebec Detailing Connection  
518 Nitto Kohki U.S.A., Inc.  
522 Tristar Cables  
529 V&S Galvanizing  
532 Faccin USA, Inc.  
535 Essar Steel Algoma  
536 Lindapter North America  
541 TurnaSure, LLC  
543 Totten Tubes, Inc.  
545 Birmingham Fastener, Inc.  
546 Stud Welding Associates Pro Weld  
549 Fabtool, LLC  
551 Steel Erectors Association of America (SEAA)  
553 Cleveland City Forge  
600 Intsel Steel Distributors  
601 Metal Dek Group, a unit of CSI  
602 Max Weiss Co., Inc.  
604 InfoSight Corporation  
607 New Millennium Building Systems  
610 Comblift  
612 Ronstan Cable and Rod Systems  
613 Fabreka International, Inc.  
615 DACS, Inc.  
617 Neilsoft  
619 High Steel Structures, Inc.  
623 G.W.Y., Inc.  
627 Spencer Reed Group, LLC.  
629 Holtec Consulting Private Limited  
631 Lincoln Structural Solutions  
634 Star Seismic  
635 Design Data  
640 Gaulle Detailing  
641 PSDesign Engineers & Consultants  
643 IMPACT Engineering Solutions  
644 Kee Safety, Inc.  
645 PPG Protective and Marine Coatings  
648 Pan Gulf Technologies, Pvt. Ltd.  
650 Albina Pipe Bending Co., Inc.  
651 DGS Technical Services, Inc.  
657 LTC, Inc.  
659 Modern Steel Construction magazine  
701 Nippon Steel Corporation  
703 Marubeni-Itochu Steel America, Inc. (MISA)  
707 Delta Structural Steel Services Group  
709 Moldtek Technologies Ltd.  
712 P2 Programs  
713 Structural Desktop, Inc.  
716 Bug-O Systems/Cypress Welding Equipment  
717 Computers & Structures, Inc.  
722 Sherwin-Williams  
723 Graitec, Inc.  
724 Prothious Engineering Services  
728 Strand7 Pty Limited  
731 Eastern Pneumatics & Hydraulics, Inc./McCann Equipment Ltd.  
733 TDS Industrial Services Ltd.  
735 BDS Vircon  
740 Kubes Steel, Inc.  
741 Girder-Slab Technologies, LLC  
742 SSDCP  
744 Indiana Gratings Pvt. Ltd - INDIA  
746 World Engineering Services Private Limited  
747 ESJ Steel Joist  
750 Corus International Americas  
751 Atlas Tube, Inc.  
756 AZZ Galvanizing Services  
757 Brown Consulting Services, Inc.  
760 Skidmore Wilhelm  
761 AISC Certification  
761 American Institute of Steel Construction (AISC)  
761 National Steel Bridge Alliance  
761 Quality Management Company, LLC  
762 Bridge Street Toys  
800 CSC, Inc. Chicago  
801 Design Data

802 BIMSoft, Inc.  
806 Metals USA  
808 FabSuite, LLC  
809 Bentley Systems, Inc. - RAM/STAAD Solution Center  
815 CMC Joist & Deck  
815 CMC Steel Products  
815 Commercial Metals Co. (CMC)  
823 Azco Steel Co.  
825 Core Brace, LLC  
827 Sen Consulting Corp.  
829 Wheeling Corrugating Company  
830 Quincy Joist Company  
832 Pieresearch  
834 SteelCad Consulting Corporation  
835 Dowco Consultants Ltd.  
836 PDM Steel Service Centers, Inc.  
840 Gerdau Ameristeel  
846 Fisher & Ludlow Grating Products  
847 Sharon Stairs  
848 Grating Fasteners, LLC  
850 Paramount Roll & Forming, Inc.  
853 Tennessee Galvanizing, Inc.  
856 ALFRA USA, LLC  
857 Kottler Metal Products, Inc.  
901 Nucor-Vulcraft Group  
901 Nucor Corporation  
901 Nucor Fastener Division  
901 Nucor-Yamato Steel Company  
901 Verco Decking, Inc.  
909 AceCad Software, Inc.  
915 LeJeune Bolt Company  
917 Hilti, Inc.  
922 Applied Bolting Technology, Inc.  
923 Stinger Welding, Inc.  
925 Lohr Structural Fasteners, Inc.  
926 Cerbaco Ltd.  
927 ISD - International Steel Detailing  
928 Lincoln Electric  
929 Detailed Design Drafting Services, Ltd.  
929 M&D Drafting Ltd.  
935 Tekla, Inc.  
941 RISA Technologies  
947 DetailCAD  
949 Trader Software, LLC  
951 eCADsystems, LLC.  
952 Buckner Companies  
953 Michelman-Cancelliere Iron Works, Inc.  
956 Precision Steel Detailing, LLC  
957 Chicago Metal Rolled Products-Chicago  
961 Chicago Clamp Company  
963 SteelDay 2009  
1001 Canam Steel Corporation  
1007 FabTrol Systems, Inc.  
1013 ESAB Welding & Cutting Products  
1014 ArcelorMittal International  
1017 Steel Cast Connections LLC  
1018 Haydon Bolts, Inc.  
1019 St. Louis Screw & Bolt  
1022 Omnitech Associates  
1024 Industrial Galvanizers America  
1028 National Institute of Steel Detailing  
1029 Taylor Devices, Inc.  
1030 Southern Chapter NISD  
1031 Southwest Detailers Association  
1033 SOFTEK Services Ltd.  
1035 Techflow, Inc.  
1041 Atema Inc.  
1043 Tectonix Steel  
1045 TriadCAD.com  
1046 Steel Joist Institute  
1047 Structural Stability Research Council  
1048 Decon USA, Inc.  
1049 INGENIERIA TECNICA STEEL DETAILING  
1050 Steel Business Briefing  
1051 American Galvanizers Association  
1052 4D Steel Detailing (USA) Limited  
1053 International Design Services, Inc.  
1056 Carboline Company  
1101 SidePlate Systems, Inc.  
1103 Gantrex, Inc.  
1105 Soft Steel, Inc.  
1109 GT STRUDL - Georgia Tech CASE Center  
1111 Connected Structural Group  
1112 Radley Corporation  
1114 Structural Engineering Institute of ASCE  
1115 Steel Deck Institute  
1116 Madden Bolt & Galvanizing  
1117 Steel Founders' Society of America  
1118 Cast Connex Corporation  
1119 Voss Engineering, Inc.  
1121 Brafer Steel Structures  
1123 Metal Improvement Company  
1125 Allied Tube  
1127 United Rentals  
1128 Infasco  
1130 American Subcontractors Association, Inc.  
1131 Society for Protective Coatings, The (SSPC)  
1132 Engineering Ministries International (eMi)  
1133 American Welding Society  
1134 Structural Engineer magazine/Zweig White  
1135 American Society of Professional Estimators  
1136 Marks Metal Technology  
1137 National Commission for the Certification of Crane Operators (NCCCO)  
1139 S&J Steel Structures, Inc.  
1140 Real Technology, LLC  
1141 Steel Recycling Institute

(Exhibitors current as of February 5, 2009.)





# NASC

## THE STEEL CONFERENCE

Incorporating the  
2009 Annual Stability Conference

## PHOENIX, ARIZONA

Phoenix Civic Plaza Convention Center

**Conference:** April 1–4, 2009

**Exhibits:** April 1–3, 2009

Technical Seminars ♦ Networking ♦ Product Showcase  
for Structural Engineers, Detailers, Erectors, and Fabricators

### Who attends?

More than 3,700 structural engineers, steel fabricators, erectors, detailers, educators, and others involved in the design and construction of fabricated steel attend the conference each year. In addition to conference seminars, attendees have many networking opportunities, including the annual Fabricator Workshops, where fabricators can exchange ideas in a non-competitive environment.

### What about the exhibit hall?

This year's exhibit hall features more than 400 booths with more than 200 exhibitors demonstrating their latest products. You'll find fabrication equipment, detailing software, connection products, safety equipment, engineering software, and coatings. Equipment manufacturers typically provide full demonstrations of their equipment; steel beams are cut, punched, and drilled right on the exhibit hall floor! The exhibit hall is open April 1–3.

### What will I learn?

Learn about topics ranging from gusset plates for seismic construction to structural integrity in buildings to HSS design. Some sessions focus on technical issues while other focus on fabrication, erection, or detailing. But all attendees are welcome to attend any of the sessions, regardless of track. In addition to our regular technical sessions, we've also invited some of the industry's top professors and some of the leading experts to give their "best lecture." Speakers include Shankar Nair, Bill Thornton, Jim Malley, Tom Ferrell, Abbas Aminmansour, Peter Birkemoe, Chia-Ming Uang, and Duane Ellifrit. And new this year, we're offering a two-day "how to design" program from one of the nation's top structural engineering firms (this is a more formal version of the program Computerized Structural Design uses to train its new employees).

For more information, visit

[www.aisc.org/nascc](http://www.aisc.org/nascc)

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THE **STEEL** CONFERENCE is a premier education event aimed at providing structural engineers, steel fabricators, erectors, and detailers with practical information and the latest design and construction techniques. More than 60 technical sessions offer a variety of educational opportunities:

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The Wal-Mart Effect and Your Business  
Gusset Plates for Seismic Construction  
Structural Integrity in Buildings  
Steel Interchange LIVE!  
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Delegating Connection Responsibility to the Fabricator—What Is the EOR's Legal Responsibility?  
Rules of Thumb for Steel Design  
Design of Frames Using Web-Tapered Members  
Staggered Truss Systems: Lessons Learned  
HSS Design  
Specifying Camber—Rules of Thumb for Designers  
The Process of Renovation—Concept to Completion!  
Safety by Design  
Better Base Plate Designs  
Connection Design: Dealing with Load Paths, Transfer Forces, and the Apparent Lack of Joint Equilibrium  
Cold-Formed and Hot-Rolled: The Best of Both Worlds  
What Fabricator Certification Means to the EOR  
Wind Design Considerations for Steel Joists and Joist Girders  
Trends in Offshoring/Outsourcing and How Advances in Software Address the Migration  
An Introduction to Earthquake Engineering and Seismic Codes—Part I: Ductility  
An Introduction to Earthquake Engineering and Seismic Codes—Part II: Seismic Provisions

An Introduction to Earthquake Engineering and Seismic Codes—Part III: Design Examples  
BIM: "Cradle to Grave"—From the Structural Engineer's Perspective  
How Does Parking Play with Mixed-Use?  
Ethics and Accountability  
Improving Shop Safety  
Estimating Rules of Thumb  
QMC's Top 10 CARs: Part I  
QMC's Top 10 CARs: Part II  
Current Sales Forecasts and Outlook  
Contract Language and Risk Management—Understanding Basic Contract Language  
Employee Retention (What's New? What Can We Do?)  
Trucking: Lease vs. Buy vs. Contract  
Fabricator Roundtable  
Connections: The Good, the Bad, and the Ugly  
RFIs: Use and Abuse (Do you Know the Difference?)  
Document Control Management  
How to Get Rich in Detailing  
Value-Added Selling: Competing Against Overseas Detailers  
OSHA Revisited  
Fire Protection, Painting and Galvanizing (What the Detailer Should Know)  
Communicating and Coordinating Between Detailers  
Stair and Miscellaneous Steel Detailing in 3D  
High Seismic—An Erector's Guide  
Safety First  
Moving Steel to Make Iron  
Preparing a Site-Specific Erection Plan

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Internal Auditing & Audit Program Design For Steel Fabricators  
March 31, 2009  
Phoenix, AZ (In conjunction with NASCC)

AISC Building, Bridge & Component Certification Criteria  
May 18, 19, 20, 2009  
Chicago, IL

AISC Sophisticated Paint Endorsement  
May 20, 21, 2009  
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## Author Thomas A. Sabol, Ph.D., S.E.



is a Principal at Englekirk & Sabol Consulting Structural Engineers, Inc., a Los Angeles-based firm specializing in structural and earthquake engineering, historical structure rehabilitation, and wind engineering.

He received his B.S. in Architectural Engineering from California Polytechnic State University, San Luis Obispo, and his Ph.D. in Structural and Earthquake Engineering from UCLA. In addition to his structural design experience, Tom has extensive experience in evaluation of earthquake safety of structures and has directed numerous projects investigating the seismic behavior of buildings.

Sabol is an Adjunct Professor in the Civil Engineering Department at UCLA where he teaches graduate and undergraduate courses focusing on tall building design, earthquake engineering, and structural steel. His research work has focused on the performance of structural steel buildings subjected to earthquake loads. He is a member of AISC's Seismic Provisions Technical Committee and the Committee on Specifications.

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## Professional is as Professional Does

BY DOUG CAPLAN

Maintaining a professional image is even more important when you're a one-man show.

**NOT TOO LONG AGO**, I was on a steel detailing listserve and read a posting from a detailer who was considering the jump from working for a firm to working for himself. As a formerly self-employed detailer, I replied to him with my advice and then realized that it might be beneficial to others in the industry—or anyone else thinking of going into business for themselves—as well.

The first thing to keep in mind is the difference between self-employed and being a business owner. Self-employed people work for themselves. It's a simple formula: Work 40 hours, get paid for 40 hours. Work very hard, crazy hours for those 40 hours, still get paid for 40 hours.

Business owners, on the other hand, know that a business is a team effort. A 40-hour job can be done in 20 hours if there are two people working on it, or maybe even a day-and-a-half if there are four people working on it. Those folks who don't particularly like the self-employed lifestyle probably never viewed the whole concept as a business enterprise when they got into it.

Being self-employed is great in a consulting capacity, but detailing is a production-based trade. I only have five people working for me, and I still lose jobs because we do not have the production capacity to fast-track a lot of jobs. Regardless of business size, a professional detailing service needs to appear as exactly that: professional. This is especially true when you're running a small or even a one-person business, as you can't necessarily fall back on the inherent image of professionalism that comes from being associated with a larger company.

Here are a few ideas for self-employed detailers to promote a professional image and hopefully get more respect and appreciation—and work:

### Don't answer the phone with "Hello."

Answer with your company name. If you don't have a company name, either get one or answer with one (under a proprietorship), and if you are not available, don't share the answering machine or voicemail with your family phone. Always say that you are either on the other line or away from your desk, even if you have only one line. There is nothing wrong with a client believing you are on the phone with—god forbid—

another client! No one will treat you as a professional if you don't treat yourself as one.

### Always under-promise and over-deliver.

It worked miracles for me. If you can do a job in three weeks, tell them four, and then give it to them in perhaps a little under three weeks. Also, learn the art of negotiation. Since you're not a large firm, you'll want to be realistic about your ability to turn a job around in a specified time frame and you'll need to make sure your customers are realistic as well.

### Get a real e-mail address.

A Yahoo! or Hotmail address tells the business world you are not taking yourself seriously, so why should anyone else? Get a domain name and look professional.

### Always refer to yourself as we, not I or me.

I learned this one the hard way. "We" means you are a company open for business. "I" means you are desperate for clients.

### Don't be afraid to tell the world how good you are at what you do.

Successful people are attracted to successful people. There is nothing arrogant about bragging about your abilities and achievements. What is arrogant is bragging about your achievements and not delivering the goods. (This is assuming that you are, in fact, good at what you do.)

Bottom line, look and act like a professional, and other professionals will take you a lot more seriously. Good fabricators are always looking for good detailers—always. Lousy fabricators are also looking for good detailers, but they are looking for suckers!

Despite being self-employed, if you're good at what you do and can present yourself as a professional, credible candidate for a customer's business, there's no reason you shouldn't be able to land the job.

Final note, there are a ton of great books that can help you get what you want out of your life and career (*Book Yourself Solid* by Michael Port and *Maximum Achievement* by Brian Tracey are two that come to mind). Try reading some of them. It might be the best 30 bucks you've ever spent. **MSC**

Visit <http://finance.groups.yahoo.com/group/steel-detail/> to access the Yahoo Steel-Detail Email Discussion.



Doug Caplan is president of DECCON Steel Detailing Services, Ltd. ([www.deconsteel.com](http://www.deconsteel.com)).

Have an opinion you'd like to share in "Topping Out?" Send your feedback to Geoff Weisenberger, senior editor, at [weisenberger@modernsteel.com](mailto:weisenberger@modernsteel.com).



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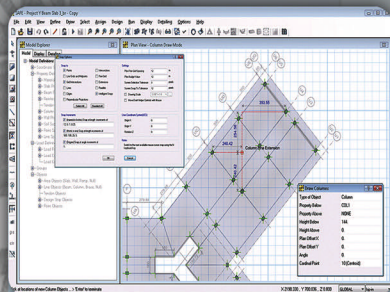




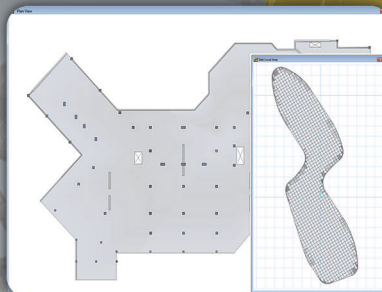
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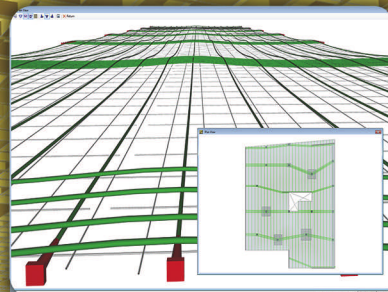
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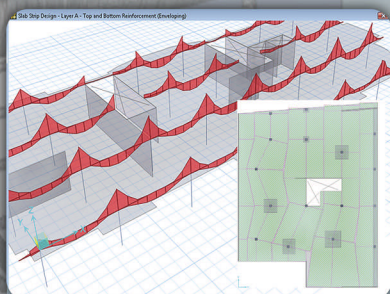
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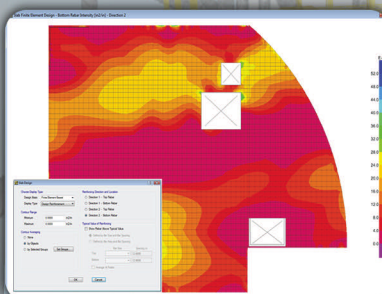
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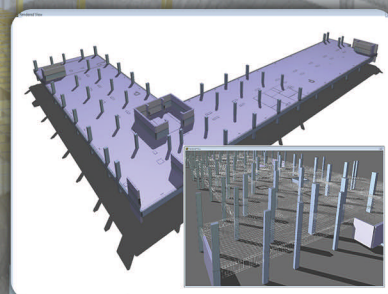
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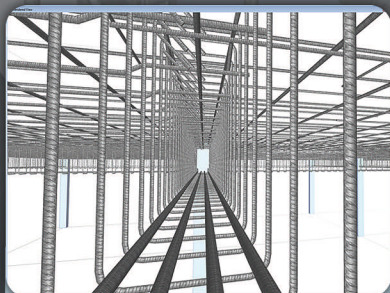
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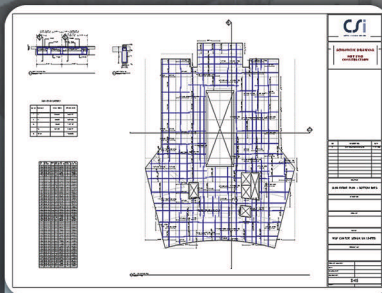
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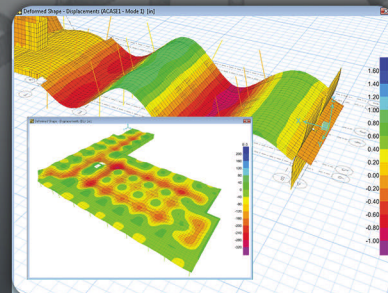
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