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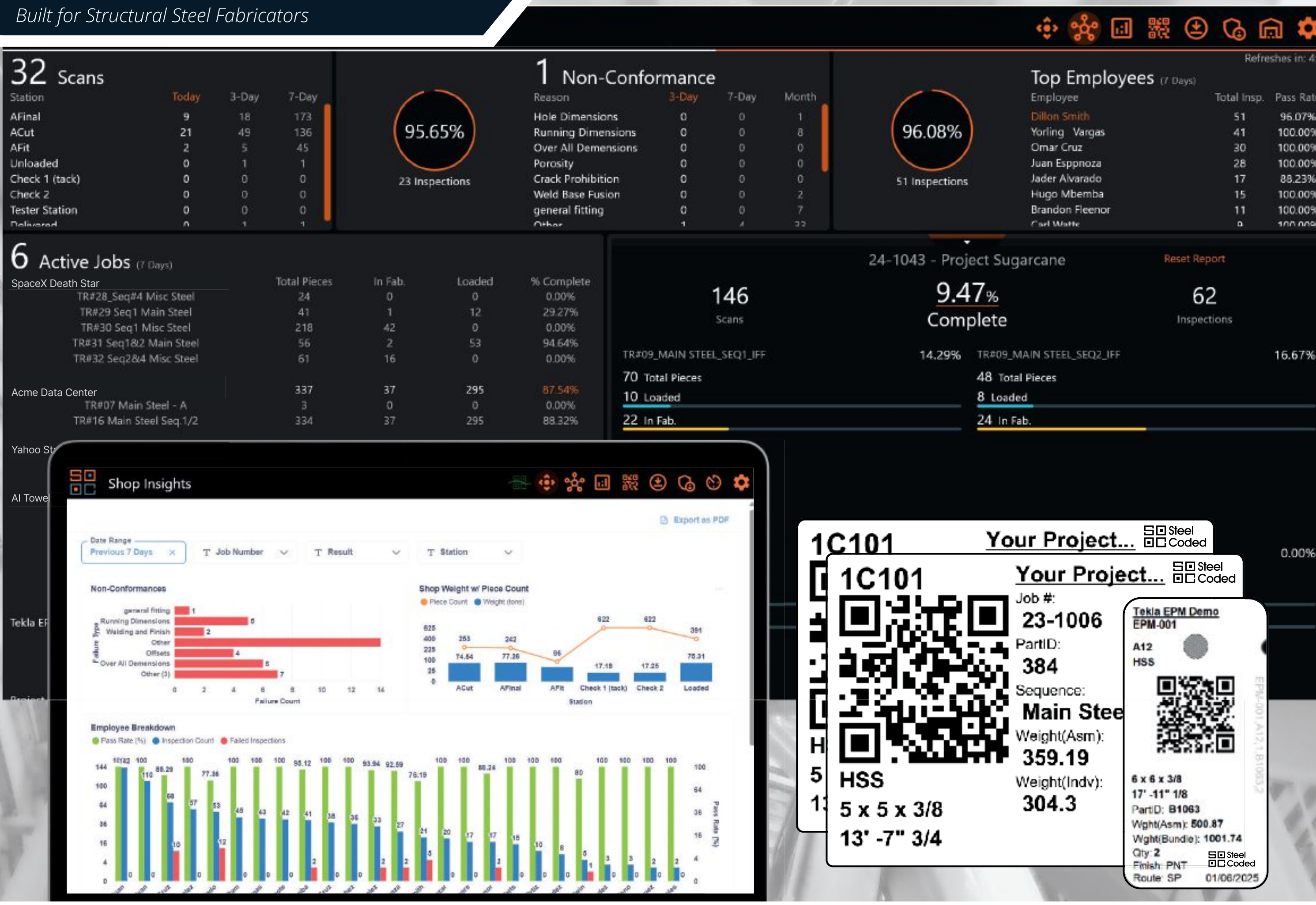

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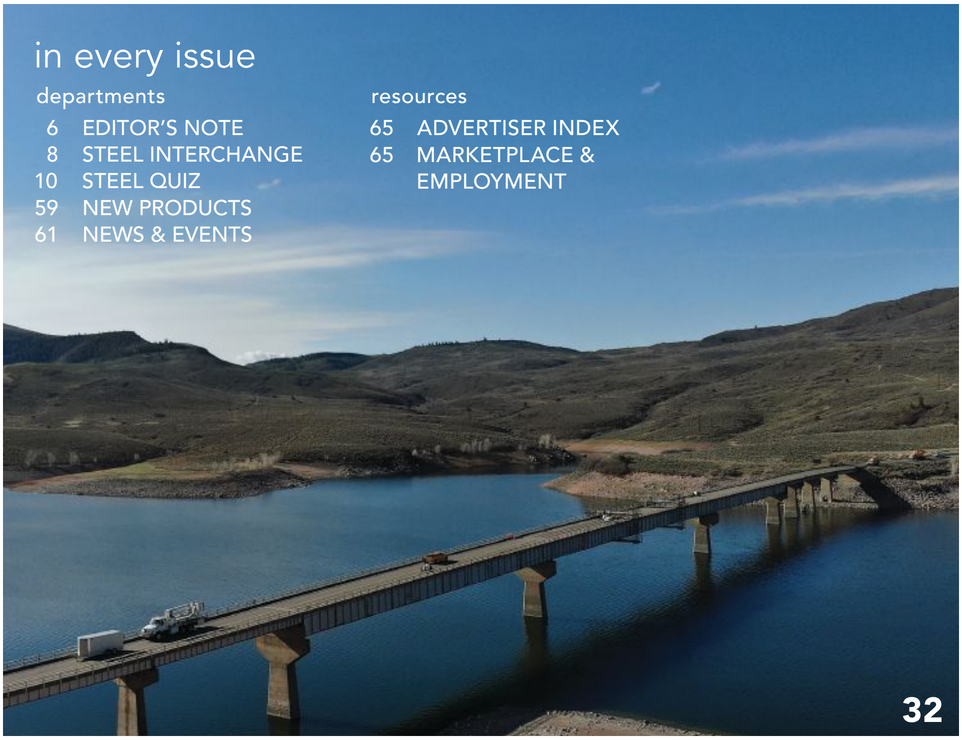

in every issue

departments

resources

columns

features

ON THE COVER: A concrete building from the 1970s added steel framing to help bring it into its second life, p. 24. (Image: Thornton Tomasetti)

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editor's note

As Steve Miller once said, "Time keeps on slipping, slipping, slipping… into the future."

These lyrics come to mind because even though it feels like summer was just yesterday (thanks, largely, to the warm weather lingering further into the fall than usual here in Chicago), winter is now in full swing and it's the start of 2026.

The new year is often a time of change—or at least promises of change, many of which turn out to be hollow within weeks. Part of the issue, I think, is that New Year's resolutions can be overly ambitious.

But here at *Modern Steel Construction*, we've kept our resolution to add a new column to the magazine, one that gathers voices from the design and construction industry and provides them with a platform to enlighten us on the topics that are most important to them—and that they know a *lot* about. In our inaugural The Last Word Column (found on the last page of the magazine), you'll hear from Tom Smith, former executive director of the American Society of Civil Engineers (ASCE), who was instrumental in creating the ASCE Infrastructure Report Card. (By the way, Structurally Sound, which appeared on the last page for more than a decade, will live on in the form of web-exclusive content at **www.modernsteel.com**.)

The 2025 report card just came out recently, and you can see how the U.S. infrastructure fared at **infrastructurereportcard.org**. It's a crucial measuring stick for a crucial component of the U.S. As Smith says of infrastructure as a whole, "It's the foundation for our country and essential for a globally competitive economy." No doubt, a recurring New Year's resolution for the engineering community is to work to improve the grade every year.

Another recurring resolution in our industry is to get more PDHs. Good news: We've got you covered! Registration for NASCC: The Steel Conference opens on January 26. And at this year's conference, you can earn up to 16 PDHs (and an additional four hours if you attend a short course on Tuesday). Not able to attend in person? Not a problem! You can still earn up to 13 PDHs via NASCC Online sessions. Information on sessions, exhibitors, sponsorships, and more is available at **aisc.org/nascc**.

And remember, attending the conference (or tuning in to the streaming sessions) is more than about simply earning PDHs. Our sessions aim to provide actionable information you can apply immediately. And for the topics, we don't just issue a general call for papers. Rather, we talk to industry experts to find out what's important in steel design and construction right now, as well as what's coming down the pike, and invite the innovators who are changing the industry to speak.

We attract a *lot* of experts and innovators to The Steel Conference. The 2026 edition will feature more than 200 sessions, including the Thursday and Friday keynotes, "The Aesthetic Appeal of Steel," presented by renowned AESS (architecturally exposed structural steel) expert Terri Meyer Boake, and "Fatigue and Fracture Performance," presented by 2026 AISC T.R. Higgins Lectureship Award winner Caroline Bennett—especially valuable for those of you who have resolved to incorporate more AESS into your designs or bone up on your fracture knowledge in 2026.

I should add that the conference takes place April 22–24 in Atlanta. We look forward to seeing you there! Meanwhile, Happy New Year, and thanks for reading!

Geoff Weisenberger
Editor and Publisher

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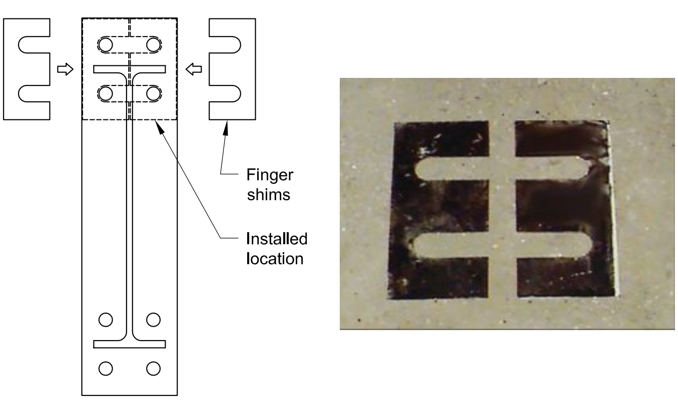
If you've ever asked yourself "Why?" about something related to structural steel design or construction, *Modern Steel*'s monthly Steel Interchange is for you! Send your questions or comments to **solutions@aisc.org**.

Slip-Critical End-Plate Moment Connections with Shims

Are shims permitted to be used in end-plate moment connections if the connections are required to be slip-critical?

Yes. Its is common to use shims with end-plate moment connections. Shims are not prohibited in either slip-critical connections or end-plate moment connections.

Design Guide 39: *End-Plate Moment Connections* (download or order at **aisc.org/dg**) Section 4.2.1 states, "To solve the tolerance problem, the beam or girder may be detailed and fabricated 3/16-in. to 3/8-in. short, and then any gaps between the end-plate and column flange filled using finger shims. Finger shims are thin steel plates, usually 1/16 in. thick, that are cut to match the connection bolt pattern so that they can be inserted between the column flange and the end-plate. Figure 4-1 illustrates the use of finger shims inserted from the sides, although finger shims may also be inserted from the top. A tilted column flange or end-plate can be corrected by inserting more or thicker shims on one side of the connection than the other. Experimental tests have been performed with finger shims, and no adverse consequences or differences in connection behavior were observed. If the shim thickness exceeds ¼ in., the bolt shear strength must be adjusted according to AISC *Specification for Structural Steel Buildings* (ANSI/AISC 360-22) Section J5.2."



(a) Application of finger shims

(b) Picture of finger shims (Sumner, 2003)

Fig. 4-1. Typical use of finger shims.

Specification Section J3.9 states, "Slip-critical connections shall be designed to prevent slip and for the limit states of bearing-type connections." This means that the bolt shear strength is still a consideration and so one may want to keep the total thickness of shims less than or equal to ¼ in.

Specification Section J3.9 also includes a factor for fillers, h_f, which reduces the slip resistance when there are "two or more fillers between connected parts." Perhaps rather than supplying several 1/16-in.-thick shims to be stacked as needed, one may choose to provide shims of various thicknesses, so that only one shim is needed. Conversely, one may choose to assume in the design of the connections that there will be "two or more fillers between connected parts" and reduce the slip resistance to simplify erection.

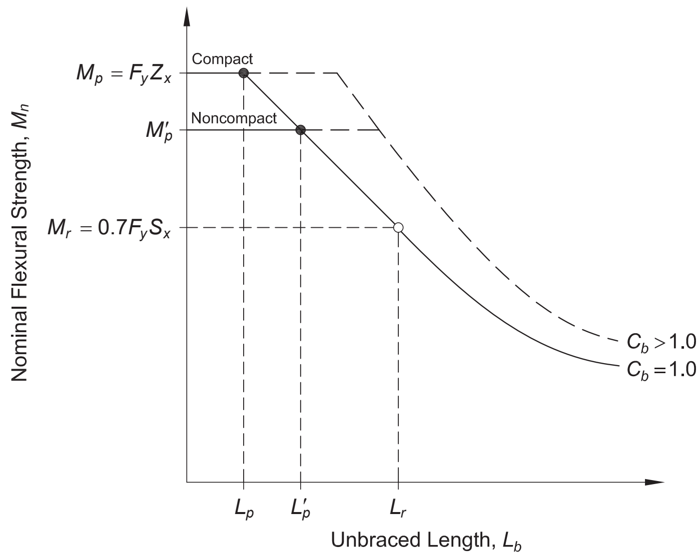
Generally, end-plate moment connections do not have to be designed as slip-critical, and this is one of their advantages. Design Guide 39 Section 1.1 states, "The end-plate connection does not need to be designed as slip-critical, thus allowing relaxed surface preparation as compared to other bolted moment connections such as bolted flange plate connections." In Section 3.5, it states, "Slip-critical end-plate connections are not required for static (temperature, wind, and snow) or seismic loading." This is further explained in Section 3.7.2, which states, "Generally, the shear force at a connection can be resisted by the compression side bolts. End-plate connections need not be designed as slip-critical connections, and it is noted that shear is rarely a major concern in the design of moment end-plate connections."

The end-plate connection does not need to be designed as slip-critical, because the bolts are primarily resisting loads through tension and because, as stated in Section 3.7.2, "shear is rarely a major concern in the design of moment end-plate connections."

Larry Muir, PE

Inconsistencies in the *Manual* Table L_p Values

In the 16th Edition AISC *Steel Construction Manual* tables, some shapes list L_p values that do not match those calculated directly from the 2022 AISC *Specification for Structural Steel Buildings* (ANSI/AISC 360). Why are these tabulated values different?



$$L_p = 1.76 r_y \sqrt{\frac{E}{F_y}} \qquad \text{(\textit{Spec}. Eq. F2-5)}$$

$$L_r = 1.95 r_{ts} \frac{E}{0.7F_y} \sqrt{\frac{Jc}{S_x h_o} + \sqrt{\left(\frac{Jc}{S_x h_o}\right)^2 + 6.76\left(\frac{0.7F_y}{E}\right)^2}} \qquad \text{(\textit{Spec}. Eq. F2-6)}$$

$$M_r = 0.7F_y S_x \qquad \text{(3-1)}$$

For cross sections with noncompact flanges:

$$M'_p = M_n = M_p - \left(M_p - 0.7F_y S_x\right)\left(\frac{\lambda - \lambda_{pf}}{\lambda_{rf} - \lambda_{pf}}\right) \qquad \text{(from \textit{Spec}. Eq. F3-1)}$$

$$L'_p = L_p + \left(L_r - L_p\right)\frac{\left(M_p - M'_p\right)}{\left(M_p - M_r\right)} \qquad \text{(3-2)}$$

Fig. 3-1. General available flexural strength of beams.

The tabulated values are different because the *Manual* shows the L'_p value for L_p for cross sections with non-compact flanges.

The *Specification* defines L_p as the limiting laterally unbraced length for yielding, while the *Manual* introduces L'_p, defined in Part 18, to adjust L_p for the limiting laterally unbraced length for the maximum design flexural strength of non-compact shapes for the uniform moment case ($C_b = 1.0$).

The *Manual* includes design aids and tables, and it adds symbols such as L'_p (and M'_p) to present consistent and usable values across limit states, in this case, to support its tabulated flexural design information.

For non-compact sections, the *Manual* uses these modified parameters L'_p (and M'_p), which are defined and illustrated in Part 3 (Figure 3-1), and replaces L_p (and M_p) in the tables for these shapes.

Part 6, specifically Table 6-1, applies the same approach for members subject to combined forces. The tables in Part 3 and the Available Flexural Strength portion of Table 6-1 identify these shapes with Footnote f to indicate they are noncompact.

Melissa Gradecki, SE, PE

F1554 Anchor Rod Nut Requirements

For an F1554 Grade 55 anchor rod in a fixed base plate, is a single, properly selected nut sufficient to develop the tensile strength of the rod, or is a double nut required for strength?

A properly selected single nut is sufficient to develop the specified minimum tensile strength of the anchor rod.

ASTM F1554-20 Section 6.7.1 has a table of recommended nuts for use with various grades and diameters of anchor rods, which are selected to develop the tensile strength of the rod (when the nut is fully engaged). This table in ASTM F1554 can be used to select the appropriate nuts for the anchor rods.

The September 2016 *Modern Steel Construction* article titled, "Strength and Engagement," (find at **modernsteel.com/archives**) states, "A suitable heavy-hex nut (HHN, fully engaged) will, without thread stripping, allow a matching bolt or anchor to develop its tensile ultimate at the threaded cross-section."

There are some conditions where double nuts are recommended, but they are not related to developing the tensile strength of the rod. AISC Design Guide 1: *Base Connection Design* (download or order at **aisc.org/dg**) discusses double-nut joints in Appendix A, where it states,

"Anchor rods are sometimes used in special applications that require special design details, such as anchor rods designed without a grout base (double-nut anchor rods), anchor rods in sleeves, pretensioned applications, and special moment bases or anchor rod chairs.

"Double-nut anchor rods are different from building column anchor rods that may use a setting nut but are not designed for compression in the completed structure. Double-nut joints are very stiff and reliable for transmitting moment to the foundation. Because tall pole-type structures are nonredundant and are subject to fatigue due to wind flutter, special inspection and tightening procedures should be used. Studies have shown that pretension in the rod between the two nuts improves fatigue strength and assures good load distribution among the anchor rods (Frank, 1980; Kaczinski et al., 1996). The base plates of light and sign standards are not grouted after erection, and the rod carries all the structural load. The anchor rods must be designed for tension, compression, and shear, and the foundation must be designed to receive these loads from the anchor rods…"

Heather Gathman, PE

Melissa Gradecki (**gradecki@aisc.org**) is senior engineer, innovation, and **Heather Gathman** (**gathman@aisc.org**) is a staff engineer, both in AISC's Steel Solutions Center. **Larry Muir** is a consultant to AISC.

steel quiz

This month's quiz is all about industrial buildings with cranes. Learn more in AISC Design Guide 7: *Industrial Building Design*, Third Edition (download or order at **aisc.org/dg**). The questions and answers were developed by Mansoureh Shahabi, an AISC intern and graduate student at the Illinois Institute of Technology.

1 Which crane classification from the Crane Manufacturers Association of America (CMAA) would be most appropriate for a machine shop operating 10 lifts per hour, with average loads of 50% of the rated capacity?
a. Class B – Light Service
b. Class C – Moderate Service
c. Class D – Heavy Service
d. Class E – Severe Service

2 Proper detailing can help ensure long-term fatigue performance of crane runway girders. Which of the following practices helps minimize the potential for fatigue cracking?
a. Limiting the applied stress range to acceptable levels.
b. Avoiding eccentricities due to rail misalignment or out-of-plane distortions.
c. Avoiding stress concentrations at critical locations.
d. All of the above.

3 **True or False:** The dominant variable governing fatigue damage is the maximum stress imposed by dead plus live load.

4 **True or False:** The crane weight should be included in seismic load determination.

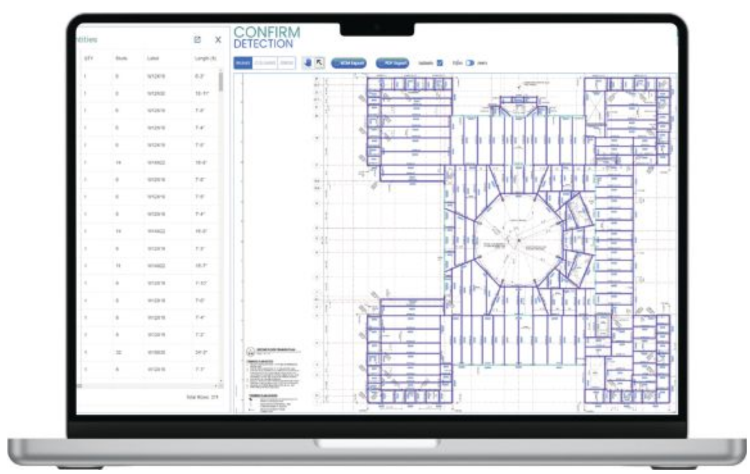
5 **True or False:** The recommended lateral deflection limit of the crane beam due to crane lateral loads is L/600.

6 **True or False:** Crane runway fabrication and erection tolerances can typically be the same as those used in standard steel frameworks for buildings.

7 **True or False:** Crane columns in most industrial buildings with cranes are statically indeterminate.

TURN TO PAGE 12 FOR ANSWERS

[redacted] is using SketchDeck.ai to automate their steel takeoffs and win more bids than ever.



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— [redacted]

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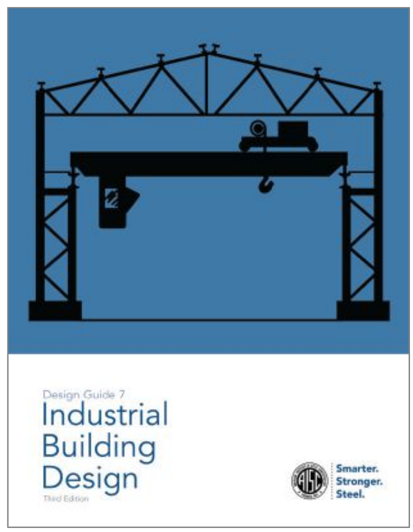
Answers reference the third edition of AISC Design Guide 7: *Industrial Building Design*.

1 **b.** Class C – Moderate Service. Classifications for cranes have been established by the Crane Manufacturers Association of America (CMAA) *Specification for Top Running Bridge and Gantry Type Multiple Girder Electric Overhead Traveling Cranes—No. 70*, referred to as CMAA 70. The class of crane, the type of crane, and loadings all affect the design of crane buildings. Cranes are classified into loading groups according to the service conditions of the most severely loaded part of the crane. Class C covers cranes which may be used in machine shops or paper mill machine rooms, etc., where service requirements are moderate. In this type of service, the crane will handle loads which average 50% of the rated capacity with 5 to 10 lifts per hour, averaging 15 ft, not over 50% of the lift at rated capacity (Section 10.2).

2 **d.** All of the above. While fatigue cracking has been a common source of crane runway girder problems, well-designed and detailed girders have demonstrated excellent performance under millions of load cycles. Successfully performing girders have been properly designed and detailed to limit the applied stress range to acceptable levels, avoid eccentricities due to rail misalignment or out-of-plane distortions, and avoid stress concentrations at critical locations. See Chapter 11 for more information and other design and detailing recommendations to minimize the potential for fatigue damage.

3 **False.** Fatigue failures result from repeated application of service loads, which cause crack initiation and propagation to final fracture. The dominant variable is the tensile stress range imposed by the repeated application of the live load, not the maximum stress that is imposed by live plus dead load (Section 11.1).



4 **True.** Although cranes do not induce seismic loads on a structure, the crane weight should be considered in seismic load determination. For cranes and trolleys that lift suspended loads, the seismic mass need only include the empty weight of the crane and trolley, not the lifted load. Designers must also evaluate crane location, soil conditions, and possible vertical accelerations that could cause the crane to "bounce" off the runway during an earthquake (Section 12.6).

5 **False.** The recommended lateral deflection limit of the crane beam due to crane lateral loads is L/400 for all CMAA 70 crane classes. The recommended vertical deflection limit of the crane beam due to wheel loads (without impact) varies depending on the CMAA 70 crane class. The recommended vertical deflection limits are L/600 for light and medium cranes (Classes A–C), L/800 for light and medium cranes (Class D), and L/1000 for heavy-duty mill cranes (Classes E and F). See Chapter 14 for more information.

6 **False.** Crane runway fabrication and erection tolerances should be addressed in the project specifications because standard tolerances used in steel frameworks for buildings are not tight enough for buildings with cranes. Also, some of the required tolerances are not addressed in standard specifications. Chapter 15 contains guidance on the fabrication and erection tolerances that should be applied to crane runways.

7 **True.** Typically, crane columns are restrained at the bottom by some degree of base fixity, with the level of fixity largely under the control of a designer. Even with a complete computer frame analysis, certain assumptions must be made of the degree of restraint at the bottom of a column and the distribution of lateral loads in the structure. Chapter 16 includes a discussion of the way a crane column can be analyzed, how the detailing and construction of the building will affect the loads the crane column receives, and how shear and moment will be distributed along its length.

Everyone is welcome to submit questions and answers for the 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 **solutions@aisc.org**.

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Composite Column Central

BY MARK DENAVIT, PE, PHD

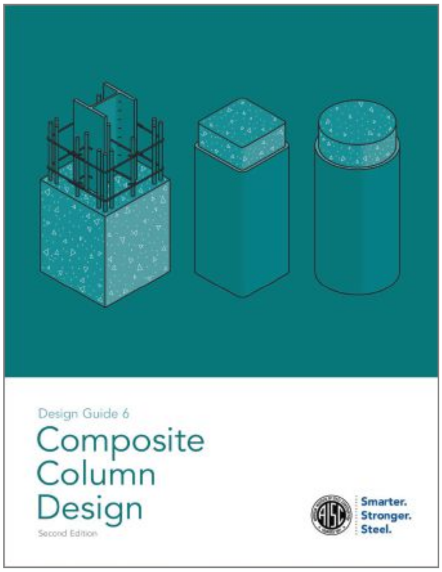
An updated AISC design guide is a comprehensive reference for composite column design and unveils a new user-friendly design tool.

COMPOSITE CONSTRUCTION, the combination of structural steel and concrete in unified structural elements, has long been recognized as an effective way to achieve strength, stiffness, economy, and durability in buildings. When applied to vertical load-bearing members, this approach yields composite columns, which bring together the compressive strength and fire resistance of concrete with the ductility and speed of construction associated with steel.

The newly released second edition of Design Guide 6: *Composite Column Design*, is the latest in the 40-volume series of design guides published by AISC, each providing detailed information on topics related to structural steel design and construction. Design Guide 6 is a comprehensive reference for engineers designing with composite columns.

Updated to reflect the 2022 AISC *Specification for Structural Steel Buildings* (ANSI/AISC 360) and the 2019 ACI *Building Code Requirements for Structural Concrete* (ACI 318), the guide provides theoretical background and practical tools for safe and efficient design of composite columns. It supersedes the first edition of Design Guide 6, which was published in 1992 and focused on encased composite columns. The second edition expands coverage from the first edition's focus on encased composite members to include filled composite columns and introduces a spreadsheet-based design tool in place of extensive tables of available strengths.

The guide's primary intent is to help engineers interpret and apply the latest design provisions for composite columns. It describes provisions for encased and filled composite members. Encased composite members (typically wide-flange steel sections surrounded by reinforced concrete) and filled composite members (hollow structural sections or box sections filled with concrete, sometimes with additional reinforcement) are the main types of composite columns. The guide focuses on non-seismic design, but acknowledges the proven ductility of composite columns under extreme events such as earthquakes and blast.



The structure of the guide is practical and user-oriented, containing the following chapters:

- **Introduction.** Context, applications, and historical background.
- **Members and Frames.** Design methods, required and available strengths, and detailed provisions for different column types.
- **Connections.** Load transfer mechanisms, simple and fully restrained beam-to-column connections, and base connections.
- **Practical Design Considerations.** Fire resistance, reinforcement details, concrete placement, erection stability, and long-term column shortening.
- **Future Perspective.** Emerging directions in sustainability, resilience, and innovative composite systems.

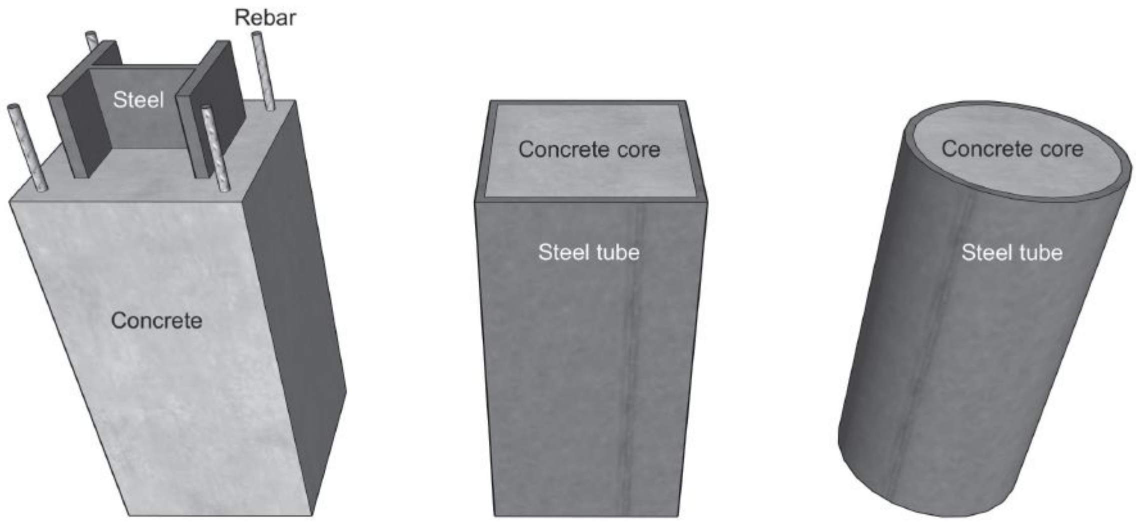
Additionally, an appendix introduces a composite column design program in spreadsheet form, replacing the design tables of the first edition.

The second chapter on members and frames is the most lengthy and detailed. It starts by describing how composite columns fit within the *Specification*'s two primary methods of design: the direct analysis method and the effective length method. Both methods require specific definitions of stiffness in analysis models used to calculate required strengths. Unlike steel, concrete cracks at low tensile stress and has a relatively low proportional limit in compression, meaning that gross section properties must be reduced in addition to stiffness reductions associated with the method of design.

For calculation of available strengths, the guide lays out *Specification* provisions for axial, flexural, shear, and interaction strengths across different types of members: encased, rectangular or square filled, high-strength rectangular filled, and round filled members. Design examples are embedded throughout to demonstrate real-world applications.

Some of the available strength calculations for composite columns cannot efficiently be done by hand. In particular, the flexural strength of many composite sections is difficult to compute by hand. For this reason, the authors of Design Guide 6 developed a spreadsheet to accompany the guide. Flexural strength is computed in the workbook with macros that discretize the composite cross-section into small fibers and determine the neutral axis and moment strength numerically.

Connections are a perennial challenge in composite construction, and Design

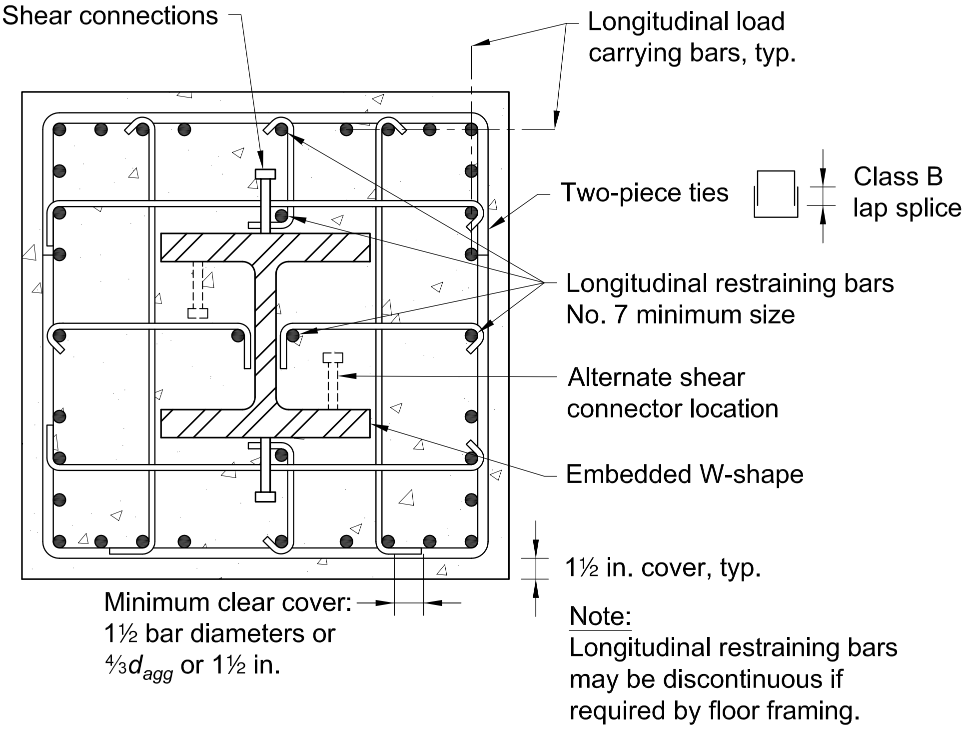


(a) Rectangular encased composite member

(b) Rectangular filled composite member

(c) Round filled composite member

Types of composite columns considered in Design Guide 6.



Spreadsheet Guide

Design Guide 6: *Composite Column Design*, Second Edition replaced the extensive design tables in the first edition with an interactive composite column program spreadsheet, available at **aisc.org/dg**. The following questions and answers are a basic guide to using it.

Why was a spreadsheet included with this design guide?

Calculating the flexural strength of composite members is difficult. Equations for some cross sections can be found in the Commentary on the AISC *Specification for Structural Steel Buildings* (ANSI/AISC 360-22) or in the tables of AISC 16th Edition *Steel Construction Manual* Part 6, but equations are not available for many other cross sections. The flexural strength for any composite cross section can be computed numerically, but until the spreadsheet was released, there were no easy-to-use and widely available tools capable of performing the calculations.

What are the spreadsheet's main features and how is it laid out?

The spreadsheet has one tab with general information and four tabs of calculations for different types of composite columns. The calculation tabs are formatted to print nicely on two or three pages. The first page shows user input and calculated section properties; results of the available strength calculations are shown on the following page(s). The main feature of the program is easy calculation of the available strengths of composite members, especially the available flexural strengths that are difficult to compute by hand.

What can you do with the spreadsheet?

The main purpose of the spreadsheet is to calculate available strengths of composite columns. The goal when developing the spreadsheet was to do one thing well, so it is not a full design solution. However, you can use it to efficiently calculate the strength of individual columns. You can also use the spreadsheet, which has been reviewed by the authors of Design Guide 6 and AISC to validate in-house software that is part of a full design solution.

What kinds of composite columns does the spreadsheet cover?

The spreadsheet works for four different types of doubly symmetric composite columns: round filled composite members, square or rectangular filled composite members, square or rectangular filled composite members constructed with high-strength materials, and encased composite members. The filled composite members can have any range of thickness from compact to slender and can include internal reinforcement. Encased composite members are limited to I-shaped steel sections in square or rectangular reinforced concrete sections. Steel sections can be selected from a list of rolled wide-flange shapes (for encased), formed HSS shapes (for filled), or custom defined for built-up shapes or box-sections.

Guide 6 dedicates a full chapter to them. The basics of load transfer are described first and followed by discussion of specific connection types, including simple shear connection between beams and composite columns, non-seismic moment connections between beams and composite columns, and base connections.

Beyond code provisions, the guide acknowledges realities of practice with a chapter on practical design considerations on a range of topics, including:

- **Fire resistance.** Concrete infill or encasement boosts fire ratings.
- **Reinforcement details.** Reinforcement congestion and constructability issues are addressed with practical detailing advice, ensuring that designs on paper can be built successfully in the field.
- **Concrete placement.** Guidance on how to fill HSS members without the wet weight of concrete bulging the walls.
- **Erection stability.** Temporary bracing needs during construction before concrete cures.
- **Column shortening.** Addressing long-term creep and shrinkage effects in tall buildings, with mitigation strategies such as shims or length adjustments.

Composite construction has a long history. Early composite structures simply took advantage of the protection that the concrete provided to steel shapes for resistance to fire and corrosion. Through advances in research and practice, composite structural systems have become a practical option for many building types and dominant for the world's tallest buildings.

The future of composite construction, described in the final chapter, presents opportunities for more sustainable and resilient systems. Composite construction is well-suited to embrace low-carbon materials, modular prefabrication, and design for deconstruction approaches. Innovations such as replaceable energy-dissipating components could make composite systems more resilient to earthquakes and extreme events, allowing structures to recover quickly with minimal waste.

For practicing engineers, Design Guide 6 provides direct support in applying the latest specifications to real projects, with worked examples, connection details, and a design spreadsheet. For the broader design community, it captures the trajectory of composite construction, from its early history to its adoption in the tallest buildings in the world to its potential role in a more sustainable future. Whether you are tackling a 60-story tower or a low-rise industrial structure, this reference will help you unlock the benefits of combining steel and concrete into one of the most effective structural forms available today.

Download Design Guide 6 and the associated spreadsheet-based composite column program at **aisc.org/dg**. ■

Through beam connections are among the connection types covered in Design Guide 6.

Design Guide 6, second edition was written by Matthew Trammell of Trammell Engineering Group; Mark Denavit of the University of Tennessee-Knoxville; Tiziano Perea of Universidad Autónoma Metropolitana, Mexico City; Jerome Hajjar of Northeastern University; and Roberto Leon of Virginia Tech.

Mark Denavit (**mdenavit@utk.edu**) is an associate professor at the University of Tennessee-Knoxville and co-author of Design Guide 6: *Composite Column Design*, Second Edition. He is a member of AISC Committee on Specifications, Task Committee 5—Composite Design.

Sustained Success

INTERVIEW BY GEOFF WEISENBERGER

Jerry Hajjar once planned to spend his entire career as a practicing engineer, but an affinity for research pulled him into academia, where he has found a passion for sustainability, resilience, and earthquake engineering.

JERRY HAJJAR REMEMBERS thinking he'd never leave a job in private practice.

Hajjar felt he was thriving as a young engineer working in design and research in major cities. He found the architecture and engineering community welcoming and rewarding. But his affinity for research grew and opened his mind to a job in academia, where it could be a primary focus. He took his first academic job in 1992, and three decades later, he remains a prominent steel design researcher and educator.

Hajjar, the University Distinguished Professor and CDM Smith Professor of Civil and Environmental Engineering at Northeastern University, initially specialized in earthquake engineering before adding sustainability and resilience focuses. This year, while on sabbatical, he is the inaugural AISC Innovation Fellow, a collaborative research residency at AISC headquarters that aims to engage industry leaders with structural steel-focused research. He spoke with *Modern Steel Construction* about his career path and more.

Where are you from and where did you grow up?

I was born outside Boston, went to elementary school in Worcester, Mass., and attended high school in East Greenwich, R.I. I earned an undergraduate degree in engineering mechanics from Yale University and a graduate degree in structural engineering from Cornell University.

When did engineering become your focus?

I began college interested in engineering, physics, and math. But I did a lot of exploring. Very quickly, I started loving architecture, but also studied political science, economics, and history. In the second semester of my sophomore year, I took a fantastic architectural history course with Vincent Scully, one of the great architectural historians. That solidified my path toward structural engineering, especially building design.

I knew I was interested in engineering mechanics. That field could take you in many directions, whether it was mechanical engineering or other avenues. My path wasn't clear until I started thinking more about architecture in general and took Scully's class. I devoured books by great architects and engineers—Frank Lloyd Wright, Louis Sullivan, Mies van der Rohe, Le Corbusier, David Billington—and learned about Adler, Roebling, and other great engineers of their time.

What led you to academia and when did you decide to take that path?

It wasn't my initial preference. When I finished my PhD, I said to myself I would not go back to academia. I had been in school all my life. My first job was at Skidmore, Owings & Merrill in Manhattan. After about two and a half years there, I transferred to their headquarters in Chicago. I loved working at SOM with its many great engineers and architects.

I distinctly remember days when I said I would never leave and that it was perfect. I was doing a mix of design and research. It was an innovative time at the firm. It was exciting to be in New York and Chicago and learn about the architecture and engineering communities there in general.

But I always had a strong interest in research and a growing interest in teaching. I was conducting research at SOM and working with faculty members from around the country, especially Don White, who was at Purdue University at the time and is now at Georgia Tech. I frequently attended conferences and couldn't deny my growing interest in full-time research. I met professor Ted Galambos from the University of Minnesota at an SSRC annual conference in 1989. We got to know each other, and in 1991, he mentioned that a faculty position had opened in his department. I applied and got the job.

What do you remember about your first class and your first time teaching?

It was an advanced steel design class that Ted normally taught, but we co-taught it in my first semester. He started the course, but after a few weeks, he left the class to me. That was a helpful transition. I was a very enthusiastic professor with a wonderful group of students, to the point where on the last day of class, all the students came in wearing the same T-shirt that said, "I Survived Steel Design with Professor Hajjar!"

Overall, we had a very collaborative environment and a great group of structural engineering faculty. I had great years there.

How did you get from there to Northeastern?

I was at Minnesota for 13 years. I then went to the University of Illinois for five years. I was deputy director of the Mid-America Earthquake Center, one of the National Science Foundation's earthquake engineering research centers. I learned a lot there. I also chaired the structures faculty for several years, which piqued my interest in academic leadership and being a department chair. Northeastern offered me a chance to be a department chair in 2010. I took the job and stayed as department chair there for 15 years. I worked with a wonderful group of faculty, staff, and students. I rotated out in May 2025 and went on sabbatical, which is why I had the time to be an AISC Innovation Fellow.

You've done a lot of sustainability work and research. What led you to that area?

It started with the Northridge earthquake in Southern California in January 1994, during which several steel frame structures fractured in the connection region. That was early in my academic career. I had been a faculty member for a couple of years focusing on earthquake engineering. I got involved in the SAC joint venture, which was formed a few months after the earthquake to develop guidelines and standards of practice for repairing or upgrading damaged steel moment frame buildings, designing new steel buildings to be safer, and identifying at-risk steel buildings. We had a project from the National Science Foundation studying why these fractures occurred.

It all made me think about steel frame design in high-seismic zones for several years after the earthquake. We came up with effective solutions that are still used now. But in many ways, those methods are moving the damage that occurs during an extreme event about a foot down the length of the girder. There will often be significant yielding and local buckling in the girder or connection components. There almost certainly will not be a fracture right at the girder-column interface like there was after the Northridge earthquake, but the primary members are still being damaged as a way of absorbing the seismic energy.

I wondered if we could do better, and that led me down several research paths—for example, working with professor Greg Deierlein and colleagues at Stanford University about using replaceable energy-dissipating "fuses" made from standard steel material to absorb the energy from an earthquake, leaving much of the rest of the structure essentially damage-free and thus enhancing its resilience. That got me thinking about structure lifespan in general and how we use our materials.

There was another component: the documentary *An Inconvenient Truth*, which I saw soon after it came out in 2006. I pieced together the carbon footprint aspect with my other thoughts from earthquake engineering and structural design and became quite passionate about sustainability.

Researching solutions to structural system damage has led me to think about structural resilience, modular construction, design for deconstruction, the embodied carbon in our structures, and many other facets of sustainability and resilience.

How did you become interested in the Innovation Fellow program, and what are you working on as part of it?

In fall 2024, I sent an email that I would be rotating out as department chair and taking a sabbatical, and within minutes, AISC vice president of engineering and research Chris Raebel called me. He said AISC president Charlie Carter had received the email and they had been discussing the creation of the Innovation Fellow program. Charlie recommended that Chris call me, Chris told me all about the program, and I enthusiastically said that I would do it.

It's part of the plan I have for sabbatical. I was president of the Structural Engineering Institute (SEI) of ASCE from 2023–24 and past president from 2024–25. I rotated off the board this fall. Many of my thoughts as SEI president were about sustainability, resilience, and equity. I've been working on evolving the structural engineering profession to prioritize sustainability, resilience, and equity as premier design objectives. They would be underpinned by what we do now: strength, stability, serviceability, constructability, aesthetics, and economy. That's the overall focus for my sabbatical.

I've worked within SEI to collaborate with individuals on its sustainability committee and related committees to develop several sustainability initiatives. Similarly, at AISC, I've talked with team members about how we can develop a supply chain for reuse and design for deconstruction.

Over the last 20 years or so, a significant portion of my work has focused on developing new structural systems designed to be more sustainable and resilient. During my time at AISC, I've been discussing ongoing research and new ideas it has generated with people at AISC. I've worked with AISC's excellent sustainability team discussing initiatives to lower the embodied carbon of steel structures. I've collaborated with the education team about ideas to integrate sustainability within the curriculum at our universities. ■

*This interview was excerpted from my conversation with Jerry. To hear more, listen to the January Field Notes podcast at Apple Podcasts, **modernsteel.com/podcasts**, or Spotify.*

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Lock in on Labor Hours

BY JOHN SCHUEPBACH

Focusing on net profit per labor hour will give steel fabricators and erectors the clearest picture of business success.

JIM COLLINS' MANAGEMENT BOOK, *Good to Great*, has been cited in thousands of boardrooms, classrooms, and planning sessions since it was published in 2001. Many executives in the steel industry are familiar with his ideas, especially Level 5 leadership, the Flywheel, and confronting the brutal facts. I have also found that another Collins idea is often overlooked—especially in steel fabrication and erection.

Collins' Hedgehog Concept is his framework for identifying the simple, powerful idea that sits at the intersection of three circles: what you can be best at, what drives your economic engine, and what you are deeply passionate about. Tucked inside this chapter is a deceptively simple question: "If you could pick one and only one ratio—profit per 'X'—to systematically increase over time, what 'X' would have the greatest and most sustainable impact on your economic engine?"

For our industry, the answer is clear. The 'X' is labor hours.

Fabrication and erection businesses hinge on how they manage labor hours, which are the ultimate constraint. Every cut, layout, fit-up, weld, blast, coat, and bolt depends on a person's time and effort. Materials, buyouts, and subcontracts may flex, but labor hours are finite. They are the one denominator that ties every line of the financial statement to operational reality. When leaders focus relentlessly on net profit per labor hour, the financial statements stop being abstract and tell what's happening in a business.

Profit per labor hour is practical, measurable, and grounded in daily operations. Focusing on it helps a business gain clarity on estimating and managing risk, negotiate from a position of strength on change orders, manage schedules with an eye on safety and productivity, and build a culture that understands how every decision connects back to the economic engine.

Why Labor Hours Matter Most

Think about your own operation. At the end of each month, you review your income statement, balance sheet, and cash flow. Those reports can feel disconnected from the shop floor or the jobsite. They tell you whether you made or lost money, but not why or how. They don't say whether your estimates were accurate, whether indirect costs are creeping up, or whether your overhead is being absorbed by enough work.

Take those same financials and normalize them by direct labor hours. It paints a clear picture of performance. Each expense and each revenue stream becomes relative to the only true constraint: labor hours. Collins' research pointed to this exact insight. By identifying the correct denominator—profit per labor hour—you gain a management dashboard that cuts through accounting complexity and identifies the heart of operational performance.

Key Metrics

Every fabricator and erector should track these metrics on a per-hour basis:

Value add per man hour. This is the simplest and most revealing check figure when reviewing project estimates. The formula is straightforward:

(Revenue – materials/buyouts/freight/subcontracts/other COGS) ÷ direct labor hours

The formula calculates the value add produced by direct labor, expressed per hour. It's essentially the gross amount available to cover direct labor, indirect costs, selling, general and administrative expenses, and profit.

For example, if revenue on a project is $1 million and materials, buyouts, freight, and subcontractors total $650,000, then the value add is $350,000. If that job consumed 3,300 direct labor hours, the value add per man hour is $106.06. That number can be compared directly to estimating models. If the estimates assumed $86 per hour of fully burdened costs, expect $20 of net profit on this project.

Indirect costs per labor hour. Accountants call these variable costs. In steel fabrication and erection, they include shop supplies, utilities, safety, welding wire, gases, and consumables, among other things. But when measured per labor hour, they become remarkably stable.

Whether a shop runs 500 hours or 5,000 hours in a week, the cost per hour of running forklifts, welding machines, or plasma tables usually land within a tight range. That stability makes it a powerful metric to manage.

Suppose indirect costs jump by 20% in one month. That increase might appear to be a problem when looking only at the income statement. But after normalizing by hours and seeing that the company ran 48-hour weeks instead of 40-hour weeks, the per-hour cost falls right back into its historical range. Without the per-hour lens, it's not possible to know if this increase is reasonable.

SG&A costs per labor hour. These are overhead or fixed expenses: office salaries, insurance, marketing, professional services, and everything else needed to keep the business running. Accountants classify them as fixed, but on a per-hour basis, they behave like variable costs. The more direct hours operated in a month, the thinner these costs are spread. Conversely, in a slow month, each direct hour carries a larger share of SG&A.

This inversion—indirects appearing fixed per hour, SG&A appearing variable per hour—explains why busy months often feel so profitable even at the same bid margins: overhead dilution is working in the business' favor.

Practical Applications

These per-hour insights aren't just academic. They have direct implications for pricing, negotiating, and managing projects.

Change orders and overtime. When a general contractor compresses a schedule and requires overtime, the first instinct may be to worry about cost. But if you secure 1.5 times your base labor rate in a change order, your profit per man hour can actually improve.

Why? Because only the direct labor cost increases by 1.5. The indirect costs per hour stay the same, and the SG&A per hour decreases because the total hours go up. When measuring profit per man hour, the improvement becomes clear and creates an advantage in negotiations.

Sustainable work hours. Every experienced executive knows 45 to 50 hours per week is the sweet spot for weekly hours where productivity and efficiency peak. Push beyond that, and fatigue erodes productivity, quality, and safety.

The 2023 NASCC: The Steel Conference SafetyCon Session "Schedule vs. Safety" from Steve Davis, PE, of Georgia Tech and Williams Enterprises of Georgia highlighted this exact point. Davis noted that crews can sustain five 10-hour shifts plus an eight-hour Saturday for only a few weeks. After that, productivity drops, nonconformances rise, and safety incidents increase. In his view, 48 hours per week is generally sustainable long-term, though temperature and other factors can shift the threshold.

When tracking profit per labor hour and labor hours per ton, degradations show up quickly. Non-conformance and rework costs increase and erode profits. Safety incidents disrupt employees' lives and project schedules. A degradation is visible in the per-hour metrics long before it shows up as a quarterly loss.

From Statements to Strategy

Financial statements in their raw form can be misleading. They are aggregates and they are history reports. They tell you what happened, but not why.

Indexed to direct labor hours, those same statements transform into a management dashboard:

- **Profit per labor hour**: The ultimate economic engine metric.
- **Value add per labor hour**: The value of each labor hour to your company, which changes depending on the type of work.
- **Indirect costs per hour**: A stability check to catch anomalies.
- **SG&A per hour:** A gauge of overhead absorption and workload balance.

Instead of being static documents, an income statement, balance sheet, and cash flow become diagnostic tools. They reveal whether operations are efficient, whether costs are in line, and whether margins are sustainable.

As Collins wrote, greatness is not a function of circumstance but of conscious choice and discipline. Choosing to manage your business through the lens of profit per labor hour is one of those disciplines. ■

Learn more about applicable business topics at NASCC: The Steel Conference in Atlanta April 22–24, 2026.

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Don't Waive Goodbye

BY LARRY MUIR, PE

The costs and complications of third-party inspections often outweigh perceived savings from waiving an AISC certification requirement.

THE THEORY THAT WAIVING an AISC certification requirements can lower costs has long existed as a temptation for project owners. Waiving it requirement permits non-certified fabricators to bid and perform the work. The increased pool of bidders may reduce the bids, and non-certified fabricators may be perceived to deliver lower bids.

That idea, though, often does not become reality. When AISC certification requirements are waived, other costs are incurred, other parties are involved, and other risks are introduced.

In this discussion, it will be assumed that the final product's quality will not vary between certified and non-certified fabricators. Given that non-certified fabricators are also required to satisfy all requirements of the AISC *Specification for Structural Steel Buildings* (ANSI/AISC 360-22) and the AISC *Code of Standard Practice for Steel Buildings and Bridges* (ANSI/AISC 303-22) and will be subject to additional third-party inspections, this should be true. But it may only be true in practice if the owner adequately completes the additional work required by the owner to satisfy the *Specification*.

When a fabricator is AISC certified and approved by the building official, the owner is permitted by the *Specification* to benefit from the work performed by AISC and the building official to evaluate (and then certify and approve) the fabricator. This complies with the *International Building Code (IBC)* section 1704.2.5.1. When a fabricator is not AISC certified and approved by the building official, the owner is required by the *Specification* to perform additional work to ensure the quality of the fabricator's work. The owner is required to identify and hire a third-party inspector, whose work must then be coordinated with the work of the fabricator.

The most immediate effects of waiving project-specific certification requirements involve special inspections. The quality assurance tasks (QA) described in Chapter N of the *Specification* are essentially the minimum requirements for special inspections required by the *IBC*.

While special inspections are generally required by the *IBC* when the work is performed by an approved fabricator, special inspections during fabrication are not required. This does not mean the QA tasks described in Chapter N are not performed, but rather, they will be performed by the fabricator instead of a third-party inspector. (See *Specification* Section N6).

Where there is overlap between the quality control tasks (QC) and the QA tasks, the tasks need only be performed once by the approved fabricator. When special inspections are required—for instance, the fabricator is not approved by the building official due to being non-certified—by default, many tasks will be performed by both the fabricator's quality control inspectors and the third-party inspectors.

Quality Corner, a monthly feature in *Modern Steel Construction* until 2012 focusing on quality assurance and quality control topics, returns as a quarterly column in 2026.

Obviously, doing anything twice will cost more than doing it once. Section N5.3 of the *Specification* permits QC and QA tasks to be coordinated to reduce duplication of effort (and the associated additional costs). However, this is only permitted with the approval of the engineer of record (EOR) and authority having jurisdiction (AHJ).

Since it is only possible to waive third-party special inspections during fabrication when the work is performed by an approved fabricator, waiving AISC certification requirements will likely mean the owner must identify and vet third-party inspectors. The owner will also have to hire a third-party inspector to perform, as a minimum, the QA tasks described in *Specification* Chapter N.

The fabricator will have to provide the third-party inspector with access to their shop. The QA tasks will have to be coordinated between the fabricator and the inspector to ensure that fabrication operations will not be disrupted and that the repair of nonconforming work can be performed while the material is still in the fabrication shop and prior to painting (if applicable).

The engineer of record (the registered design professional in the *IBC*) will have to produce a statement of special inspections, which, in accordance with *IBC*, will simply reference *Specification* Chapter N. However, where additional inspection needs are identified, supplementary requirements can be included in the statement of special inspections.

Any additional QA requirements beyond those in Chapter N must also be described in the contract documents as required by *Specification* Section A4, so that the fabricator can account for the additional time and effort associated with coordinating work with the inspections.

When AISC certification is waived, the additional cost of the third-party inspection must be considered. The third-party inspections also add complexity to the project and increase the risk of cost and schedule impacts. If the fabrication and the inspections are not properly coordinated, fabrication operations could be disrupted. If inspections are not timely and/or corrective work is not promptly approved by the owner's designated representative for design (ODRD) and the owner's designated representative for construction (ODRC), pieces may be delayed leaving the shop, or worse yet, corrective work may have to be performed in the field under worse conditions with increased cost.

Odds and Sods

When this article refers to the owner, it intends the owner and the owner's representatives, which includes the owner's designated representative for construction (ODRC) and the owner's designated representative for design (ODRD).

Have you ever read a science fiction or fantasy book that includes a glossary of made-up terms intended to make the reading experience more immersive? Prepare to be immersed in the alphabet soup of the construction industry. The discussions below may sacrifice precision for user-friendliness. For more precision, use the *Code of Standard Practice for Steel Buildings and Bridges* (ANSI/AISC 303-22).

Registered design professional, engineer of record (EOR), structural engineer of record (SEOR), owner's designated representative for design (ODRD): The entity that ensures the structure remains standing.

General contractor (GC), construction manager (CM), owner's designated representative for construction (ODRC): The entity that oversees the construction site, manages the vendors and trades, and communicates information to parties throughout the course of the construction project.

Authority having jurisdiction (AHJ), building official: The entity that administers and enforces the *Code*.

Quality control (QC): Assessments done by the fabricator or erector to ensure quality of their product. *Related terms: quality control inspector (QCI). Quality control program (QCP).*

Quality assurance (QA), special inspections: Assessments by a third-party to ensure the quality of work performed by the fabricator and erector. *Related terms: quality assurance inspector (QAI), approved agency. Quality assurance plan (QAP), statement of special inspections.*

Common Misconceptions

Are special inspections automatically waived for AISC-Certified fabricators?

No. In some jurisdictions, AISC certification may be the only consideration for fabricator approval by the building official. In these jurisdictions, AISC certification will usually mean that special inspections by a third-party will be waived. As noted in *Specification* Section N1, "the authority having jurisdiction (AHJ), applicable building code, purchaser, owner, [and] engineer of record (EOR)" all can require QA.

In other jurisdictions, AISC certification may be among the factors considered. In these jurisdictions, it is common for the AHJ to maintain a list of approved fabricators.

In any case, if special inspections by a third party have been waived based on the assumption that an approved fabricator will be used and a fabricator that has not been approved is used instead, then the special inspections by a third party will be required.

When special inspections and QA by a third party are waived, is non-destructive testing (NDT) also waived?

No. NDT cannot be waived. However, *Specification* Section N6 permits NDT to be performed by the fabricator when approved by the AHJ.

It is sometimes assumed that when special inspections and QA by a third-party are waived, NDT is also waived or automatically assigned to the fabricator. This is not correct. Many fabricators, even AISC-certified fabricators, do not have the ability to perform NDT. If NDT is to be assigned to the fabricator, this must be indicated in the contract documents. ■

Larry Muir is a consultant to AISC and owner and proprietor of The Steel Connection, LLC.

Steel Transformation

BY MICHAEL WOOD, PE, AND MICHAEL CROPPER, PE

Incorporating steel framing in a concrete building renovation project allowed for major structural changes, including a relocated elevator core and a five-story addition.

A revitalized Washington, D.C., office building that added steel framing will open in 2026.

All photos courtesy of Thornton Tomasetti

EXISTING BUILDING RENOVATIONS have inherent limitations and do not offer engineers the blank canvas that comes with a new structure. Their predefined constraints and existing conditions are, though, still an opportunity for creativity and innovation.

The architectural and engineering teams behind the renovation of 600 Fifth Street in Washington, D.C., updated a concrete-framed 1970s Brutalist building with a concrete frame into a modern corporate headquarters, and steel additions were at the center of the design. The design team anticipated the design and construction challenges ahead, and based off those, incorporated more than 1,500 tons of steel framing into the concrete structure because of steel's weight, ease of installation, and ability to be installed retroactively.

The building, located in Washington's vibrant Penn Quarter neighborhood, was Washington Metropolitan Area Transit Authority's (WMATA) headquarters for nearly half a century. In 2020, WMATA selected a joint proposal from Stonebridge and Rockefeller Group to redevelop and modernize it. Architects Pickard Chilton and Kendall/Heaton Associates, alongside structural engineer Thornton Tomasetti, were charged with delivering a modern, trophy-class building with 400,000 sq. ft of cutting-edge office space and 20,000 sq. ft of ground-floor retail. The renovation would require significant changes to the original structure's massing, height, and circulation.

The Existing Structure

Complex building renovations require a thorough understanding of the existing structure to ensure that any modifications don't create unintended consequences. The original building has three below-grade levels topped by seven floors of occupiable office space. The typical floor system consisted of an 8½-in. one-way post-tensioned concrete slab spanning 30 ft between 30-in.-deep reinforced concrete beams on the gridlines, supported by circular concrete columns. The foundations consisted of concrete pile caps supported on a series of 768 80-ton concrete piles.

Fittingly for a building once occupied by WMATA, a Metro Red Line subway tunnel bisects the basement, which requires seven transfer girders to support building columns above. The development team's proposal was selected in part due to their plan to retain most of the existing structure and minimize the impact on the tunnel.

Standing Taller

The design team ambitiously aimed to add four floors of office space. The extra building height presented several structural challenges, including increased gravity loads on the existing columns and foundation, and placed greater demands on the lateral system due to the increased mass and surface area impacting the seismic and wind forces on the building.

With the goal of keeping the new overbuild structure lightweight and simple to construct, Thornton Tomasetti opted for a steel-framed system with composite slabs, which at 50 psf, were nearly half the weight of the typical 93 psf concrete floors below.

Due to the added load from the new floors, 30% of existing concrete columns required strengthening, which was achieved with either the use of fiber-reinforced polymer or concrete enlargement. The design team collaborated with the geotechnical engineers at Mueser Rutledge Consulting Engineers to resolve the issue of the added foundation loads through a pile load testing program that revealed a 20% increase in capacity over the original design. With this increased pile capacity and a structural design strategically developed to disperse loads across the site, the existing foundation system did not require any strengthening, which saved time, material, and construction cost.

A New Core

The original 1970s design prioritized continuous, uninterrupted office space, pushing elevators, stairs, bathrooms, and mechanical shafts to the west face of the building. This layout contrasted with the architect's goal for the renovated building, which would feature a central core to enhance occupant circulation, utility distribution, and natural light within the offices. Since the lateral design of many structures on the East Coast was not explicitly considered in the 1970s, relocating the core presented the challenge and opportunity to create a new lateral system hidden within the relocated core.

The renovated lateral system from the foundation to Level 8 is a dual system with a new braced frame in the core working in tandem with the existing concrete structural frames to take advantage of the inherent stiffness within the building. Above Level 8, the lateral system at the new steel-framed floors transfers to a perimeter ring of W24 moment frames.

While the goal of the redesigned lateral system was straightforward—provide sufficient strength and stiffness—the design team recognized that an abundance of lateral stiffness in the new core would divert story shear from the existing concrete frames to the new central core. The diversion would in turn create higher overturning forces concentrated on the existing piled foundations beneath the core.


The original building, which opened in the 1970s, had a concrete frame and Brutalist exterior.


Steel-framed floors were added to the top of the building.


New steel framing installed after the core slab was demolished.

above and below: New steel transfer girder supported by existing concrete columns.

above and right: New eccentric braced frames within the relocated core of the building.

New eccentric steel braced frames in the central core solved this issue by allowing the design team to tune the system by adjusting the length of the central fuse throughout the building's height, while also providing a lightweight alternative to a comparable concrete shear wall. The fuse lengths ranged from 7 ft to 9 ft, with brace sizes varying from W14×109 at lower levels to W12×50 at upper floors. Additionally, by offsetting the lateral system at Level 8, the perimeter moment frames helped reduce the overturning forces on the foundation beneath the central core and redistribute those loads across a wider area around the perimeter.

The slab openings for the relocated stairs, elevators, and mechanical shafts also required a complete re-framing of the floor system at the new building core. The existing post-tensioned slab was re-anchored at the cut line prior to demolition, and new steel framing was installed to support a future slab-on-metal deck in the central core. The new core framing consisted of W16 and W18 beams spanning to the existing concrete girders, along with W27 beams with coordinated penetrations to allow large ducts to exit the core above the finished ceiling.

ADAPTABILITY
FEATURE STORY

Given the extent of the structural modifications, the structural engineers carefully evaluated the implications of alterations made during various stages of construction. Working in collaboration with general contractor Clark Construction, the team coordinated the construction schedule so that adding new floor slabs, demolishing existing slabs, transferring columns, and installing curtain wall did not add unaccounted loads on unfinished structural components.

To top out and enclose the building, the completion of the braced frame and central core framing were the critical path of construction, and Clark Construction implemented a top-down demolition and construction sequence for the core that maximized construction efficiency while minimizing the need for additional strengthening, reshoring, or temporary work platforms.

left: Steel moment frames on top of the existing concrete structure.

below: Steel framing on the first floor of the overbuild structure.

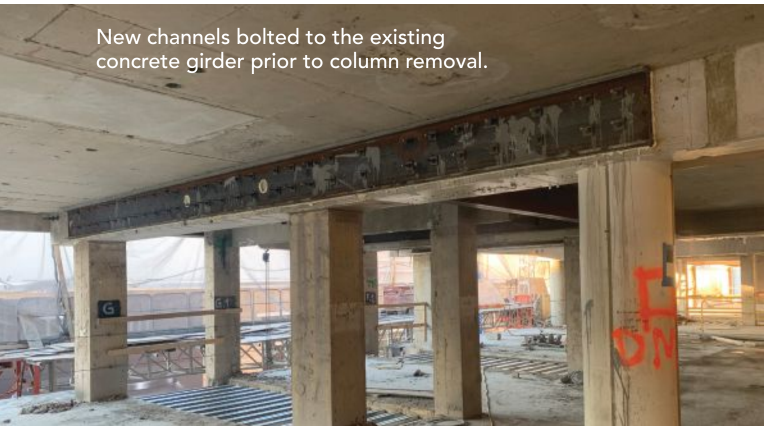
Transformational Changes

The original elevator core had a 15 ft by 12 ft column grid around the hoistway shafts that would not accommodate a premium office layout. MC18×58 steel channels were added on both sides of the concrete girder and fastened with ¾-in. through bolts to create a composite section that could span 30 ft after the column was removed.

On the east side of the building, a 5-ft slab extension at Levels 3 through 8 also utilized back-to-back steel channels on existing girders. The 18-in.-deep steel channels were built up with 1-in.-thick flange steel plates that were tapered at the cantilevered end to increase clear height at the façade.

At the northeast corner, a new 30-ft by 60-ft, five-story extension consisting of steel framing from Level 2 to Level 5 was added to the building footprint. Because the existing foundations under the new extension could not support the added weight in this area, the new columns supporting the extension were offset from the original grid below to allow for steel columns extending down to the basement foundation level, where they were supported by new drilled micropiles.

At Level 5, the architectural massing required a corner column to be offset by 7½ ft. Once the existing column above Level 5 was demolished, a W33×263 steel transfer girder with post-installed end connections was added between the existing building columns



New channels bolted to the existing concrete girder prior to column removal.

above and below: The renovation included a five-story steel framed extension.

At Level 5, the architectural massing required a corner column to be offset by 7 ft, 6 in.

The steel entry vestibule and cantilevered brow framing above.

to support the new transfer column as it continued upward. Throughout the building, 32 additional smaller transfer beams were added or reinforced to accommodate areas where the floor layout did not align with the supporting structural system between floors.

The building's main entrance features a freestanding vestibule supported by a grid of painted hollow structural section (HSS) moment frames that neatly fit within the architect's design. Above the vestibule, a series of cantilevered steel brows extend out from the building's façade to enhance its architectural expression.

Transforming 600 Fifth Street is a testament to structural steel's versatility in renovations and adaptive reuse projects. Although much of the building's original concrete structure remains intact, the introduction of a new steel core and other steel-framed systems are the backbone of a building that will stand taller in its second act when it opens in 2026. The steel framing will eventually be hidden by the finishes of a modern office building, but the design team demonstrated that steel doesn't just support the structure, it also supports the vision for the building's future. ■

Owner
Rockefeller Group and Stonebridge

Design Architect
Pickard Chilton Architects

Architect of Record
Kendall/Heaton Associates

General Contractor
Clark Construction

Structural Engineer
Thornton Tomasetti

Steel Fabricators, Erectors, and Detailers
Superior Ironworks Inc. AISC CERTIFIED FABRICATOR
Crystal Steel Fabricators Inc. AISC CERTIFIED FABRICATOR

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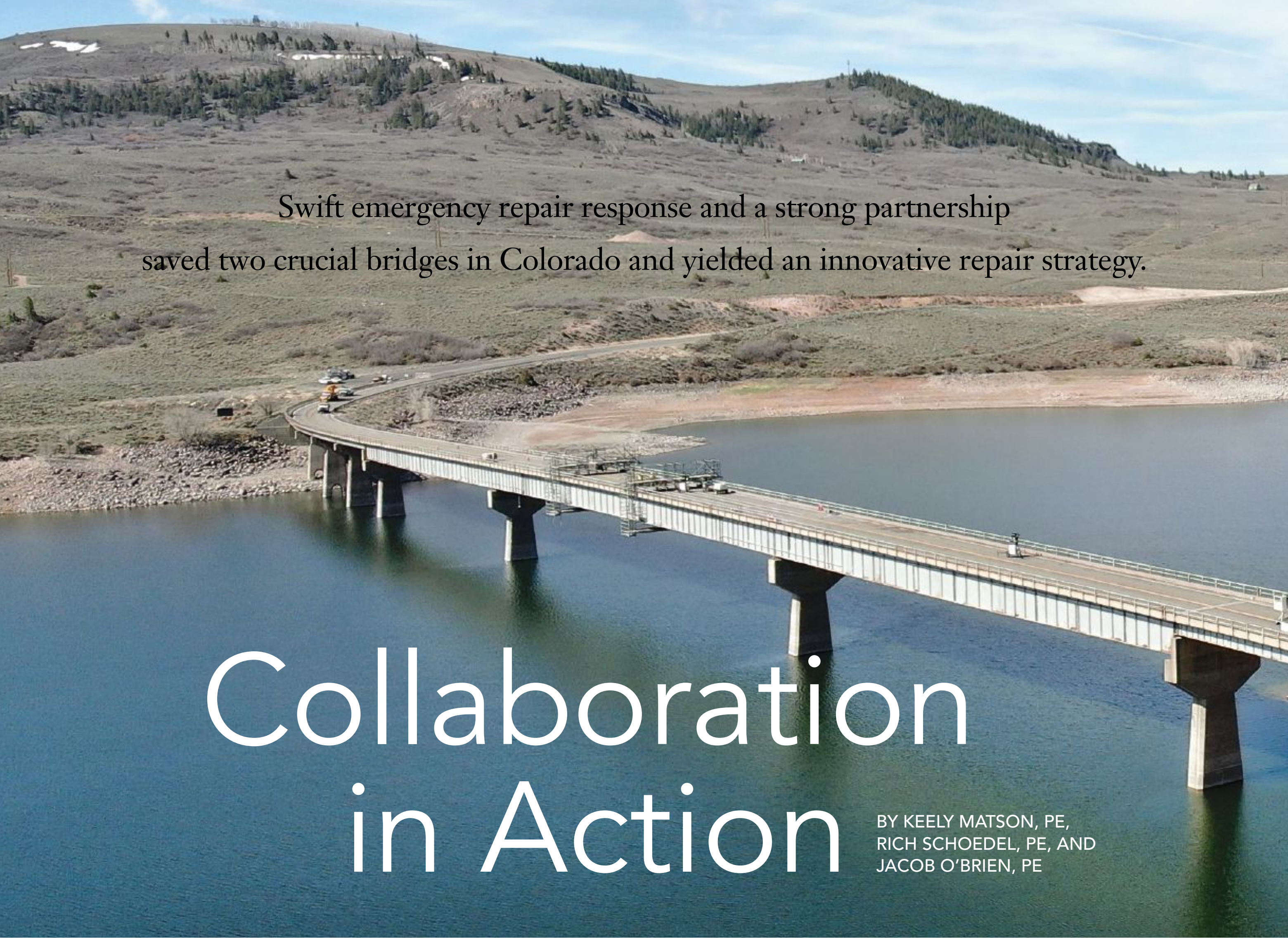


Swift emergency repair response and a strong partnership saved two crucial bridges in Colorado and yielded an innovative repair strategy.

Collaboration in Action

BY KEELY MATSON, PE, RICH SCHOEDEL, PE, AND JACOB O'BRIEN, PE

ADVERSE AND EMERGENT CIRCUMSTANCES on structural projects demand collaboration and often draw out innovation, and a project team's response to an emergency closure of one southwest Colorado bridge and an emergency weight restriction on another was no exception. The team's repair plan reopened the closed bridge in three months and removed load restrictions in eight months, a testament to the industry's ability to shift priorities quickly during an emergency repair and work to find the most sensible fix.

Residents, commuters, and visitors to the rural mountain communities of Montrose and Gunnison rely on two bridges to cross the Blue Mesa Reservoir, Lake Fork Bridge (K-07-A) and Middle Bridge (K-07-B). The bridges, constructed in 1963, carry two-lane U.S. Highway 50 over the reservoir. They provide critical access for hospital patient transfers between Montrose and Gunnison, commercial traffic throughout Colorado's western slope, and recreational access to the Curecanti National Recreation Area and Black Canyon of the Gunnison National Park. The only alternative crossing route is a six-hour detour.

K-07-A and K-07-B have several units: a main span and multiple approach spans at each end. The main-span structure consists of three spans, featuring a two-girder, floor beam stringer system with a pin and hanger in the center span, creating a hanging span in the middle of the bridge. The design means most main-span elements are classified as non-redundant steel tension members (NSTM). The bridges are constructed with AASHTO M244 Grade 100 (ASTM A514/A517) steel, commonly called T1 steel.

Previous bridge closures stemming from hydrogen cracking in T1 steel welds across the country led the FHWA to issue a memo in December of 2021. The memo required owners to perform non-destructive evaluation (NDE) of welds in tension regions on steel NSTM bridges designed and fabricated using T1 steel before 1978, when the AASHTO/AWS Fracture Control Plan material and fabrication requirements were adopted. The Colorado Department of Transportation (CDOT) identified K-07-A and K-07-B as its only two bridges covered by the memo and initiated inspection and testing.

In April 2024, the inspection team identified weld locations on both structures that needed testing. Two surface-breaking cracks were discovered on the K-07-B structure, one on each girder in the main span, mandating the immediate closure of K-07-B to traffic. K-07-A remained open to traffic with limited loading due to its unknown condition.

The route's importance to the region presented challenges that could only be solved by the owner bringing the designer, contractor, fabricator, and supplier together. Just two days after closing K-07-B, CDOT had assembled a response team comprised of Michael Baker International (designer), Benesch (bridge inspector), BDI (non-destructive testers), and Kiewit Infrastructure Company (contractor). CDOT and the response team set an ambitious goal of reopening K-07-B to limited traffic by July 4 and restoring both bridges to full legal load capacity by the winter.

A crucial reservoir crossing reopened after seven months of repairs to address cracks discovered on the bridge.

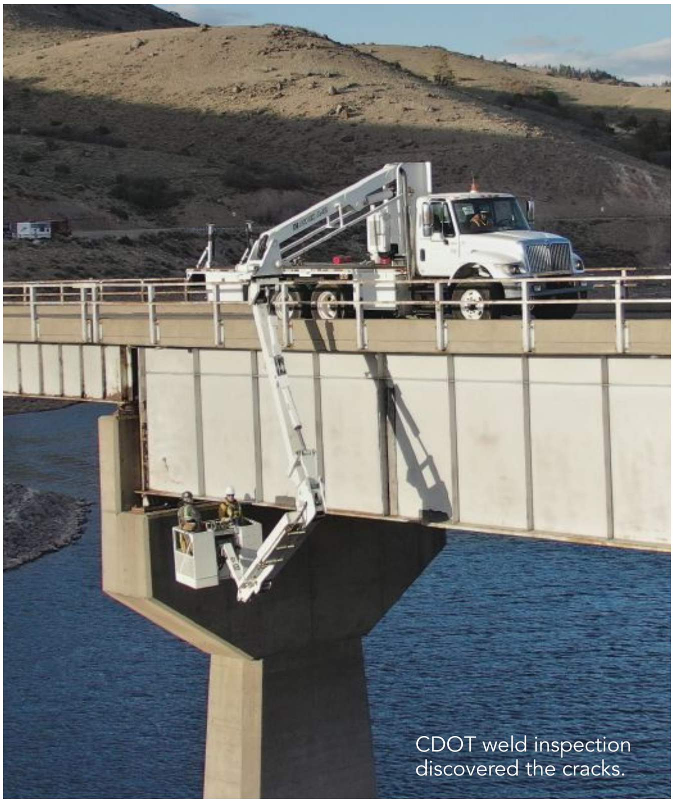
Inspection and Testing

Cracks and weld defects needed to be addressed before CDOT could reopen the bridge to full residential and commercial traffic. The team's initial focus was locating any additional surface-breaking cracks hidden by the paint system, followed by systematic inspection of all butt welds in tension regions to find and classify internal anomalies. A comprehensive non-destructive testing (NDT) program, including magnetic particle (MT), ultrasonic (UT), and phased array ultrasonic (PAUT), examined K-07-B to determine the extent and severity of the weld issues.

Inspection and testing on the bridge were complicated by difficult access, weather, and uncertainty of the structure's condition. To keep the team safe and prevent additional damage to the structure, inspection and construction loads were limited to known loads on the bridge immediately before closure. Inspection proceeded slowly and as allowed by high winds.

Over the course of two months, testing found weld defects on K-07-B were not localized and required the team to address all tension zones to ensure future resiliency. Three high-level defects were noted during the NDE:

- 212 AWS D1.5 rejectable weld indications were identified with UT, with several of them surface breaking.
- 38 transverse cracks in fillet welds between web and flanges.
- 169 additional observations and inspections, including weld porosities, discontinuities, and undercuts.



CDOT weld inspection discovered the cracks.

Repair Method Alternatives

Alongside inspection and testing, design of several repair alternatives progressed for the critical repairs of surface-breaking cracks on K-07-B, and permanent repairs to resolve any additional internal defects were identified. The design team ran three designs concurrently: local splice plates, global plating, and full superstructure replacement.

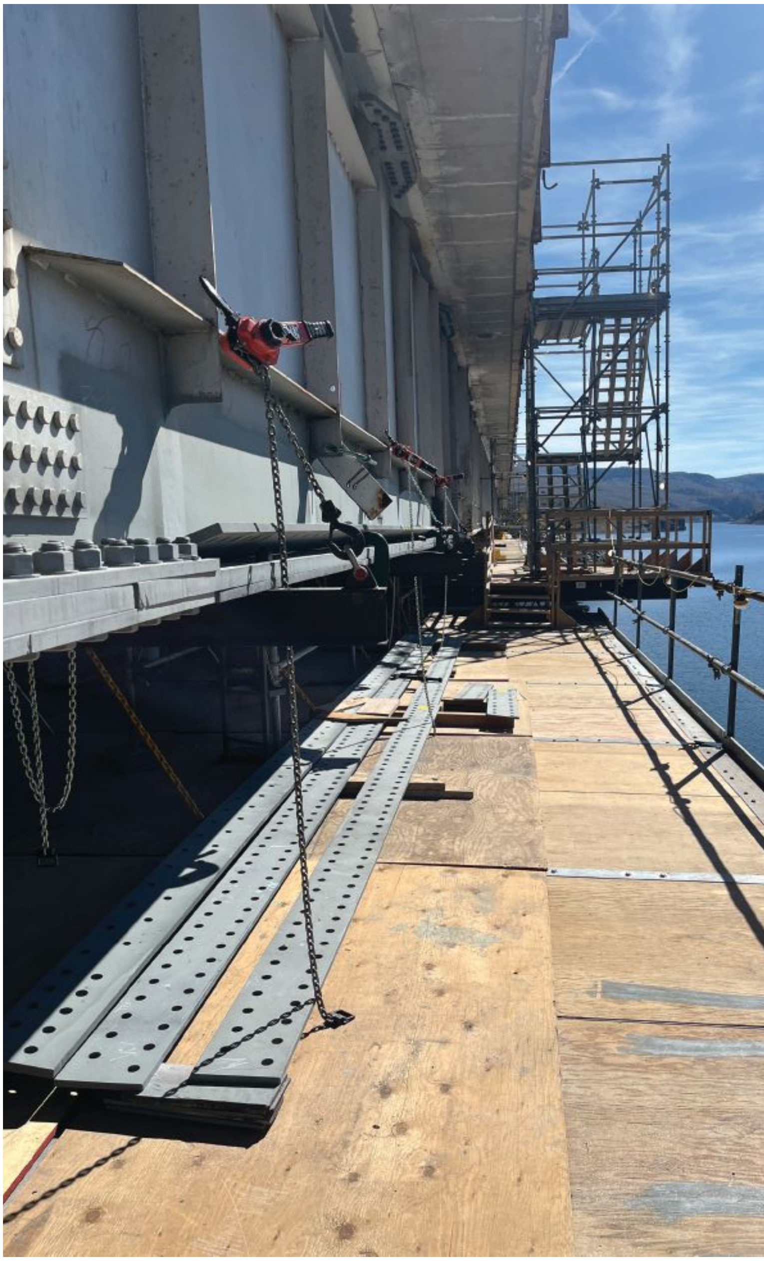
Initially, local splice plates were preferred at all butt welds if internal defects were limited to a few locations due to minimal added weight to the substructures and shorter fabrication and construction times. Inspection data was incorporated into the alternatives in real time, evolving the designs constantly.

Inspection results showed issues in 86% of the butt welds and widespread transverse cracks in web-to-flange fillet welds along the bottom flange. Once the extent and magnitude of the weld defects were classified, local splice plating prevailed at top-flange butt welds but gave way to a global plating for the permanent bottom flange repairs.

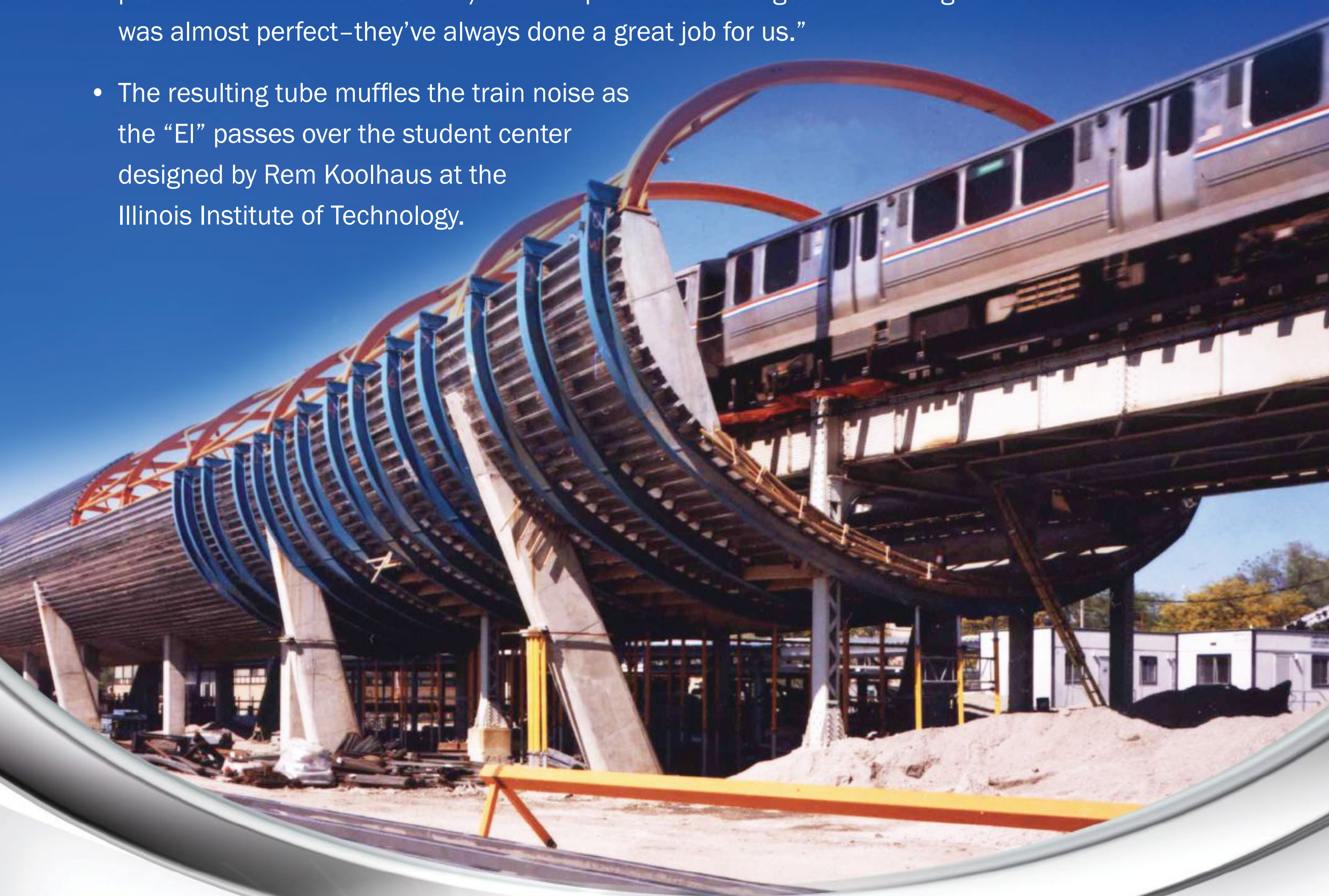
Global plating was designed to provide redundancy to the entire tension flange, addressing the widespread issues with the welds in the structure. It takes advantage of steel structures' repairability, but introduces material availability, weight, and schedule challenges. Adding an equivalent bottom-flange weight of steel to the bridge would require substructure strengthening. Replacing the existing 3-in. bituminous wearing surface with a ¾-in. polymer overlay provided enough reserve capacity for the global plating option to proceed for the permanent repair.

Immediate repair of the cracked locations required a local splice repair to be incorporated into the permanent repair. Local splice plating design continued, but required close collaboration and coordination between Michael Baker, Kiewit, fabricator W&W | AFCO Steel, and other suppliers to meet the schedule.

One of the initial cracks in K-07-B.



Repair of the bottom flanges was done with global plating.



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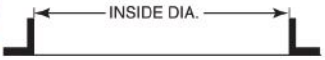
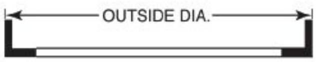


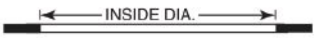
10" x 10" x 1" Angle

2 **Angle Leg In**



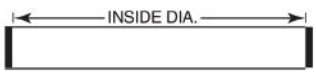
10" x 10" x 1" Angle

3 **Flat Bar The Hard Way**



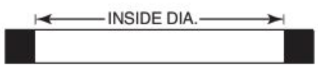
24" x 12" Flat

4 **Flat Bar The Easy Way**



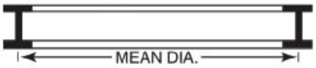
36" x 12" Flat

5 **Square Bar**



18" Square

6 **Beam The Easy Way (Y-Y Axis)**

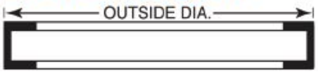


44" x 335#, 36" x 925#

7 **Beam The Hard Way (X-X Axis)**

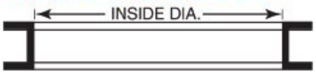
44" x 285#

8 **Channel Flanges In**



All Sizes

9 **Channel Flanges Out**

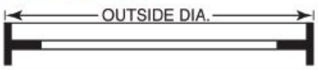


All Sizes

10 **Channel The Hard Way (X-X Axis)**

All Sizes

11 **Tee Stem In**



22" x 142$^1/_2$# Tee

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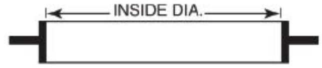
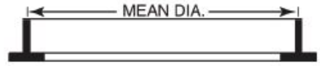
12 **Tee Stem Out**



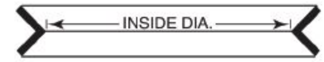
22" x 142$^1/_2$# Tee

13 **Tee Stem Up**



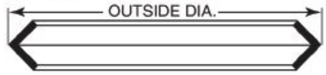
22" x 142$^1/_2$# Tee

14 **Angle Heel In**



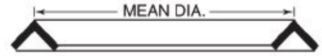
8" x 8" x 1" Angle

15 **Angle Heel Out**



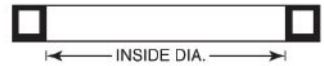
8" x 8" x 1" Angle

16 **Angle Heel Up**



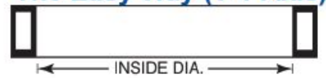
8" x 8"x1" Angle

17 **Square Tube**



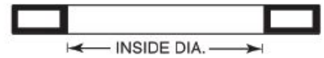
24" x $^1/_2$" Tube

18 **Rectangular Tube The Easy Way (Y-Y Axis)**



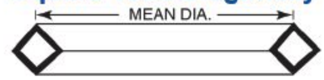
20" x 12" x $^5/_8$" Tube

19 **Rectangular Tube The Hard Way (X-X Axis)**



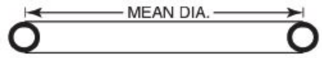
20" x 12" x $^5/_8$" Tube

20 **Square Tube Diagonally**



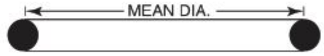
12" x $^5/_8$" Square Tube

21 **Round Tube & Pipe**



24" Sched. 80 Pipe

22 **Round Bar**



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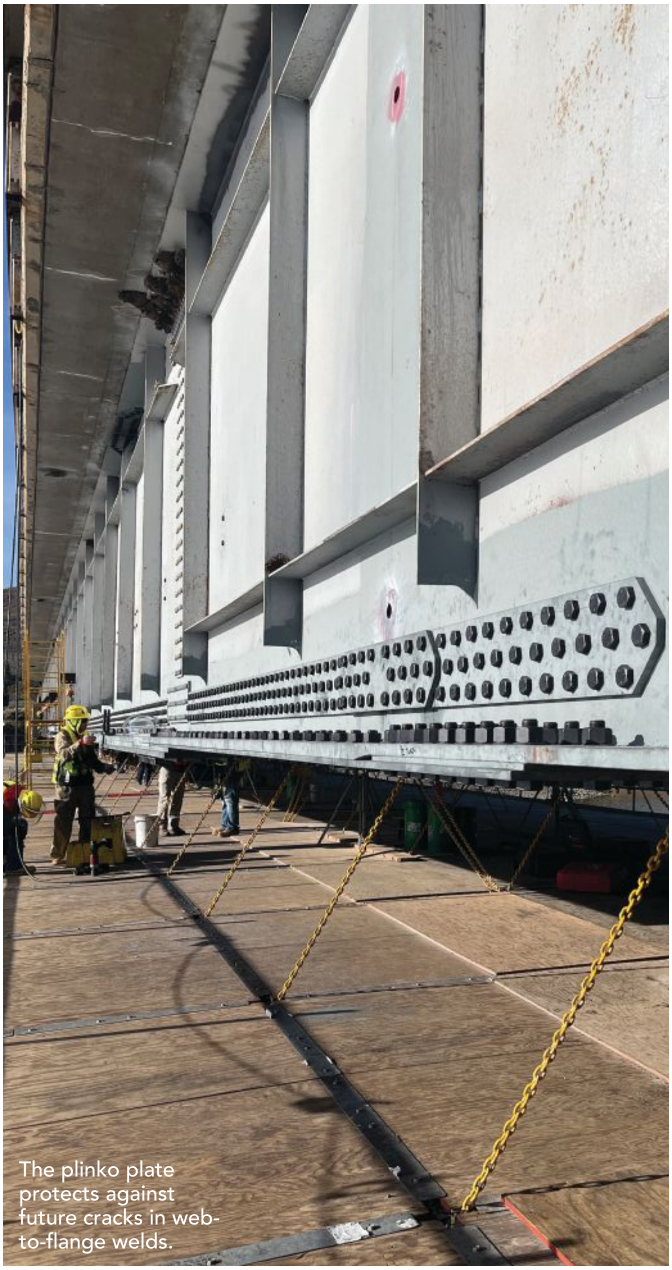
Full superstructure replacement options identified extended closures and costs that were unacceptable to the owner. The replacement option would have required repairing the structure to restore the critical route while the replacement was completed.

Continuous Plating Choices

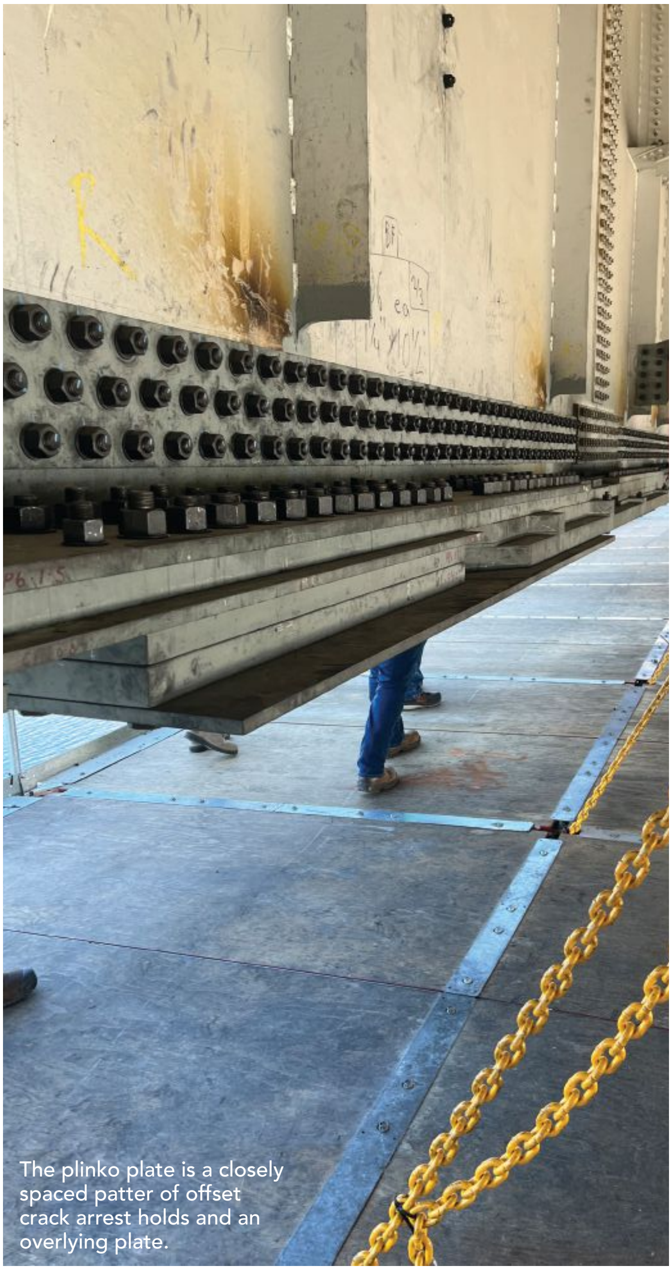
An expedited solution was necessary to reopen U.S. 50 to piloted one-way traffic by July 4. Michael Baker and Kiewit collaborated to evaluate numerous local splice plating alternatives that would meet the timeline. Material procurement and hoisting capabilities were the primary drivers of the critical repair design. Initial designs considered 50ksi, 70ksi, and 100ksi steel plating repairs. However, steel fabricators had limited immediate stock, so the design was refined to include only the two lower steel grades. The deck crane could only hoist up to 9,500-lb pieces due to the reduced bridge capacity.

Michael Baker performed design iterations for underslung plating (bolts in single shear) vs. top-and-bottom plating (bolts in double shear). A325 and A490 bolted connections were evaluated to manipulate the overall critical repair length. The critical plate repairs also needed to be designed to nest efficiently

left and below: Local splice plating was used to repair the top flange butt welds.



The plinko plate protects against future cracks in web-to-flange welds.



The plinko plate is a closely spaced patter of offset crack arrest holds and an overlying plate.

into future permanent bottom flange plating repairs as ongoing inspections continued to uncover widespread weld defects. Critical repairs were located at each of the existing girder field splices, complicating repairs.

Ultimately, a 3-in. by 30-in. underslung Grade 50 plating repair was the choice when considering all design and constructability factors. It allowed the fabricator, W&W|AFCO Steel, to rapidly fabricate four plate assemblies, procure A325 fasteners, and install only one assembly at each repair location. All four critical repairs were completed, and U.S. 50 reopened to one-way traffic on July 3, 2024. While the critical repairs were completed, the team maintained focus on the permanent repair options and fabricating steel for the global plating option.

Transitioning Repairs

Lessons learned from the critical repair phase assisted with the permanent plating design. Permanent plating design methodology mirrored the critical repair design methodology.

Michael Baker worked with CDOT, Kiewit, and experts at Purdue University to develop an innovative strategy for protecting against future cracks in web-to-flange welds. The strategy, which the team nicknamed the "plinko plate," consisted of a closely spaced pattern of offset crack arrest holes and an overlying plate to arrest any future cracks that might propagate from the defects in the web-to-flange welds and into the web before they become a safety concern.

Kiewit worked with the steel fabricator and suppliers to source 100ksi plates by fast-tracking rolling of the material, which allow for continuous plating of the structure while managing the weight on the substructures. The Michael Baker engineering team coordinated with the fabricator to limit 100ksi plate thicknesses to either ½-in. or ¾-in. to expedite orders from the mills. Therefore, plating designs incorporated combinations of only these two plate thicknesses, and the only variable was the plate width. The design significantly reduced lead time on material procurement.

The primary challenge for permanent plating occurred at the critical repair tie-in locations. The nature of the underslung repairs required a fastener swapping program where permanent repair

Critical repairs were completed with 50ksi steel, and permanent repairs were done with 100ksi steel.

plates were temporarily positioned and each existing fastener was swapped out one by one to maintain force transfer through the splice. The plies through this section exceeded 11 in. at most locations, so high-strength threaded rods were installed using a double-nut method. Using cheese plates allowed for the new structural plates to be set into final position while still providing access to remove each bolt one at a time. The cheese plates were sized to match the thicknesses of either a bolt head or a nut.

The bridges originally opened in 1963.

Due to the widespread issues on K-07-B and because K-07-A was constructed at the same time by the same fabricator and contractor, the team proceeded with the same continuous global plating solution with minimal testing. The top-flange fillet welds in tension areas (where global plating was not possible) were cleared, and the asphalt wearing surface was removed. The design and construction of K-07-A permanent repairs were advanced concurrently with K-07-B to meet weather and schedule constraints. The last bolt was installed on November 12, 2024, and both bridges reopened in December 2024 to two-way traffic with no load restriction.

With CDOT, Michael Baker, and Kiewit all at the table at the same time, the collective team meticulously identified risks, optimized the construction schedule, and minimized cost impacts. In contrast to a design-build project, where the contractor oversees the designer, CDOT had direct control over the design. Unlike a typical CMGC model, the emergency nature of the project required the pre-construction and design phases to run concurrently with construction.

The contracting model also gave the team the flexibility to divide construction into multiple work packages, which kept the project moving forward when the client faced budget constraints and made the complex nature of the work more manageable.

left: Completed repairs on the bottom flange.

below: Both bridges were reopened by December 2024 to two-way traffic with no load restrictions.

Collaboration between CDOT and the project team, Michael Baker, and Kiewit's teamwork to create innovative solutions, and the close coordination with the steel fabricator ensured the project met its aggressive timeline to restore a crucial roadway. ■

Owner
Colorado Department of Transportation

General Contractor
Kiewit

Steel Erector for Bridge A
Danny's Construction

Structural Engineer
Michael Baker International

Steel Fabricator
W&W | AFCO Steel (AISC Certified Fabricator)

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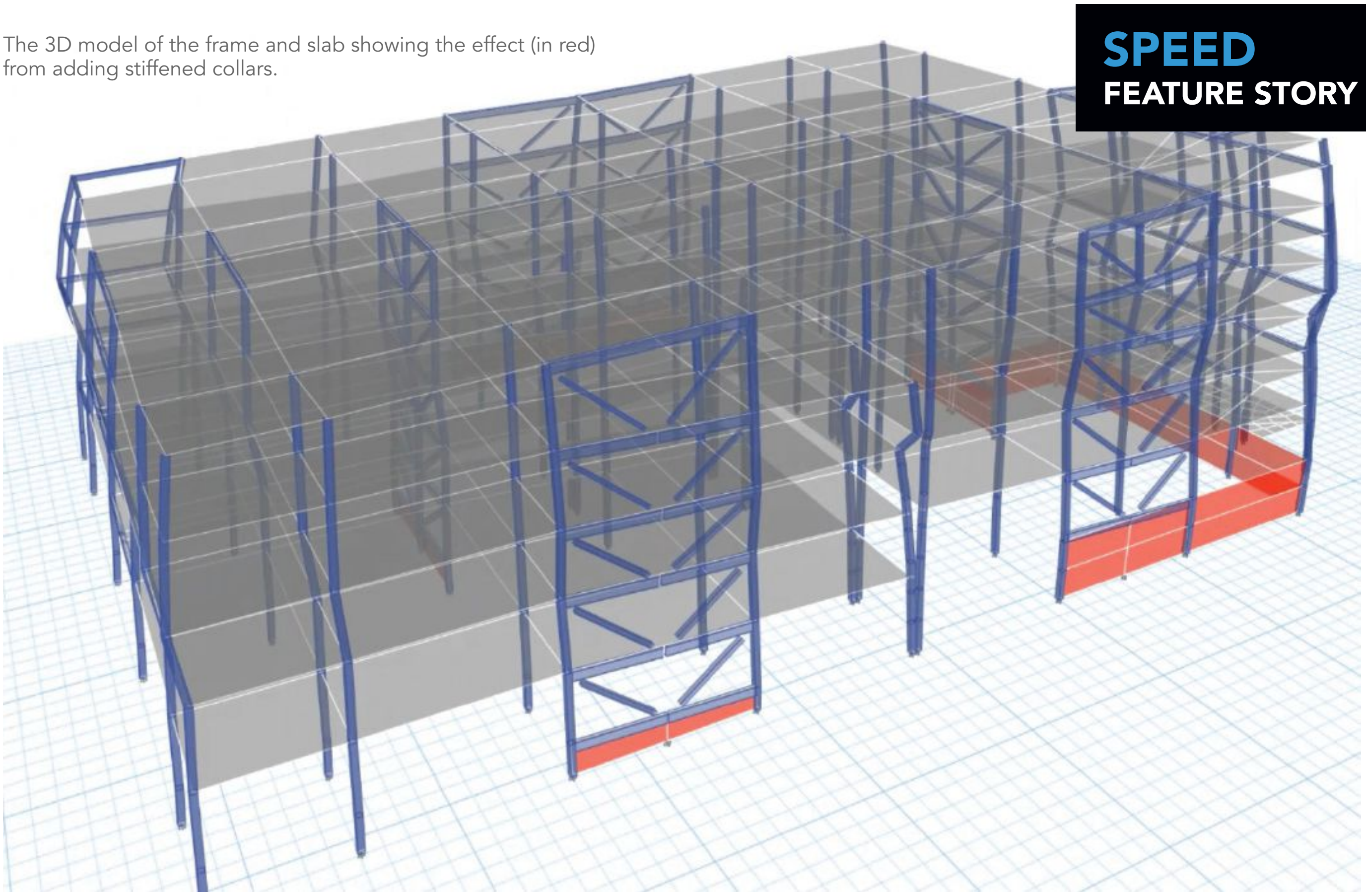
Hitting Top Speed

BY JEROD JOHNSON, SE, PhD, AND SEAN THOMPSON, AIA

A new parking structure on Utah State University's campus opened less than a year after construction began.

All photos courtesy of Reaveley Engineers

A steel frame for a parking structure worked around tight jobsite constraints and used a time-saving connection tool to stay ahead of a short delivery schedule.



The 3D model of the frame and slab showing the effect (in red) from adding stiffened collars.

WITH ENROLLMENT ON THE RISE, Utah State University needed to build a new campus parking structure in time for the current academic year. The jobsite's limited space and an aggressive 12-month schedule forced the project team to entirely rethink traditional parking structure design, leading to the selection of steel for a type of building often constructed entirely with concrete. And choosing it led to completion ahead of schedule.

Parking structures are a desirable and necessary campus amenity in college towns like Logan, Utah, and this one was crucial to keep pace with the university's expansion strategy and growing student population. The Utah State project also required the design team to create more parking in a way that overcame extreme site limitations, addressed seismic demands, and stayed ahead of a tight schedule. It's an example of how creative problem-solving and collaboration can produce a forward-thinking piece of infrastructure.

Bucking Convention

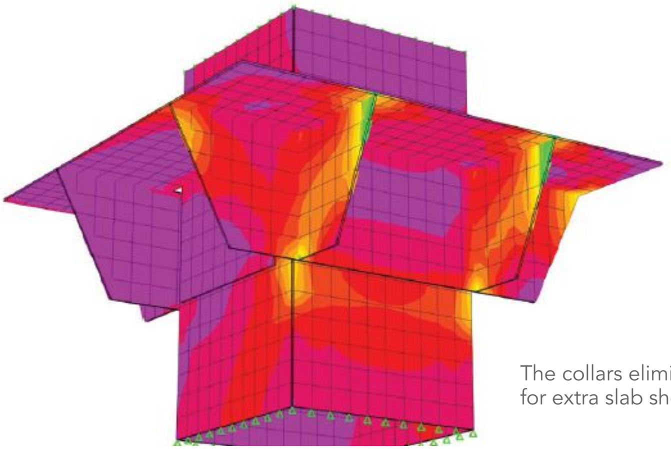
When the project team began design and construction, it was clear the structural system needed to be strong, cost-effective, and easy to construct. Architect Elliot Workgroup and structural engineer Reaveley Engineers worked with contractor Jacobsen Construction to explore a standard cast-in-place concrete garage with post-tensioned concrete floor slabs. The project's requirements quickly revealed challenges with the conventional approach—calling the site tight is an understatement.

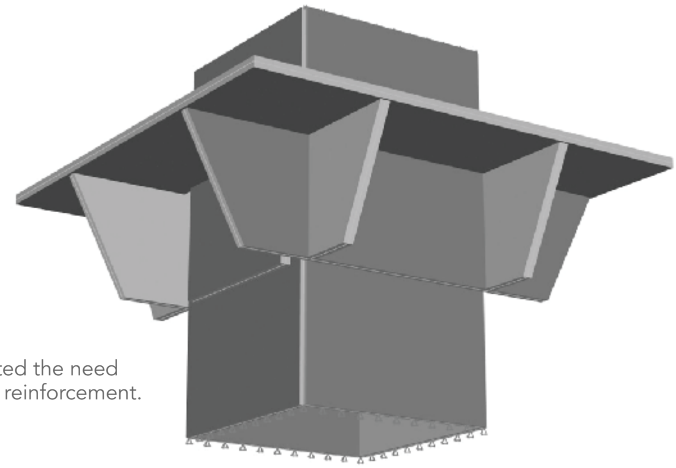
The planned structure was boxed in on every side: new student housing on one, a business school under construction on another, a state highway along the third, and an existing utility tunnel bordering the fourth. Placing concrete shear walls at the building's edge would have imposed loads on the utility tunnel beyond its capacity. Moving the walls inward would disrupt traffic circulation and visibility. Add in the site's high seismicity, and any acceptable shear wall location would demand extremely large foundations.

Concrete shear walls bring inherent challenges: their rigidity often shortens the structure's fundamental vibration period, increasing base shear forces. The typical solution, massive footings, wasn't feasible. Instead, the design team created a hybrid steel frame of hollow structural sections (HSS) columns and buckling-restrained brace frames (BRBFs) paired with post-tensioned slabs designed for heavy vehicle use and resistance to de-icing salts.

BRBFs result in structures with longer fundamental periods, lowering acceleration and reducing force. The lengthened period and higher ductility (R-value of eight compared to five for concrete shear walls) cut base shear by about 70% and reduced foundation volume from 235 cubic yards to 64 cubic yards per bracing line. The BRBF system is located in the garage's interior, which protects the utility tunnel, maximizes visibility, and preserves sightlines for drivers and pedestrians. In a significant seismic event, the BRBF design can be repaired faster and at a lower cost than a shear wall system, supporting long-term resilience and sustainability.

HSS columns were selected for their minimized surface area and clean appearance, in addition to their strong structural performance. Their closed shape provides corrosion resistance in outdoor conditions, with fewer surfaces and crevices for moisture to collect while enabling a simpler, cleaner solution for the column-to-concrete slab interface.





The collars eliminated the need for extra slab shear reinforcement.

Using the Shuriken system avoided field welds on the multi-story HSS columns.

Time-Saving Connection

Traditional multi-story HSS columns require field welds, a challenging and expensive process that impairs performance and aesthetics of exposed hot-dip galvanized members. To avoid field welding, the design team turned to Atlas Tube's Shuriken system for making one-sided bolted connections in hard-to-reach locations.

Initially, the erector was skeptical. But once the erector began work on-site, crews appreciated Shuriken's simplicity and speed. Bolted connections enabled up to 14 columns to be erected per day, a pace impossible with field welding. Using Shuriken wasn't just about solving a logistical challenge. It showed how the right connection technology can fundamentally improve a project's efficiency. (To learn more about Shuriken, read the "Meeting the Need for Speed" article in the February 2025 edition at **modernsteel.com/archives**).

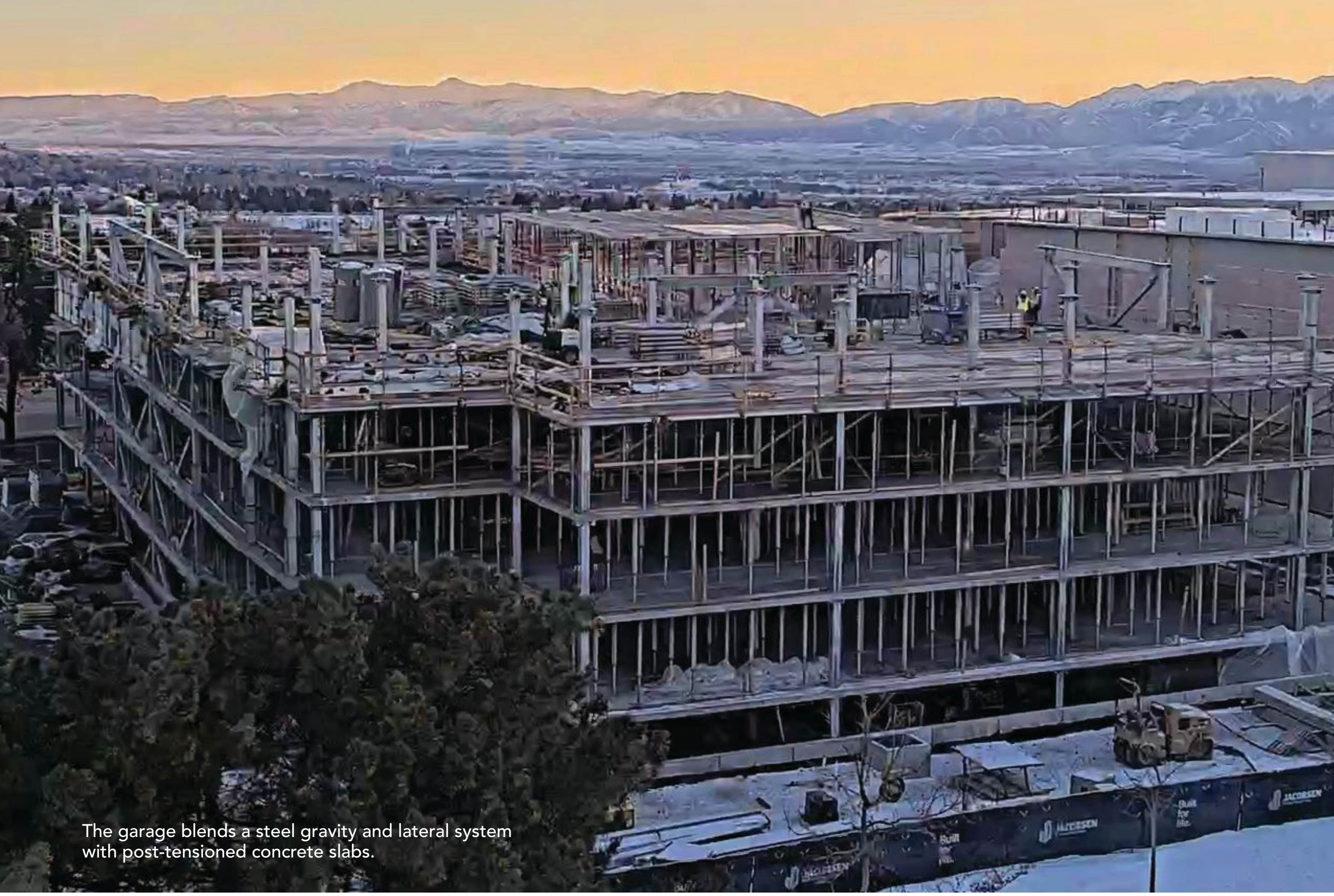
By enabling fast, clean bolted splices in locations that would traditionally require field welding, the Shuriken system directly supported the aggressive project timeline while eliminating the safety and weather concerns associated with welding galvanized steel on-site. Its compact, precise design also ensured consistent installation quality from the first column to the last, reinforcing the reliability and performance that are critical in a long-lasting structural system.

An Unlikely Pair

Blending a steel gravity and lateral system with post-tensioned concrete slabs required careful coordination. Stiffened collars were shop-welded to each column at every floor to address punching shear of the post-tensioned deck. The collars eliminated the need for extra slab shear reinforcement, which would typically be required with concrete columns having a smaller footprint than the steel collars for supporting the slab. Headed stud anchors fastened to the collars enabled positive anchorage between the collar and the slab while addressing integrity reinforcing issues.

Another consideration was slab shrinkage caused by post-tensioning. In a conventional concrete building, formwork is canted outward to offset inward slab shrinkage. Here, though, steel columns supporting multiple floors had to be canted outward to account for the cumulative inward movement. A 55-ft-tall column was also possible, but each deck cast and stressed would pull the column slightly inward. The idea was nixed due to the complexities of building around the tall, unsupported columns.

Splicing the columns reduced the amount of canting to contend with at any one time. Using Shuriken, bolts could be left



The garage blends a steel gravity and lateral system with post-tensioned concrete slabs.

finger-tight to allow column rotation until the slab above was post-tensioned—after which the Shuriken connections were fully pretensioned. Leaving bolted BRB connections and anchor rod connections loose until completing post-tensioning also reduced the oft-problematic consequences of restraint in post-tensioned construction.

The absence of floor beams further simplified steel erection, which becomes much easier and faster when nothing ties into columns except concrete. Early collaboration between the construction and design teams addressed concerns before they became problems, creating a smoother build process. The hybrid approach also shortened cycle times between floor construction. With HSS columns extending through each level, minimal layout work was needed after each pour, and the steel frame eliminated time-consuming tasks such as tying rebar or building formwork for vertical elements. The project was completed in about 10 months, reducing the original schedule by two months.

Providing a Blueprint

By breaking from convention and embracing a hybrid system, the design team found that a novel combination of steel and concrete produced a parking garage with superior visibility and safety, reduced environmental impact, and a shorter construction timeline. While site constraints drove the

above and below: The garage blends a steel gravity and lateral system with post-tensioned concrete slabs.

approach, its success suggests that hybrid HSS-BRBF-Shuriken systems could work equally well on less restrictive sites.

In a field where cost, complexity, and schedule pressures often compete, this parking garage demonstrates that challenging conditions can lead to opportunities for innovation, and that steel—particularly HSS—can be the solution that strikes the right balance for common challenges. It also underscores the importance of early, ongoing collaboration between design and construction teams. This project is not only a new garage, it's a model for how to build smarter with steel. ■

Owner
Utah State University

Architect
Elliott Workgroup

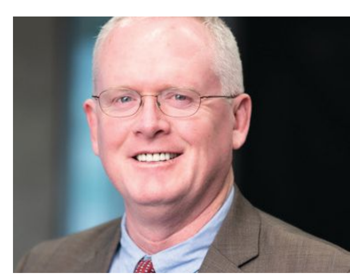
General Contractor
Jacobsen Construction Company

Structural Engineer
Reaveley Engineers

Steel Team

Fabricator
Tech-Steel Inc. AISC CERTIFIED FABRICATOR

Detailer
Hancock Manhattan Industries AISC DETAILER



Jerod Johnson is a principal at Reaveley Engineers, and **Sean Thompson** is a managing partner at Elliott Workgroup.

A welding program for deaf students is helping them find their place in the trade industry and giving them the skills to thrive.

Breaking Through

INTERVIEW BY MATTHEW HAAKSMA

Richard Layton (left) created the Texas School for the Deaf welding program in 2015.

A 170-YEAR-OLD SCHOOL in Texas has recently leaned into one of the state's growing job markets. Texas School for the Deaf (TSD), located in Austin, began developing a welding program in 2015 when it hired Richard Layton, a deaf instructor with a proven track record, to build the curriculum and teach welding classes.

Layton is now in his 10th year leading the program, which offered its first classes in 2016 as part of TSD's Career and Technical Education (CTE) track. The classes are conducted in American Sign Language (ASL), the primary language for most of the U.S. deaf population, with help from visual aids and demonstrations.

The welding program has 10 students enrolled for the 2025–26 academic year. It aims to empower deaf students with a promising career path and the tools to succeed on their own in an entry-level job or in advanced welding programs. Its advancements are an inspiring story and a call to action to champion similar initiatives and challenge existing perceptions. Layton spoke about the program's development, challenges, purpose, future, and more.

How is the school and the welding program structured?

Just about every deaf school is structured like a regular K–12 public school and must meet its state department of education mandates. All students are given the same core classes found in a public school. The delivery of the courses makes them unique; everything is presented in ASL instead of verbally. Most TSD teachers are deaf, and those who can hear are fluent in ASL. We're all state-certified teachers with a few extra certifications, such as special education, deaf and hard of hearing, and bilingual, that require additional educational training. Our CTE teachers are all industry-certified in their fields.

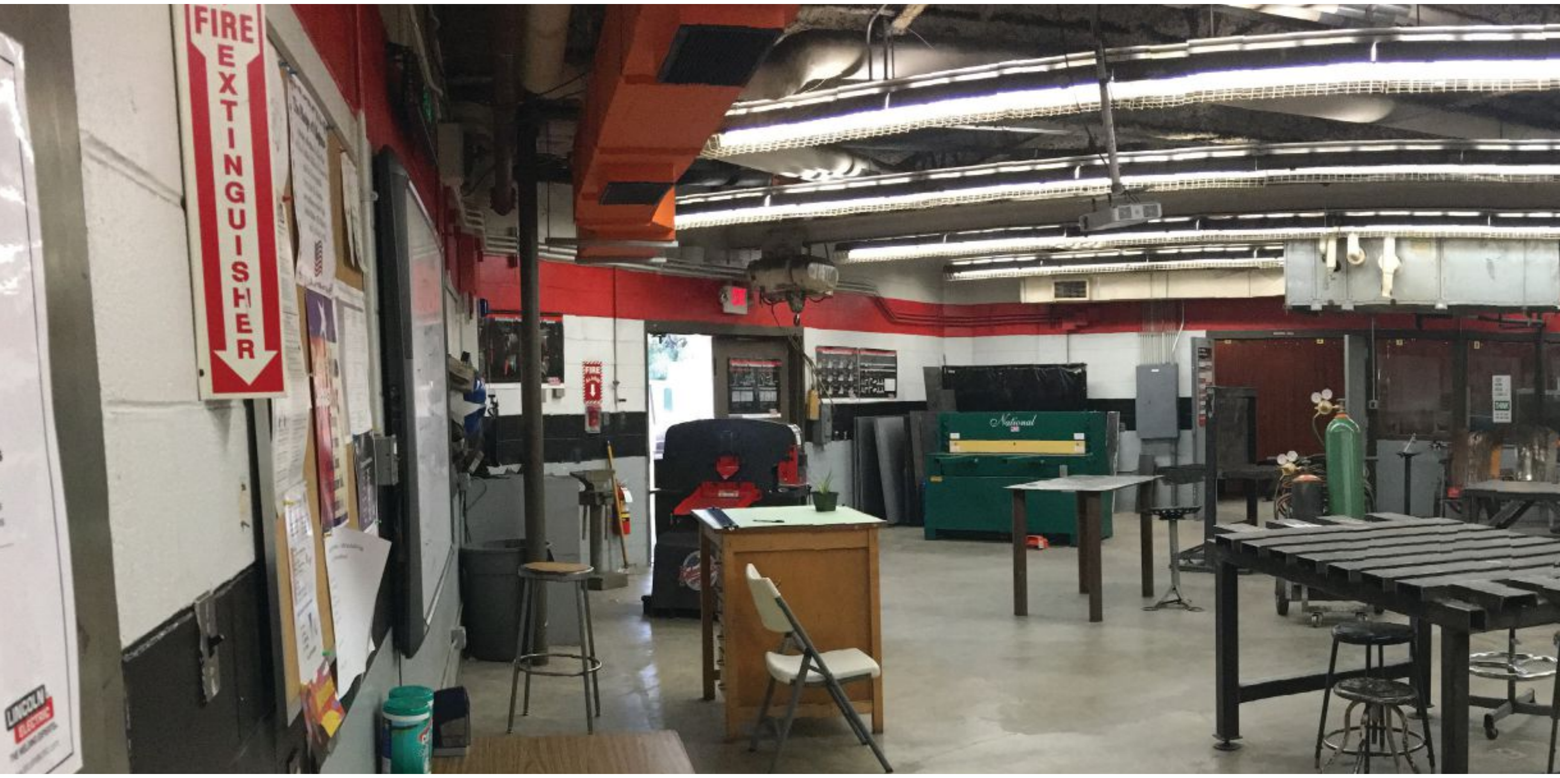
TSD offers dual-credit courses, including college algebra, forensic science, welding, and automotive technology, among others. Every student has an individualized education plan (IEP) that follows them from the day of enrollment to the day of graduation. Every year, each student's IEP is reviewed to determine if it needs modifications to ensure they receive the best possible education in the least restrictive environment.

TSD has four academies: trades, humanities, digital media, and STEM. Students are grouped in an academy starting in 9th grade, take core classes in 9th and 10th grade, then take their academy classes in 11th grade. I teach TSD's three primary welding courses: a one-semester introductory class and two yearlong advanced classes, Welding I and Welding II. The welding track also has a dual-credit partnership with Austin Community College (ACC), which allows students to earn a welding certificate from ACC.

What led you to TSD and what made it a compelling job?

TSD offered me the chance to teach welding as my sole subject for the first time, and more importantly, a chance to pursue my desire to build a welding program from the ground up. This is my second time creating a program for deaf students. In my prior role, I built and taught an agriculture science program at Arizona School for the Deaf and Blind. I have a bachelor's in agriculture technology, management, and education, so that was right up my alley.

Welding has played a part in my journey. I began my career in construction and worked my way up to heavy equipment operator, which led me to attend diesel mechanic school. That's where I had my first formal welding training. Later, I saw the value of teaching a skill like welding that can prepare students for careers in several trades, not just a welding career. I hold an associate's degree in code welding from ACC, and I believe I may be the only deaf welding teacher with a welding degree.



above: TSD's welding shop has two rooms, one with welding booths and one (pictured) with other equipment.

below: Layton and TSD students communicate with ASL and visual cues.

What are the most important components of effectively teaching deaf students?

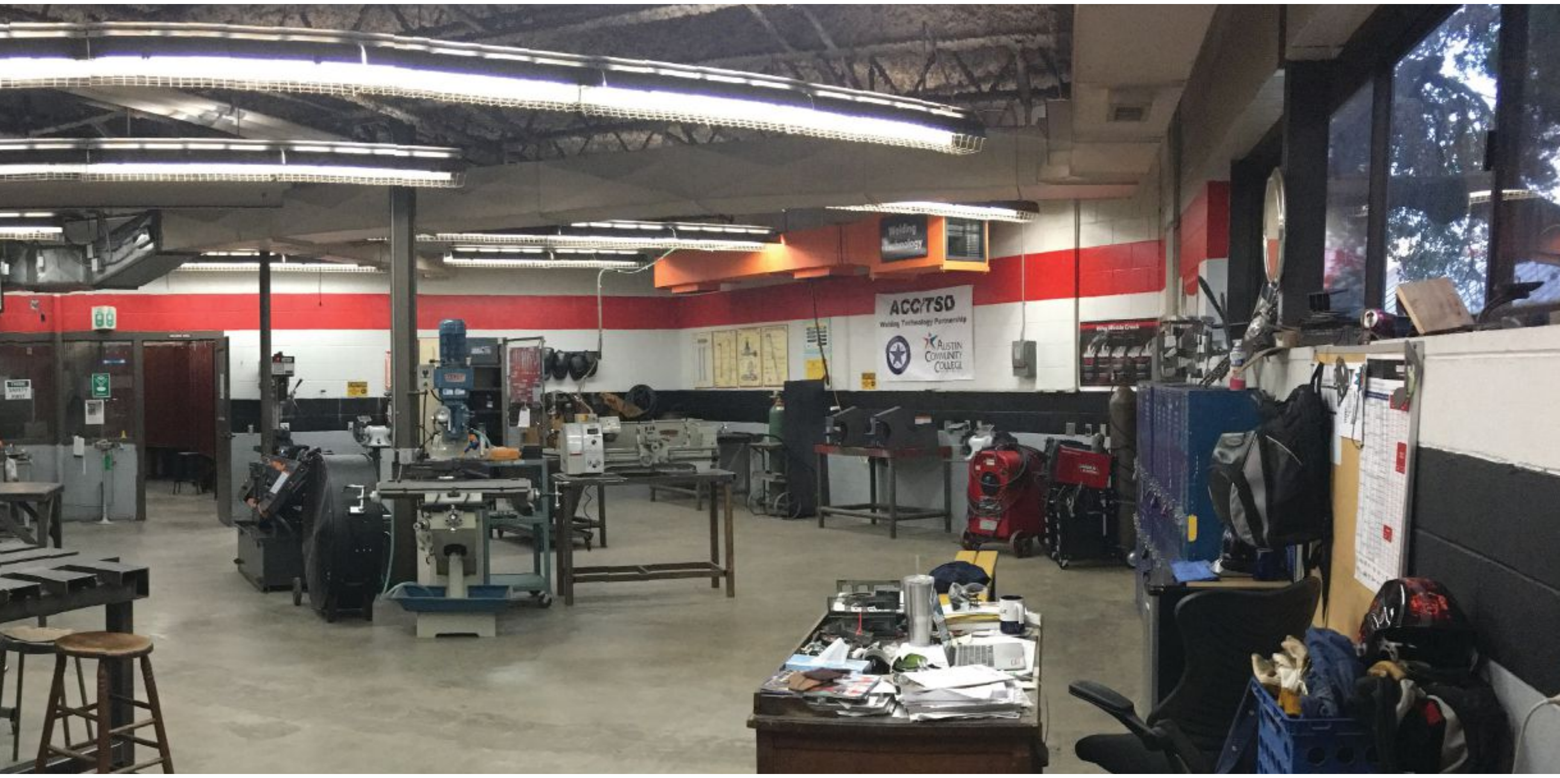
We teach our students in the language they understand best, ASL, but we also help them effectively learn the English language while delivering the lessons in ASL format. We provide them with the essentials of Maslow's hierarchy of needs, starting with language, security and stability, social relationships with peers and family, respect, and recognition.

How do you successfully blend hands-on instruction with traditional classroom instruction?

We want to focus on direct experience, but it takes balancing. Classroom schedules are a constantly evolving process, but regardless of the challenges, our CTE industry trade teachers are accustomed to adapting. Our respective industries are always evolving. Our administrators work to balance academic and elective courses to comply with state graduation requirements.

In 2025–26, classes are 45 minutes each period, but all trades classes are double periods. In the academy format, the schedule revolves around students' career endorsement selection and provides them with ample time to learn their trade and essential textbook information.

The 2025–26 academic year is the first year with the academy format. It's too early to form definitive pros and cons about this format, but the first semester proved the daily rigor of 90-minute classes helps with muscle memory and retention. I can schedule classroom lectures to reinforce welding vocabulary and technical aspects and still have time for lab work.



How is the curriculum for TSD's welding classes different from the base welding curriculum for hearing students?

Using the curriculum written for hearing students is a challenge for deaf students. In our classroom, the assignment in the booth comes first before the text, which helps students connect terminology to the work they just completed. It's more effective to focus on hands-on work, and when giving students feedback on their work, I use terminology found in the textbooks. Afterward, we'll sit down and go over the textbook.

If I designed a textbook for deaf welding students, it would have illustrated tasks and assignments first. I would then send students to the shop floor, show them the assignment by example, let them do the work, and use the textbook to review the work. In my prior teaching job, I found this concept to be effective with hearing students as well. Nothing teaches welding better than burning rods.

What adjustments do you have to make to teach welding without speaking?

Just because a person is deaf does not mean that person needs special accommodation to be a welder. For example, I can't stand behind people and give verbal instructions. I must tap them on the shoulder to get their attention, then give face-to-face instructions. The welding environment is loud, and tapping on the shoulder is a universal attention-getting method.

Instead of listening for the sound of the weld, I teach students to look for visual cues while welding—the puddle, the arc, the sparks. Another example is spraying soapy water to check for leaks when installing a new cylinder, because if you're deaf, you won't hear a leak. For hearing alarms or moving equipment, I refer to OSHA standards that say all moving equipment should have a flashing beacon or fire alarms with a flashing strobe.

What initiatives has TSD undertaken to strengthen language, academic achievement, and career pathways for deaf and hard-of-hearing students across Texas?

Every year, TSD hosts a communication skills workshop for ASL interpreters who serve deaf students throughout the state. There has been an increased demand for industry trade signs, which I teach, along with colleagues who teach a variety of ASL refresher courses. These interactions are helping increase the number of schools offering CTE courses to deaf students.

What are the challenges encountered by TSD students following graduation?

When students start their job search, we find that many struggle with securing an interview. Graduates attributed that to the lack of ASL interpreters or their limited awareness of the employer's financial responsibility to pay for an interpreter during the interview.

Many students rely on the Texas Workforce Commission's (TWC) Vocational Rehabilitation division for job placement assistance. Students who entered different trades have told me the safety training, technical vocabulary, and hands-on experience from the welding program proved beneficial in their new jobs.

One significant improvement for job placement is adding OSHA-10 construction certification to our welding technology and construction technology programs. Employers sometimes hesitate to hire a deaf person due to the communication factor, often citing safety concerns as a reason. Students carrying an OSHA-10 certification card challenge employers to reconsider those concerns.

I have spoken to safety coordinators who say the OSHA-10 card carries weight when presented during an interview. I tell students to ask during interviews how many of a company's employees hold OSHA-10 certification, and several said that question was key to overcoming an employer's safety concern.

I remind students that once they leave TSD, they will be entering a hearing-centric world. But once they establish themselves in the field, they can help their hearing peers shift towards their needs by teaching them ASL for working communications. Smartphones help bridge the communication gap between the deaf and hearing communities.

How have TSD's welding facilities evolved?

We are in the same facility and have the same equipment we acquired upon starting our partnership with ACC. Fortunately, our numbers are small, and I still have one welder per student. We have 10 welding booths in one room. Another room has a plasma cutting table, a mobile layout table, three bench grinders, two belt sanders, a sandblaster, a Baleigh mill, an oxy-fuel cutting table, an oxy-fuel track and torch table, a horizontal bandsaw, a portable plasma torch, and one 40-in. shear. I keep things portable to adapt to students' projects and use techniques that reflect work welders could do in the field.

Our facility also has a limit on the amount of electricity we can draw; the building is currently at its maximum capacity. An upcoming construction project on another wing of the building will include an upgrade to the electrical capacity.

Having a virtual reality welding system to supplement our current setup would enhance our welding technology program. Virtual reality welding enables students of all ages to experience what it's like behind a hood and visualize proper welding techniques without consuming materials during the initial learning stages.

What strategies have been successful in securing material donations and financial support? Is funding from private or public grants, or a combination?

Since we are considered a state agency rather than a public school system, receiving donations and financial support for the welding program has been limited to an annual foundation gala that auctions off pieces of work done by students. Financial donations must be made through our TSD Foundation, a 501(c)(3) organization that raises money to support educational activities for deaf students throughout Texas. Securing material donations has been challenging, particularly when competing with larger public schools.

Most deaf schools in the nation are state-funded, so their funding cycles follow the state's coffers. TSD has been fortunate enough to secure funding from our state legislature, but that doesn't mean we have sufficient funds to cover the cost of additional adaptive equipment.

A retired grant writer has offered to help us write grant applications. However, the pool of grants has dwindled with the exclusion of Department of Education funding, which was a major source for most CTE programs across the country. This reduction means that larger schools will receive a larger share of the smaller pie of grants available from the state.

PPE gear and consumables account for the majority of our department's budget. Vendors like Lincoln Electric offer educational rates on electrode consumables, but hoods, gloves, and jackets are purchased through an educational portal at a discounted rate.

TSD's welding program has 10 students enrolled for the 2025–26 academic year.

Layton demonstrates how to use basic household cleaning liquid to check for a leak when installing a new cylinder, which avoids the need to listen for the leak.

What progress has been made in establishing partnerships with local businesses? What relationship-building approaches have proven most effective?

There has been some progress in connecting with employers through an organization called Associated Builders and Contractors Central Texas. They host an educators' day with employers and jobsite visits. They also host a student day where students can interact with various companies, engage in hands-on demonstrations, and operate heavy equipment. This year, we started a partnership with SkillsUSA, the country's largest CTE workforce development organization.

I have taken students on a field trip to a local business, Dovetail Custom Wood and Metal, which employs a deaf welder as a quality control inspector. I hope it will lead to further collaboration, because they have already hired a deaf employee.

I have taken welding students to events hosted by ACC, and most people are surprised that they welded next to a deaf student. Deafness is not a visible impairment and only stands out when communicating. We hope the SkillsUSA partnership will expose more people to the abilities of deaf participants and show they're capable of performing the same tasks as others.

What are some success stories of your welding graduates in securing employment, pursuing further education, or even starting their own businesses?

Our deaf students are remarkably resilient as they carve a pathway through obstacles and discrimination. One student, Chayton Graves, aspired to work as a welder with his father's construction company. However, while in the ACC welding program, he discovered HVAC and enjoyed it, so he followed that path. I assured him that discovering HVAC while pursuing welding far exceeded my expectations.

Another student, Rebecca Giuntoli, spent four years in our program and then enrolled at the University of Texas, majoring in environmental engineering, while still enrolled at ACC in the welding program. She also modeled and won Miss Austin on the platform of encouraging companies to better design PPE for female welders and females in non-traditional trades.

While touring as Miss Austin, she was invited to participate in an underwater welding school in Houston. Underwater welding is a promising field for deaf welders, because non-verbal forms of communication are essential. Rebecca's success shows that deafness isn't a barrier.

She has now graduated as a civil engineer with a focus on the environmental impact of oil platforms. She works for an engineering firm in the Houston area specializing in oil platforms. Her knowledge of welding provided the foundation for her career choice. During her interview, when asked about safety issues related to being deaf, she presented her OSHA-10 certification, challenging the interviewer to verify whether every employee held one. She was offered the job.

*To learn more about the Texas School for the Deaf welding program, contact Richard Layton (**Richard.layton@tsd.texas.gov**) or visit **www.tsd.texas.gov**.*

Matthew Haaksma (**matthewh@ocillc.org**) is a project manager and quality manager at Orange County Ironworks in New York and a workforce development advocate. He is a member of the AISC Committee on the Code of Standard Practice.

AISC's 17th annual SteelDays featured multiple welding competitions, a New York City steel building series, and much more.

Letting Sparks Fly

LEXICON, INC., DECIDED that hosting students at its annual SteelDays event was no longer enough. In 2025, it provided them with an opportunity to put their welding skills on display.

The Arkansas-based AISC member fabricator has hosted students at its Little Rock headquarters and shop for several years. This year, added a hands-on component: a welding competition, put on in partnership with the American Welding Society.

About 60 students from central Arkansas high schools and trade schools participated in Lexicon's first welding competition, which awarded a $1,000 scholarship to the overall winner and prizes to each school's winner. They were among the 200 students who came to Lexicon headquarters October 29 to see fabrication in action and tour its shop, including a new 40,000-sq.-ft custom metals facility.

Lexicon wanted the students to leave with a stronger understanding of welding careers and the opportunities they can provide. One shop visit can create a connection, especially for local students. And a chance to compete can strengthen pride in being a skilled welder.

"We use SteelDay to celebrate, but at the same time, we want to give high school students up close exposure to our work," said Viji Kuruvilla, Lexicon vice president of quality. "When they come to our shop, they can see students from their schools who work here. It's a connection and a sense of belonging."

Several prominent voices lent their support by touting the impact welding can have, including U.S. Rep. Rick Crawford and Arkansas Attorney General Tim Griffin.

"The future of American manufacturing depends on skilled trades like welding," said Crawford, who chairs the Congressional Steel Caucus.

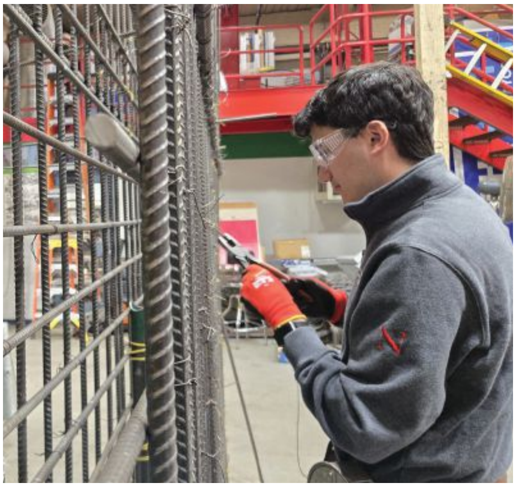
Student welding competitions sponsored by fabricators and regional fabricator associations are becoming more common. AISC member Puma Steel in Cheyenne, Wyo., has made its annual welding competition part of SteelDays. Competitions are a chance for fabrication companies to identify future hires and generate enthusiasm about welding as a career. Lexicon's goal in hosting SteelDays and a competition is the latter, but 10 high school senior contestants also interviewed with Lexicon for job opportunities. One school winner even interviewed right before competing.

Fabricator associations and AISC member fabricators don't need to wait until next year's SteelDays to host a competition. Visit **aisc.org/weldingcompetition** to learn more about hosting. The AISC Education Foundation provides up to $4,000 in matching scholarship funds for competition winners through its Rex I. Lewis Scholarships.

Lexicon hosted one of more than 40 SteelDays events in 2025. Many were focused on students, such as shop tours and visits to Iron Workers Local training centers. Some, though, were open to the entire AEC industry and even the public, including Open House New York's steel building-focused series of tours, panel discussions, and more.

Read on for a photo recap of many events from AISC's 17th annual SteelDays. ■

Crystal Steel Fabricators in Federalsburg, Md., hosted two shop visits, one for industry professionals and one for students. Attendees toured the site and got hands-on fabrication experience.



Several Iron Workers Local chapters hosted SteelDays events at their training centers. Professionals visited Iron Workers Local 7 in South Boston, Mass., to step into an ironworkers' boots for a day.

right: Puma Steel in Cheyenne, Wyo., held its annual welding competition. Attendees and contestants also practiced on the virtual welding machine.

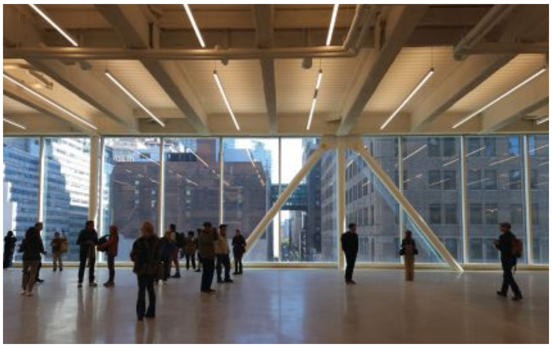
below: Students attempt a girder climb at the Iron Workers Local 433 training center in La Palma, Calif.

Lexicon, Inc. added a welding competition to its annual SteelDays event at its Little Rock, Ark., headquarters. About 60 contestants from Little Rock area schools competed and heard from notable local voices, including Lexicon CEO Patrick Schueck (below) and U.S. Rep. Rick Crawford (above), who represents Arkansas' 1st Congressional District.

above: Manhattan's newest steel skyscraper, 270 Park Avenue, is JP Morgan Chase's new headquarters. Project team members, including representatives from structural engineer Severud Associates and fabricator Banker Steel, held a panel discussion about the design and fabrication as part of Open House New York's steel series.

left: A tour and presentation at TY Lin's Manhattan office was part of Open House New York's steel-focused series.

below: The general public toured PENN 2, a Midtown Manhattan office building that recently completed a steel addition and won a 2025 AISC IDEAS award.



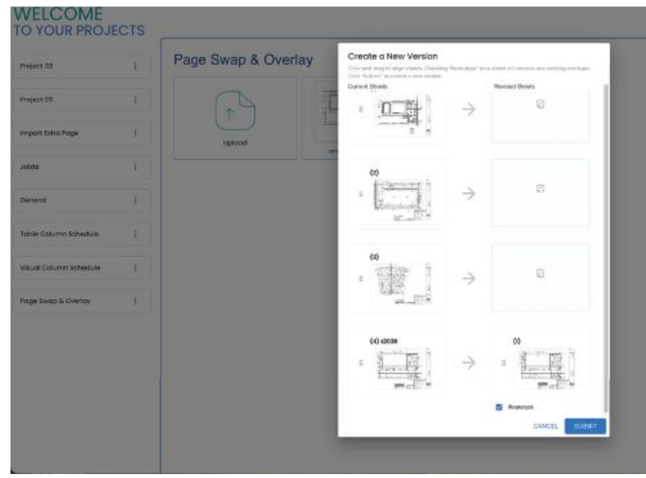
About 100 local high school and trade school students visited Metal Works in Oroville, Calif., for tours and hands-on welding experience.

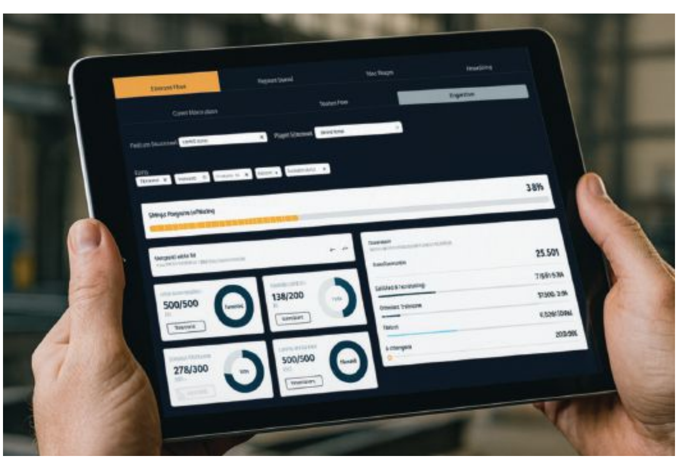
This month's new products includes updates to structural engineering software and recently released software for engineers and fabricators.

LIFT Change Order Management

Every estimator knows the frustration: revised drawings arrive after completing the takeoff. In traditional workflows, this means starting over, spending hours comparing versions line by line, or using software overlays that don't quite work well all the time. LIFT by SketchDeck.ai's AI-powered change order management feature avoids the do-over and wasted hours. Upload the revised pages, and the AI automatically identifies every addition, deletion, and modification—no manual comparison required. The software highlights exactly what changed and calculates the impact on your quantities in seconds. The result: More accurate estimates and more profitable bids.

When revisions arrive during a tight bidding window, you can assess the impact, adjust your numbers, and get back to winning work. Whether you're rebidding a project or preparing a change order, LIFT handles tedious work so you can focus on growing your business. For more information, visit **www.sketchdeck.ai**.





FabStation

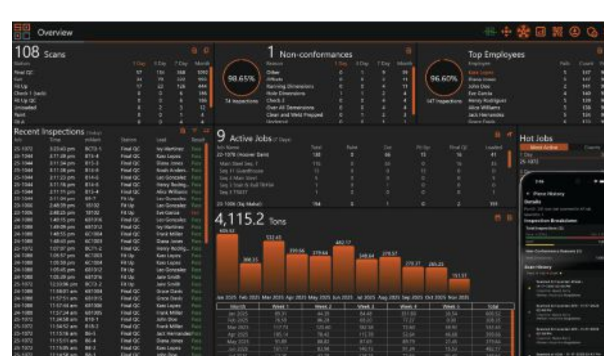
FabStation, an augmented reality fabrication software, now has automated production reporting, unifying the production process in one structured workflow and delivering complete visibility from project start to finish. Automated production reporting centralizes data, tasks, and oversight while improving accuracy, transparency, and efficiency across production activities. Integrated features include production trackers, AR-powered completion and inspection checklists, time tracking, automated reporting forms, AR image capture, error-free shipping assurance, MRP/ERP integrations, and progress analytics.

These tools streamline daily operations, strengthen consistency, and reduce manual effort. With enhanced analytics, a robust audit page, and customizable progress reports, automated production reporting delivers deeper insights and smarter decision-making. For more information, visit **www.fabstation.com**.

SteelCoded

The updated version of SteelCoded brings powerful new reporting tools that turn production data into real-time insights. It also has an enhanced quality control module that makes for simpler and faster inspections, documentation, and compliance with the *Code of Standard Practice for Structural Steel Buildings* (ANSI/AISC 303-22) and the *Specification for Structural Steel Buildings* (ANSI/AISC 360-22). These updates build on SteelCoded's reputation for accurate steel tracking and reliable inventory management from receiving through delivery.

Designed to fit seamlessly with Trimble's Tekla PowerFab, SteelCoded connects the shop, field, and office with QR-based scanning, mobile workflows, and valuable analytics. Steel fabricators across the country rely on it to stay organized, reduce errors, and see exactly where every piece stands. For more information, visit **www.steelcoded.com**.



new products

STSX 2.0

STSX 2.0 by P2 Programs is a complete rewrite of the original STSX barcoding and tracking system and its most advanced version yet. This new release delivers significantly faster performance, a modern interface, and a fully web-based experience designed to make your workflow smoother than ever.

With built-in SSL communication, STSX 2.0 offers enhanced security and flexibility. If your system is SSL-enabled, you can now use the camera on your phone, giving you more mobility with less equipment. It also greatly reduces reliance on third-party software, simplifying updates and maintenance. For more information, visit **www.p2programs.com**.

Voxel Link

Voxel Labs delivers simple, fast, and reliable software built by engineers, for engineers. Its software aims to eliminate manual data entry and broken transfers between models. Its tools cut out redundant steps, timely reworks, and keep analyses and modeling in sync so teams can finish designs faster and with fewer errors.

Voxel's new release, Voxel Link, is a smarter structural software that directly links analysis models to BIM. Voxel Link integrates with existing modeling environments, aligns customized input fields and data to your company's standards, and automatically saves import settings for every session. It helps eliminate manual re-entry, misaligned data, and costly revisions—saving hours, reducing errors, and delivering flawless steel projects. For more information, visit **www.voxellabs.co**.

Ferra

Ferra is an AI-native takeoff platform built for structural steel estimators. Ferra turns plan sheets into accurate, auditable takeoffs, giving teams a faster and clearer path from drawings to bids. Designed by estimators and powered by advanced computer vision, Ferra helps teams process more bids with greater accuracy—reducing manual effort, minimizing rework, and unlocking time for business development and value engineering.

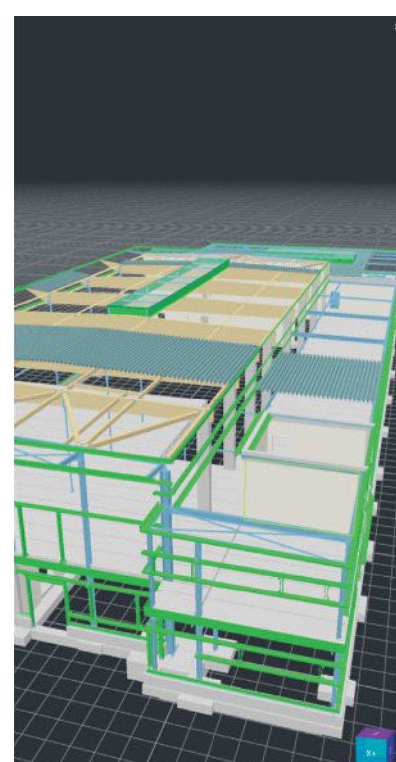
Ferra is currently in early design partnership with leading fabricators and is defining the future of AI-enabled estimating, where human expertise and machine precision work seamlessly together. For more information, visit **www.bidferra.com**.

S&C bocad

SCHULLER&Company has launched bocad 2026, a new generation of BIM-based detailing software designed to meet the needs of modern fabricators and detailers. Its centralized data platform ensures consistent information for all users throughout the entire process, from design to fabrication, strengthening quality, efficiency, and collaboration. Its SmartDraw feature provides complete visibility and control of the drawings, their status, content, and automatic updates.

bocad Hybrid integrates steel, timber, structural glazing, and cladding within a single model, enabling fully coordinated, multidisciplinary workflows. Cloning allows modelers to apply changes quickly throughout their models, and the webviewer provides instant access to 3D models via QR code. BCF compatibility enables open communication across project teams.

With customizable shortcuts, intuitive navigation, and dark mode, bocad 2026 delivers an enhanced user experience—empowering engineers to build smarter, faster, and with greater precision. For more information, visit **www.schullerandcompany.com**.



AWARDS

AISC Chooses Namesake for New Educator Award

AISC has named its newest educator award in honor of a past president and board member who advanced the institute's efforts to promote steel education.

The H. Louis Gurthet Teaching Faculty Award celebrates the contributions and legacy of Lou Gurthet, who served as AISC's president from 1996 to 2005 and on AISC's Board of Directors from 1990 to 1996. It honors a teaching-focused faculty member (such as a professor of practice, lecturer, instructor, or adjunct professor) in a university civil engineering, architectural engineering, architecture, construction engineering, or construction management department.

"Lou's leadership and advancement of AISC as president was broad and deep, and his impact is still felt today. Within that, I could always see the importance he put on AISC's support of and engagement with teaching professors," said AISC president Charles J. Carter, SE, PE, PhD. "He understood the impact AISC could have with programs and resources that enable professors to engage with and impact their students. This new award focuses on one of Lou's greatest passions, and it's a fitting opportunity to recognize him."

As a board member, Gurthet oversaw AISC's Partners in Education Committee, which promoted the long-term strength and vitality of structural steel education at the university level. In 1998, he led the incorporation of the AISC Education Foundation, which was originally formed in 1959 as an unincorporated charitable trust.

Before his stint at AISC, Gurthet was the president of AISC full member Zalk Josephs Fabricators in Stoughton, Wisc., from 1980 to 1996. He became the first AISC president with experience in both structural engineering and fabrication and was also the first to hold a registered professional engineer designation.

To earn the award, a candidate must have no more than 10 years of teaching experience at the university level, exhibit excellent classroom performance, and demonstrate the ability to connect students to the steel industry effectively. The award's inaugural recipient will be announced as part of the 2026 AISC annual awards and recognized at the opening keynote at NASCC: The Steel Conference in Atlanta on April 22. The recipient will also earn a $2,500 honorarium.

CERTIFICATION CORNER

AISC certification sets the quality standard for the structural steel industry and is the most recognized national quality certification program. It aims to confirm to owners, the design community, the construction industry, and public officials that certified participants, who adhere to program criteria, have the personnel, organization, experience, documented procedures, knowledge, equipment, and commitment to quality to perform fabrication, manufacturing, and/or erection.

The following U.S.-based companies were newly certified in at least one category from October 1–31, 2025. Find all certified companies at **aisc.org/certification**.

Newly Certified Companies
(October 2025)

All Around Industrial Inc., Linden, Tenn.
Blum Enterprises, Inc., Baton Rouge, La.
Chet Morrison Contractors, LLC, Harvey, La.
Fema Construction LLC, Altamonte Springs, Fla.
General Welding Company, Inc, Upper Marlboro, Md.
GSM Industrial, Lancaster, Pa.
Hayden Steel Erector Co., Bardstown, Ky.
JD2 Inc., Auburn, Calif.
Kerr Squared, LLC, Albuquerque, N.M.
MetalStorm LLC, De Pere, Wisc.
River City Erectors of TN LLC, Memphis
San Joaquin Steel Co., Inc., Stockton, Calif.
Santa Fe Water Systems, Santa Fe Springs, Calif.
Summit Steel Fabricators, Inc., Houston

RUNNING FOR OFFICE

Leading New England Fabricator Announces Candidacy for Congress

Hollie Noveletsky, a former member of the AISC Board of Directors and president/CEO of Novel Iron Works in Greenland, N.H., is making her second run for the Republican nomination for the 1st Congressional District of New Hampshire.

A strong advocate of Buy America initiatives, her platform emphasizes the importance of job growth and strengthening American industry. As a passionate advocate, Noveletsky was instrumental in the 2022 enactment of New Hampshire's Buy America legislation.

Novel Iron Works was founded by Noveletsky's father, Ralph, in 1956. Noveletsky has worked full-time for the company since 1999, having previously worked part-time while attending college and graduate school. She joined the AISC board in 2015 and has also served as past chair of the AISC Government Relations Committee. She is the president of Novel-affiliated erector Rose Steel, also in Greenland, N.H., and previously served as president of the Structural Steel Fabricators of New England.

Noveletsky began college as an engineering student at Lawrence University but transferred to Rush University, where she earned a bachelor's in nursing. She holds a master's in geriatric nursing from Boston University, a PhD in nursing research from Boston College, and a post-master's certificate in psychiatric nursing from MGH Institute of Health Professions. She served in the U.S. Army Reserve for 10 years as a nurse practitioner.

Rep. Chris Pappas (D) is the current representative for New Hampshire's 1st Congressional District and has announced his candidacy for the U.S. Senate.

AISC advocates for policies that support the U.S. steel fabrication industry but does not endorse individual candidates for public office.

RESEARCH

Pankow Foundation Completes Research Project on Parking Garage Live Loads

A newly available Charles Pankow Foundation-sponsored research project investigated whether the currently prescribed parking garage live load in *Minimum Design Loads and Associated Criteria for Buildings and Other Structures* (ASCE 7) should be updated to account for the rise in electric vehicle (EV) usage.

The research paper, "Safe and Sustainable Parking Garage Live Loads in the Age of the Electric Vehicle," was published in late 2025. Its principal investigators were Ross B. Corotis, PE, PhD of the University of Colorado-Boulder and Sanjay R. Arwade, PhD, of the University of Massachusetts-Amherst. It found that the current 40 psf live load in ASCE 7 is still sufficient to accommodate the increasing amount of EVs in the U.S. and their significant battery weight.

Parking garages are subject to changes in loads and demand as the market's vehicle purchasing preferences shift over time. EVs' growing popularity raises the idea of a possible change to the prescribed design live load in ASCE 7. The study implemented the stochastic live load method that established the existing 40 psf garage live load value in ASCE 7, but used data reflective of the current U.S. vehicle fleet. It also introduced an approach to account for future increased EV usage. Corresponding equivalent uniform design loads (EUDLs) are calculated for several cases, considering geographic and temporal variation and various EV adoption scenarios.

In all but the most extreme cases of EV adoption and EV weight, calculated EUDLs are equal to or lower than 40 psf. When the EUDL exceeds 40 psf, it is prudent to consider the additional safety margin provided by the presence of a load factor greater than 1.0 in the specification of load combinations. Using direct simulation of loading and column axial forces on multiple levels of a parking garage, the study found that a 10% reduction in live load is supported for columns supporting multiple levels.

The full research paper is available at **www.pankowfoundation.org/news**.

People & Companies

WSP recently announced formal leadership of its national bridge inspection services, naming **Salvatore Iodice**, a senior vice president and longtime structural engineering manager for the firm in the U.S., to lead the team.

Iodice, based in New York, leads more than 150 inspectors nationwide to work with state departments of transportation, transit agencies, federal agencies, bridge and port authorities, city agencies, and municipalities to ensure that their structures meet or exceed requirements for safety and security. WSP's diverse bridge inspection portfolio includes highway, long-span truss, arch and cable-supported bridges, steel and concrete viaducts, and movable and undergrade railroad bridges.

Iodice joined the firm in 1990 following six years of bridge inspection in New York and has since managed the inspection of more than 40,000 bridges. He most recently served as the firm's Northeast region bridge inspection manager.

Afinitas, a leading global infrastructure equipment and services company, has completed the acquisition of **RJ Watson, Inc.**, a key provider of engineered structural products and systems for the bridge, highway, and heavy construction industries. The acquisition broadens Afinitas' scope beyond its traditional precast concrete customer base and strengthens its position as a comprehensive provider for the global infrastructure market.

Headquartered in the Buffalo, N.Y., area, RJ Watson has built a reputation for innovation and engineering excellence, specializing in bridge and structural bearings, seismic isolation devices, and expansion joints. With a state-of-the-art facility and decades of experience, RJ Watson serves construction clients with customized solutions for complex design challenges.

BRIDGES

Drexel University Professor Earns Steel Bridge Task Force Award

The Steel Bridge Task Force has awarded a respected engineering professor and former practicing engineer with one of its annual awards.

Matthew Reichenbach, PE, PhD, assistant teaching professor in the Civil, Architectural and Environmental Engineering Department at Drexel University, recently received the 2025 Robert J. Dexter Memorial Award. As part of the honor, he presented his research—focused on the lateral torsional buckling behavior of non-prismatic steel bridge girders—at a recent Steel Bridge Task Force meeting in Lafayette, Ind.

The Dexter Memorial Lecture was established in 2005 in memory of Robert J. Dexter, an associate professor of civil engineering at the University of Minnesota and internationally recognized expert on steel fracture and fatigue problems in bridges. It provides an opportunity for individuals early in their careers in structural engineering to present a lecture on their steel bridge research activities to the Steel Bridge Task Force and to participate in its semiannual three-day meeting.

Reichenbach joined Drexel University in 2021, following his doctoral and master's studies in structural engineering at the University of Texas at Austin. He earned his bachelor's in civil engineering from Lafayette College in Easton, Pa. Before his academic career, he gained valuable industry experience as a structural engineer with the Harman Group and Hardesty & Hanover, where he worked on the design of steel bridges and complex structural systems. His combined academic and professional experience provides him with a practical perspective that informs his research and his teaching.

Throughout his career, Reichenbach has contributed to several high-impact projects that have advanced steel bridge design. He played a leading role in the National Cooperative Highway Research Program (NCHRP) Project 12-113, which focused on modifying AASHTO cross-frame analysis and design. His work included field monitoring of bridges, laboratory experiments on cross-frame members, and parametric finite element analyses of over 4,000 bridges. These efforts led to the development of comprehensive design methodologies and several AASHTO provisions for cross-frame and diaphragm systems, significantly improving the safety, reliability, and efficiency of steel bridge structures.

In addition to his work on cross-frames and diaphragms, Reichenbach has contributed to research on lateral-torsional buckling of non-prismatic steel girders, influencing the 10th Edition AASHTO *LRFD Bridge Design Specifications*. His research is widely recognized for its practical applicability and impact on bridge design standards.

ENGINEERING JOURNAL

First-Quarter 2026 *Engineering Journal* Available

The first-quarter 2026 issue of AISC's *Engineering Journal* is now available at **aisc.org/ej**. It includes papers on torsion of rectangular HSS and box section members, design of non-contact lap splice connections for SpeedCore, and seismic design and performance of buckling restrained braced frames with eccentric brace configurations. Here are some highlights.

Torsion of Rectangular HSS and Box Section Members: A Critical Review
Bo Dowswell

This paper summarizes the research on the torsional performance of square and rectangular hollow structural section (HSS) members and compares the available experimental results to the applicable provisions in the *Specification for Structural Steel Buildings* (ANSI/AISC 360-2022).

A review of the research on the torsional strength of square and rectangular HSS members revealed 49 experimental tests from 11 projects. A first-order reliability analysis was used to calculate appropriate resistance factors for the current design equations, revealing inconsistent reliability indices that are dependent on the predicted failure mode. Revisions are proposed for the provisions in *Specification* Section H3.1 that result in a simpler design method with increased accuracy. Also, the accuracy of serviceability rotation calculations is evaluated using the available experimental data.

Design of Non-contact Lap Splice Connections for C-PSW/CF (SpeedCore)
Ron Klemencic, Shivam Sharma, Soheil Shafaei, Amit Varma

Concrete-filled composite plate shear walls (C-PSW/CF), also known as SpeedCore, are an emerging structural system in building construction. The composite wall-to-base connection is a critical component influencing system behavior and design. Different types of composite wall-to-base connections are possible, but the non-contact lap splice connection between the dowel bars of the reinforced concrete (RC) base and the steel faceplates of the composite walls is of interest due to its constructability and potential structural efficiency. This type of wall-to-base connection can govern the lateral resistance of the overall wall system, which may be acceptable for wind loading situations and, depending on ductility, may also be acceptable for seismic loading conditions.

This study presents the design and detailing of non-contact dowel bar lap splice connections for composite walls-to-RC foundations or walls. Design parameters include embedment length and arrangement of dowel bars within the composite wall cross section and the interfacial shear strength provided using ties or a combination of ties and stud anchors (shear studs) to transfer forces from the dowel bar to the steel faceplates. Previous recommendations for these parameters, provided in the literature, are used and verified experimentally. Three large-scale specimens with different connection details are designed, constructed, and tested to failure. The experimental results are evaluated, and design recommendations are proposed along with methods to calculate the flexural stiffness and flexural strength of the composite wall-to-base connections.

Seismic Design and Performance of Buckling Restrained Braced Frames with Eccentric Brace Configurations Part 1: Design Procedure and Case Studies
Chao-Hsien Li, Paul W. Richards, Heidi L. Richards, and Brandt W. Saxey

Buckling restrained braced frames (BRBFs) are a widely used lateral system comprised of beams, columns, and diagonal buckling restrained braces (BRBs). The BRBs within these frames are typically oriented concentrically. Current U.S. design provisions limit the eccentricities in BRBFs to less than the beam depth, which results in less architectural flexibility as compared to eccentrically braced frames (EBFs).

This study investigates the design and performance of BRBFs with larger beam eccentricities. BRBFs were designed with beam eccentricities ranging from zero (control case) to two times the beam depth in the chevron (inverted-V) and single-diagonal configurations. In each case, the beams were designed to remain elastic under the maximum forces that could be delivered by the braces, including the effects of the brace eccentricity on the beam. Nonlinear response history analysis and pushover analysis were used to quantify the performance of the various frames under design earthquake shaking and to investigate the relationship between BRBF beam eccentricity and seismic performance for the cases considered.

The results of this study are presented in a two-part paper. Part 1 describes the design procedures for BRBFs with eccentricity in chevron and single-diagonal configurations. Analysis methods for determining force demands in braces, beams, and columns are presented. The analysis methods are illustrated through the design of nine case study buildings. The designs show the impact that eccentricities have on member sizing and overall frame weight.

Seismic Design and Performance of Buckling Restrained Braced Frames with Eccentric Brace Configurations Part 2: Analysis Studies and Design Implications
Chao-Hsien Li, Paul W. Richards, and Brandt W. Saxey

This is the second of two companion papers discussing the seismic design and performance of buckling-restrained braced frames (BRBFs) with braces oriented in eccentric configurations. Part 2 presents nonlinear response history analysis (NLRHA) results for the nine design case study buildings subjected to 16 ground motions scaled to the design basis earthquake (DBE) and maximum considered earthquake (MCE) levels. The analytical results demonstrate that BRBFs with eccentricities equal to twice the beam depth—double the current code limit of one beam depth—perform satisfactorily under seismic loading, provided they are properly capacity designed to account for brace eccentricities.

The paper explores the relationship between brace eccentricity and key response parameters. The NLRHA results also validate the accuracy of the proposed analysis methods in estimating beam force demands in capacity design. Subsequently, nonlinear pushover analysis results for specific stories in selected chevron design cases are presented, with a focus on the effects of connection geometry, specifically combined and split gusset configurations, on local stress state in the beam region, analyzed through detailed finite element modeling.

advertiser index

Pointing to Progress

BY THOMAS W. SMITH

INFRASTRUCTURE IS VITAL to our economy, how we live, how we get around, and our health. It supports our manufacturing, keeps our lights on, delivers water to our faucets, and gets us from Point A to Point B by plane, train, automobile, or any other mode of travel. It's the foundation for our country and essential for a globally competitive economy.

Something so indispensable to everyday life should be held to high standards and frequently evaluated on whether it meets them, which is why the American Society of Civil Engineers (ASCE) created the quadrennial Report Card for America's Infrastructure in 1998.

ASCE released the most recent report card in April 2025, assigning 18 categories of infrastructure a cumulative grade of 'C' overall. A 'C' is classified as "mediocre and requires attention." It's an improvement over the last four years, but still not a grade most would be proud to take home. You can read the full report card at www.infrastructurereportcard.org.

Half of the categories covered by ASCE's report card received 'D' grades, including aviation, roads, transit, dams and stormwater systems. Seven others received 'C' grades. The ports and rail categories earned 'B'-level grades.

While more federal funding has helped bring the grade up from a 'C-' in 2021, we need long-term commitments from the federal government and state and private sectors to support economic growth and return our mediocre infrastructure system to its former glory.

We have a simple choice: invest in America and homegrown jobs while supporting families and our businesses, or stifle growth and increase costs that will only grow over time.

The good news is both parties agree on providing increased infrastructure funding. When we invest in modernizing our infrastructure, we save money and see results.

The steel industry plays a major role in advancing sustainable, resilient, and economic solutions while safeguarding the systems American households and businesses depend on. High-performance or stainless steel can extend the lifespan of our bridges, improving safety and saving taxpayers money. Steel structures supporting transmission lines have proven to be durable during extreme weather events, keeping the lights on and systems running. Bridge owners, engineers, and steel fabricators admirably collaborate to deliver rapid repairs on crucial bridges—including the emergency response detailed in the "Collaboration in Action" article on page 32.

Where there are great needs, there are also great opportunities for the engineering and steel industries to solve the issues holding back our built environment. Their commitment to helping has been obvious. Last year, ASCE honored the Brightline Florida East-West Connector with its 2025 Outstanding Civil Engineering Achievement Award, recognizing advanced engineering and innovation associated with a passenger rail link that included new train stations and 32 new bridges, both of which used structural steel in the design. The project also used over 225 million pounds of recycled American steel.

More recently, ASCE honored SpeedCore with the 2026 Charles Pankow Award for Innovation recognizing its use of prefabricated steel plate modules separated by steel tie-bars to create core walls that allow construction to proceed at the speed of steel, with significant savings in time and money.

In recent years, Congress has worked on a bipartisan basis to pass bills providing more funding to our infrastructure. And in less than four years, we saw tens of thousands of new projects lead to improved conditions—like a decrease in structurally deficient bridges and poor condition roads, and increases in shipment capacities at ports—and, ultimately, the highest grade ASCE has ever given our country's collective infrastructure network. We must keep up that positive trend with sustained investment.

The report card identifies a remaining infrastructure investment gap of nearly $3.7 trillion over 10 years. Congress can do its part by sustaining current funding levels, which would save each family $700 per year. Further investments from state and local governments and the private sector are critical for closing the gap.

We must invest in our infrastructure to keep the U.S. strong, and America's engineers and manufacturers—including the structural steel industry—are ready to do their part to build a more prosperous future.

OVERALL GPA

The Last Word is a monthly guest column written by notable voices in the U.S. AEC community that touches on important and relevant topics in the industry.

Thomas W. Smith is the former executive director of the American Society of Civil Engineers. He retired in December 2025 after 29 years with ASCE, the last 11 as executive director.

Atlas Tube
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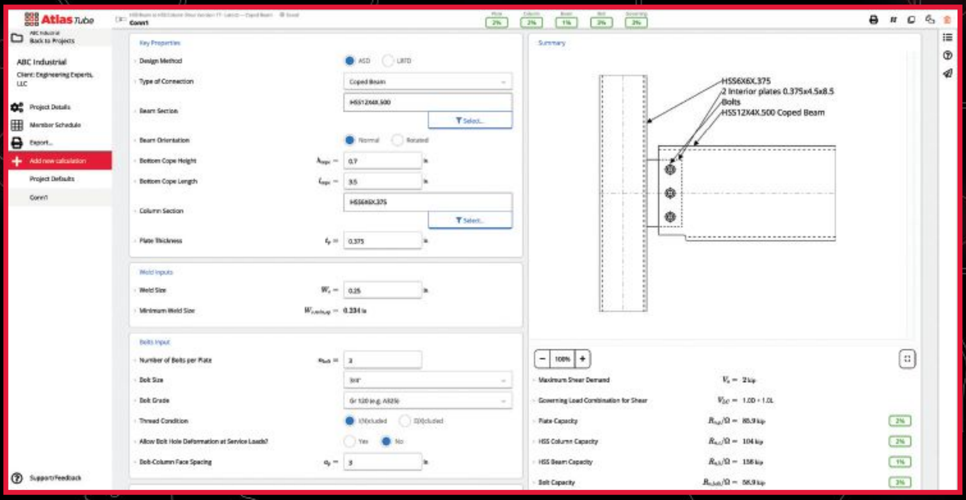
JOIN THE 2,000+ ENGINEERS RECLAIMING THEIR TIME

with the HSS Connections Hub™



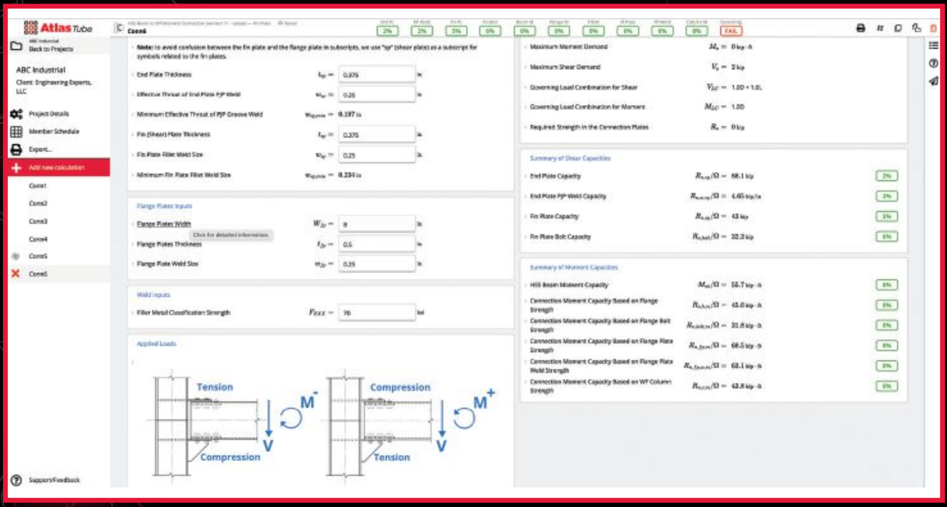
A direct path to efficient HSS connection design

This invaluable—soon-to-be indispensable—and complimentary online resource will **save design time** by eliminating the need for developing and maintaining custom spreadsheets. Fabrication-friendly typical HSS details are an excellent starting point for design while corresponding calculators enable design completion.

Teams can streamline the design process and **enhance collaboration** directly on the HSS Connections Hub. Engineers can **quickly create** HSS connection calculations based on the most recent design manual and specific code requirements. Fabricators will **receive connection designs** that meet requirements and are fabrication-friendly, eliminating back-and-forth revisions.

Since September, we've doubled the number of connection types and typical details available in the HSS Connections Hub to over 70. See what's new:

- HSS Baseplate Connection
- TKYX (Shear) Y with Rectangle HSS
- Bracing to Column: Field-welded
- Bracing to Column: Bolted
- Bracing to Column: 2 Sides
- Bracing to Column: 4 Sides
- TKYX (Shear) Cross Connection with Rectangle HSS
- TKYX (Shear) Overlapped KT Connection with Square HSS
- TKYX (Shear) Gapped K with Square HSS
- TKYX (Moment) Vierendeel Connection with Square HSS, In-plane Bending
- TKYX (Moment) T Connection with Rectangle HSS, Out-of-plane Bending
- TKYX (Moment) Cross Connection with Rectangle HSS, Out-of-plane Bending
- HSS to WF Shear End Plate to WF Web
- WF to HSS Shear-stiffened Seat
- WF on top of HSS Post Bearing (Simple Beam)
- HSS to HSS Moment End Plate (Concrete Filled)
- WF to HSS Moment End Plate
- WF to HSS Moment End Plate (Concrete Filled)
- WF to HSS Moment Diaphragm II
- HSS to HSS Splice End Plates
- HSS to HSS Splice with Rectangular Sections
- Round HSS End Plate Splices
- Round HSS to HSS Moment Seated
- *...and more!*



Leverage the benefits of HSS with the HSS Connections Hub

- **Access** a growing library of HSS connection calculators and fabrication-friendly typical HSS details, each available with a wide range of options.
- Hub calculators **automate and confirm** connection designs in real-time based on the AISC Steel Construction Manual, 16th edition.
- **Clear and concise** results indicate whether the designed connection is efficient and it meets specified requirements.
- **Full transparency:** Review and verify your calculations against specific code references with a simple click.
- **Download or share** detailed connection drawings, including dimensions, bolt sizes and other relevant information for easy communication with fabricators.
- **Request support** from Atlas Tube's engineering experts on your project.

Sign up today and start using the HSS Connections Hub.

connectionshub.atlastube.com

Watch the how-to video.

ADVANCE PROGRAM

aisc.org/nascc

NASCC: THE STEEL CONFERENCE

incorporating the World Steel Bridge Symposium | QualityCon | Architecture in Steel
SafetyCon | SSRC Annual Stability Conference | NISD Conference on Steel Detailing

GEORGIA WORLD CONGRESS CENTER | ATLANTA

APRIL 22–24, 2026

NASCC: THE STEEL CONFERENCE

World Steel Bridge Symposium
QualityCon
Architecture in Steel
SafetyCon
SSRC Annual Stability Conference
NISD Conference on Steel Detailing

GEORGIA WORLD CONGRESS CENTER | ATLANTA

APRIL 22–24, 2026

EDUCATE, ENGAGE, AND EMPOWER

NASCC: The Steel Conference, the nation's leading conference for the design and construction of steel buildings and bridges, is heading to Atlanta from April 22–24, 2026.

The Steel Conference is the premier event for everyone involved in the design and construction of steel buildings and bridges. We feature more than 280 technical sessions (and 17 PDHs!); a giant exhibition hall showcasing over 300 products and services that can help you design and build better with steel; and the opportunity to network with more than 6,500 colleagues, including leading designers, top fabricators, and prestigious researchers at the cutting edge of today's innovation.

This year's event also incorporates the World Steel Bridge Symposium, QualityCon, the NISD Detailing Conference, SafetyCon, Architecture in Steel, and SSRC's Annual Stability Conference.

One registration fee gets you into all of this, as well as keynote addresses, lunch in the exhibit hall each day, the welcome reception, and—of course!—the fabulous conference dinner!

Mobile App

Put The Steel Conference in the palm of your hand! Stay organized with the session schedule tool; navigate the exhibit hall; learn about exhibitors; and network with attendees during the conference with our custom mobile app. Visit **aisc.org/nascc** to download the app in early 2026.

Make it social—join the conversation and network with attendees by using **#NASCC26** and **#AISC** on Facebook, Instagram, LinkedIn, and X.

What makes us different?

We carefully design our sessions to serve practicing professionals. Our goal is to provide you with information and skills that you can immediately apply. While some of our sessions are developed through the traditional call-for-papers route, most are the result of our planning committee selecting relevant topics and then seeking out the top experts and engaging speakers to share their knowledge.

That's why our technical sessions consistently get rave reviews. Want to get a taste of what a conference session is like? Visit **aisc.org/learning** and watch one of the more than 2,000 posted sessions from previous conferences.

Who attends?

Our sessions are designed to cover all aspects of steel design and construction, from basic review sessions to advanced methodologies. Our audience is similarly diverse, ranging from professionals just a few months out of school to many of the top principals at the nation's leading structural engineering firms.

Last year's conference had nearly 7,000 participants, including structural engineers, architects, steel fabricators, detailers, erectors, academics, students, and product vendors/service providers—and we expect this year to be even bigger!

There's more online! Visit **aisc.org/nascc** to see our entire program.

Registration and Housing

Registration and housing open Monday, January 26, 2026. Pro tip: Register early! Registration fees increase each week. Visit **aisc.org/nascc/register** to register and to book your hotel reservation.

Registration includes:

World Steel Bridge Symposium

The World Steel Bridge Symposium (WSBS) brings together bridge design engineers, construction professionals, academics, transportation officials, fabricators, erectors, and constructors to discuss state-of-the-art practices that enhance steel bridge design, fabrication, and construction.

QualityCon

The best quality management processes don't just fix problems—they prevent them. Improving your quality processes will boost your bottom line, and we've gathered experts to equip you with ideas and tools that will bring immediate value to your fabrication facility or erection jobsite, regardless of whether you hold AISC Certification.

SafetyCon

Safety first! AISC's Safety Committee has developed a special slate of sessions designed to give fabricators and erectors practical guidance and useful tools to promote safety.

Architecture in Steel

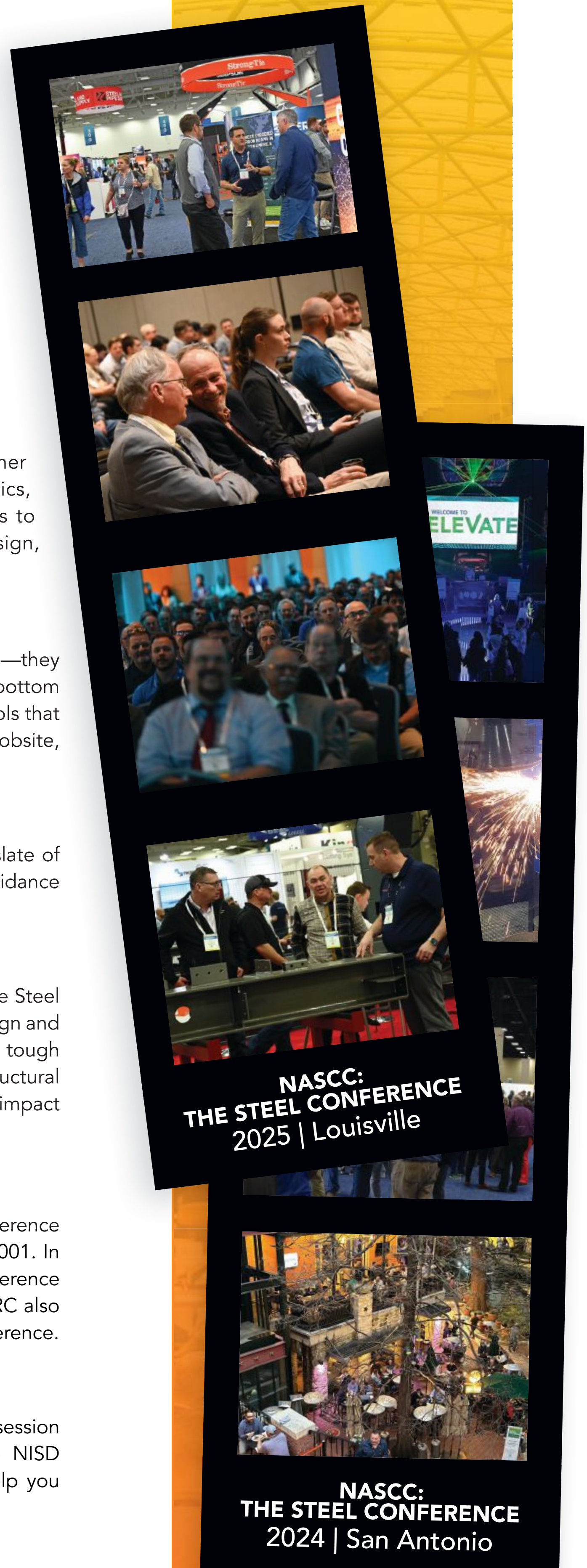
Architecture in Steel is the architectural community's home at the Steel Conference. Designers—and everyone else involved in steel design and construction—can expect to hear about ingenious solutions to tough design challenges, inspiring structures that came to life in structural steel, and the innovations that will define how structural steel's impact on a greener, safer, more beautiful future.

SSRC Annual Stability Conference

The Structural Stability Research Council's Annual Stability Conference has been held in conjunction with the Steel Conference since 2001. In addition to 14 sessions with more than 60 papers, the SSRC Conference includes the Beedle Award and MAJR Medal presentations. SSRC also holds its annual meeting immediately prior to the Stability Conference.

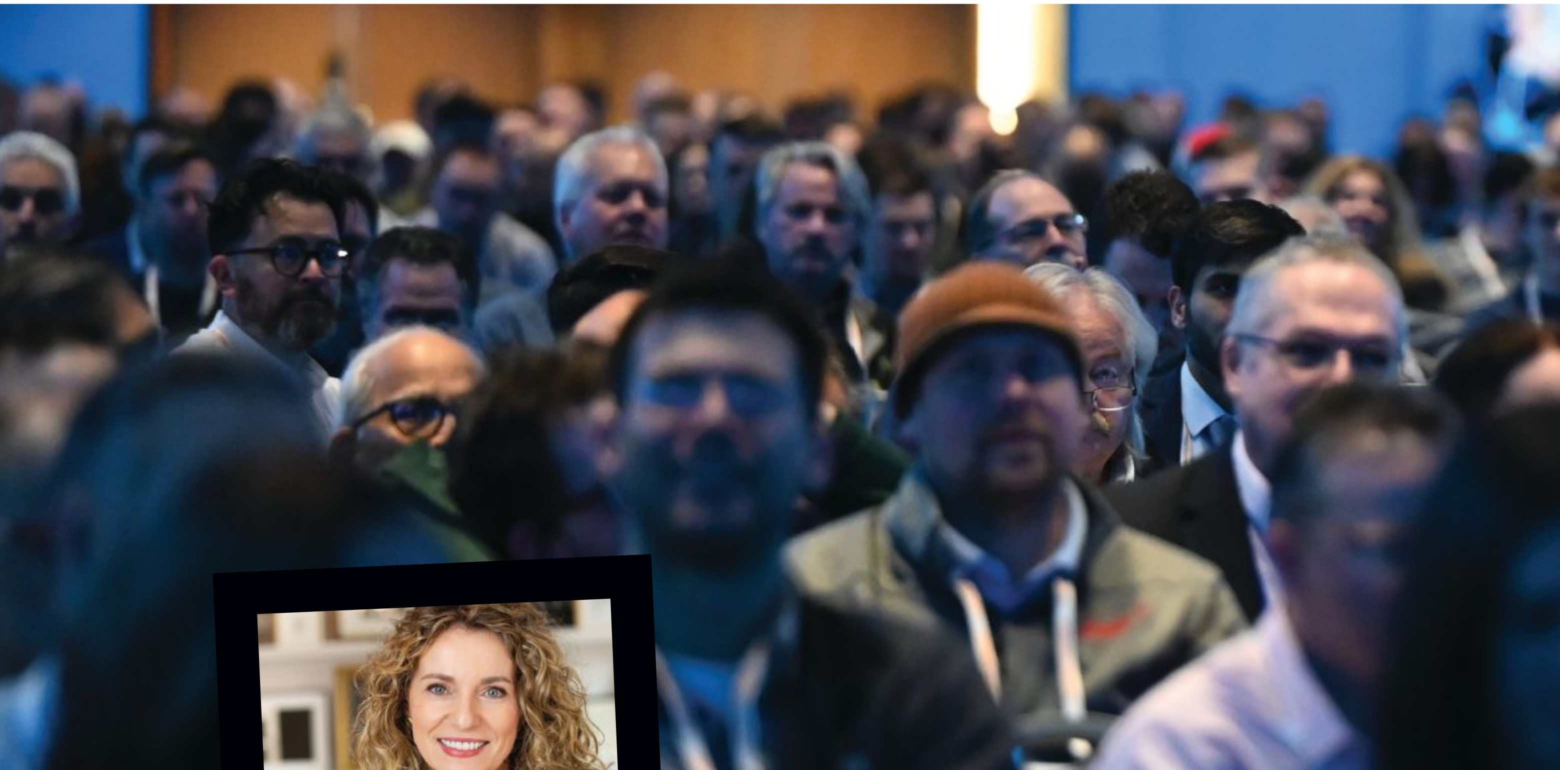
NISD Conference on Steel Detailing

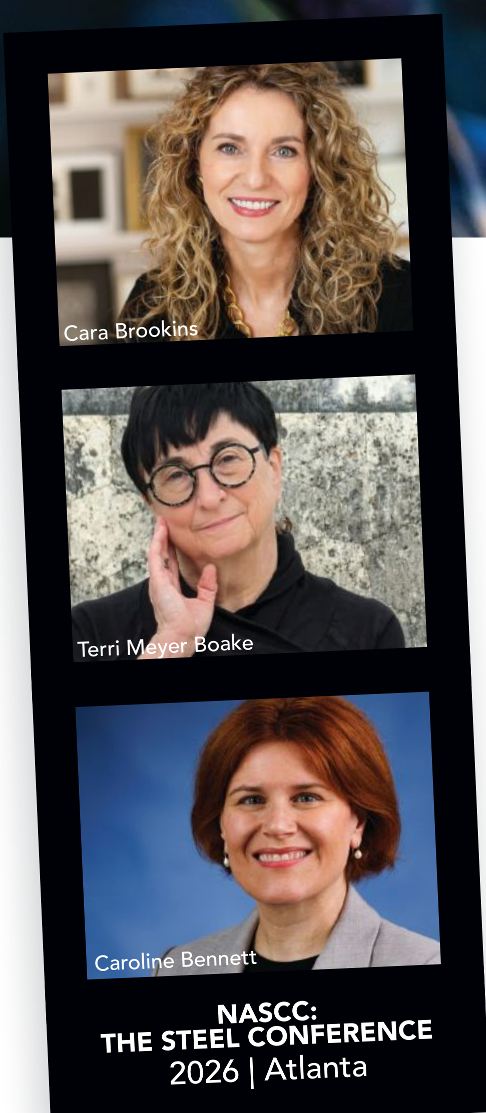
The National Institute of Steel Detailing has developed a 14-session program specifically for detailers. The program parallels the NISD Certification program and provides practical information to help you become a better detailer.



NASCC: THE STEEL CONFERENCE

CONFERENCE KEYNOTES





WEDNESDAY

Cara Brookins

Can a mom with no construction experience, together with her young children, actually build a house from scratch? Award-winning speaker and author Cara Brookins is living proof that with the right motivation, you can achieve amazing results.

In a world filled with economic uncertainty, political volatility, unprecedented developments in technology, increasingly devastating natural disasters, and never-ending challenges, staying motivated can feel impossible. Cara combines her expertise in the science of motivation with more than twenty years of business experience to empower audiences to navigate change and thrive in any situation.

Using real-life examples from her unconventional construction site, Cara shares the latest science-based motivation strategies to challenge conventional thinking and transform the way you approach personal growth, change, teamwork, and leadership.

There's more online!
Visit **aisc.org/nascc** to see our full list of sessions and offerings.

THURSDAY

Terri Meyer Boake

When you think about AESS (Architecturally Exposed Structural Steel), you naturally think about Terri Meyer Boake. Terri is a distinguished figure in architecture, recognized globally for her expertise in steel construction, particularly Architecturally Exposed Structural Steel (AESS). As a Full Professor at the School of Architecture at the University of Waterloo, she has dedicated her career since 1986 to teaching and researching building construction, environmental design, and film. Her passion centers on the aesthetic and technical application of visible structural steel, aiming to bridge the gap in understanding among architects, engineers, and fabricators. She has actively collaborated with organizations like the Canadian Institute of Steel Construction (CISC) and the American Institute of Steel Construction (AISC), receiving the AISC Lifetime Achievement Award for her significant contributions to the field.

Terri's publications serve as crucial resources for both students and professionals. Her expertise is primarily encapsulated in a series of comprehensive books published by Birkhäuser, including *Understanding Steel Design* (2011), *Diagrid Structures* (2013), *Architecturally Exposed Structural Steel* (2015), and *Complex Steel Structures* (2020). These works delve into the specifications, connections, and details required for AESS, emphasizing the importance of clear communication and specialized fabrication practices.

FRIDAY

Caroline Bennett

Caroline Bennett, PE, PhD, is the Charles E. & Mary Jane Spahr professor and chair of the Department of Civil, Environmental, and Architectural Engineering at the University of Kansas. Her research has addressed some of the most pressing challenges in structural engineering, including fatigue and fracture performance of steel infrastructure, constraint-induced fracture in steel bridges, and innovative structural retrofit strategies for a wide range of structures.

Bennett has led national projects with the Federal Highway Administration, the National Cooperative Highway Research Program, the U.S. Army Corps of Engineers' Engineer Research and Development Center, and several state departments of transportation, delivering solutions that extend the service life of structures and improve infrastructure performance.

She serves on AISC's Committee on Research as well as the TC10 Materials and Fabrication Committee. She recently served on AISC's Game Changer panel. She also contributes to the American Iron and Steel Institute (AISI) Steel Bridge Task Force and Transportation Research Board committees, strengthening connections between research and practice.

NETWORKING OPPORTUNITIES

WEDNESDAY

Welcome Reception

5:30 – 7:00 p.m.
Exhibit Hall

Kick off the conference with a networking extravaganza in the exhibit hall. Join us for a special preview of what exhibitors will offer and experience the latest trends in software, coatings, connection products, and more—plus refreshments, hors d'oeuvres, and excellent company!

ELEVATE

7:30 – 9:30 p.m.
National Center for Civil and Human Rights

You're at The Steel Conference to see the future of steel design and construction—but it's also important to meet the people. Join us for Elevate, a free Conference networking event designed to connect structural steel industry professionals, academics, and students. Move beyond business cards and engage in real conversations. This reception is your chance to expand your professional network, exchange innovative ideas, and engage with leaders from all corners of the structural steel industry in a relaxed, vibrant atmosphere. Held at the nearby National Center for Civil and Human Rights, this location powerfully underscores our industry's commitment to fostering an inclusive culture where all voices are heard. Don't miss this opportunity to mingle with colleagues and celebrate the advancements in our industry.

THURSDAY

Experience an Unforgettable Evening at the Georgia Aquarium

7:00 – 9:00 p.m.
Cost: Included with full registration.
Tickets are available for purchase for other registration types.

Join us for an exclusive night at one of Atlanta's most iconic attractions—the Georgia Aquarium, reserved entirely for us. Enjoy dinner, drinks, and networking surrounded by some of the ocean's most fascinating creatures—including whale sharks, sea otters, and penguins. It's a one-of-a-kind opportunity to connect and unwind in an unforgettable setting.

In addition to the program's main offerings, we have planned other exciting tours and events. To explore the full spectrum of activities and for additional information, please visit **aisc.org/nascc**.

NASCC: THE STEEL CONFERENCE
EXHIBITOR LIST—ALPHABETICAL
(As of November 7, 2025)

Color Key:
Bridge Pavilion Exhibitor
Heavy Machinery Area

3D Engineering Global LLC
www.3deglobal.com

4XStruct, Inc.
4xstruct.com

AA Anchor Bolt, Inc.
www.aaanchorbolt.com

Abrafast.com /
The Blind Bolt Co.
www.abrafast.com

Accurate Perforating
www.accurateperforating.com

Acero Manufacturing
Aceromfg.com

ACME LASER
www.acme-laser.com

Acrow Bridge
www.acrow.com

Action Stainless
www.actionstainless.com

Advenser Technology Services Inc
www.advenser.com

AGT Robotics
www.agtrobotics.com

Airgas, an Air Liquide company
www.airgas.com

AKS Cutting Systems
akscutting.com

AKYAPAK USA
www.akyapak.com

Albina Co. Inc.
www.albinaco.com

Alro Steel
www.alro.com

American Galvanizers Association
galvanizeit.org

American Institute of Steel Construction (AISC)
www.aisc.org

American Punch Company
americanpunchco.com

American Steel Detailing, LLC
www.americansteeldetailing.com

American Welding Society
www.aws.org

AMPP
ampp.org/home

Anatomic Iron Steel Detailing
www.anatomiciron.com

Applied Bolting Technology, Inc.
www.appliedbolting.com

ArcelorMittal International
ami.arcelormittal.com/structural-shapes

Armatherm Thermal Bridging Solutions
www.armatherm.com

Arteras Inc.
arteras-inc.com

Association of Women in the Metal Industries
www.awmi.org

Atema Inc.
www.atema.com

Atlas Tube
www.atlastube.com

Autodesk
autodesk.com/solutions/aec/bim/structural-engineering

Automated Layout Technology LLC
www.automatedlayout.com

Automation International, Inc.
www.automation-intl.com

AYARI LLC
www.ayariventure.com

AZZ Metal Coatings
www.azz.com

Baco Enterprises Inc.
www.bacoent.com

Badger Products USA
badgerproductsusa.com

Baumann USA
www.baumannusa.com

Bay Standard Manufacturing
www.baystandard.com

Be Pro Be Proud, Inc.
www.beprobeproud.org

Ben Hur Construction Co.
www.benhurconstruction.com

Bend-Tech
www.bend-tech.com

Bennett Services, LLC
bennettservicesllc.com

Bentley Systems, Inc.
www.bentley.com

BesCutter
www.bescutter.com

Birmingham Fastener
www.bhamfast.com

Blackstone Group Technologies
www.bgtek.com

Blair Corporation
www.blairwirerope.com

Blastec
www.blastec.com

Bluebeam
www.bluebeam.com

Brown Strauss Steel
www.brownstrauss.com

Bryzos
www.bryzos.com

Bull Moose Tube Company
www.bullmoosetube.com

C.M. Mockbee Co.
mockbee.com

CADeploy, Inc.
www.cadeploy.com

CAI Software
caisoft.com/products/radley-material-traceability

Caldim Tech Services LLC
caldimtech.com

Canam
canam.com

Cano Steel
www.canosteel.com

Carboline
www.carboline.com

CAST CONNEX
www.castconnex.com

Cerbaco Ltd.
www.cerbaco.com

Chapel Steel
www.chapelsteel.com

Charlie Irwin Painting, LLC (CIP)
www.cipaint.com

Chicago Clamp Company
www.chicagoclampcompany.com

Chicago Jack Service, Inc.
www.chicagojack.com

Chicago Metal Rolled Products
www.cmrp.com

Cleveland City Forge
www.clevelandcityforge.com

Cleveland Punch & Die Co.
www.clevelandpunch.com

Cleveland Steel Tool
clevelandsteeltool.com

CN-Seamless
cn-seamless.com

Code&Steel
codeandsteel.com

Columbia Safety and Supply
www.colsafety.com

Combilift
www.combilift.com

Complex Structures Group
www.complex-structures.com

COMSLAB
www.comslab-usa.com

Con-Serv Inc.
www.con-servinc.com

Consolidated Pipe & Supply Company
www.consolidatedpipe.com

Construction Products Group of IAPMO
www.uniform-es.org

Controlled Automation, Inc.
www.controlledautomation.com

Copper State Bolt & Nut Co.
www.copperstate.com

Cordeck
www.cordeck.com

CoreBrace
www.corebrace.com

Cronus Steel Detailing LLC
www.cronussteel.com

CSC – Canam Steel Corp.
cscsteelusa.com

Cutlite America
cutlite.com

Cutting Edge Steel
cesteel.com

D.S. Brown
dsbrown.com

DACS, Inc.
www.dacsinc.com

Daito Seiki Co., Ltd.
www.daitousa.com

Danny's Construction Company, LLC
www.dannysconstruction.com

DAVI, Inc.
www.davi.com

DBM VirCon
www.dbmvircon.com

DEICON
www.deicon.com

Delta Steel
www.deltasteel.com

DGS Technical Services, Inc.
www.dgsts.com

Dlubal Software, Inc.
www.dlubal.com/en

Doerken Coatings
doerken.com/us/en/doerken-coatings

Drivensteel Inc.
drivensteel.com

DuraFuse Frames
www.durafuseframes.com

Eastern Pneumatics & Hydraulics, Inc./ McCann Equipment Ltd.
www.ephtools.com

EHS Momentum, LLC
www.ehsmomentum.com

Elevate Design Group
www.elevatedesigngroupllc.com

EMI
www.emiworks.com

ENERCALC
enercalc.com

Enerpac
www.enerpac.com

Engineered Rigging
engineeredrigginggroup.com

Enidine
www.itt-infrastructure.com

EPAcoat, Inc.
epacoat.com

EVER Seismic
www.everseismic.com

Exact Detailing Ltd.
www.exactdetailing.com

Fabreeka International, Inc.
www.fabreeka.com

Fabricating & Metalworking Magazine
fabricatingandmetalworking.com

FabStation
fabstation.com

FATZER AG
www.fatzer.com

FICEP Corporation
www.ficepcorp.com

Field Fastener
www.fieldfastener.com

Florida Precision Tool
www.floridaprecisiontool.com

Fontana Fasteners, Inc.
www.fontanagruppoagtna.com

Gamma Steel Detailing Inc.
gammasteelus.com

GATOR
www.gatorfabtech.com

GEKA USA
www.geka-cnc.com

Gerdau
www.gerdau.com

GH Cranes & Components
www.ghcranes.com

GIZA
www.gizasteel.com

Gonza Joist
gonzaglobal.com/en/gonza-joist

Graitec
www.graitec.com

Grating Fasteners
www.gclips.com

Grating Systems
www.gratingsystems.com

Greenbrook Engineering Services
greenbrookengineering.com

GRM Custom Products
www.grmcp.com

GWY, LLC
www.gwyinc.com

Harbor Fab
www.harborfab.com

Haydon Bolts, Inc.
www.haydonbolts.com

Hercules Bolt Company
www.herculesbolt.com

HGG Profiling Equipment BV
hgg-group.com

Hilti Inc.
www.hilti.com

Holemaker Technology HMT
www.holemaker-technology.com

Holloway Steel Services
www.hollowaycompanyinc.com

HRV Conformance Verification Associates, Inc.
www.hrvinc.com

Hypertherm Inc.
www.hypertherm.com

HYTORC
www.hytorc.com

IDEA StatiCa US LLC
www.ideastatica.com

IES, Inc.
www.iesweb.com

IKG
ikg.com

Indiana Grating Pvt Ltd.
www.indianagroup.com

Indiana Steel Products, Inc.
indianasteelproducts.com

Infasco
www.infasco.com

Informed Infrastructure
informedinfrastructure.com

InfoSight Corporation
www.infosight.com

The Infra Group
www.infra-metals.com

Innovatech
www.innova.tech

Innovation Tech
innovationtechllc.com

Innovative Transport Solutions (ITS)
innovativetransportsolutions.com

Intermark Steel
www.intermarksteel.com

International Design Services, Inc.
www.ids-inc.net

Interstate Gratings
www.interstategratings.com

Ironworkers / IMPACT
www.impact-net.org

IRyS Global Inc.
www.irysglobal.com

ISD Group USA
www.isdgroup.us

J. B. Long, Inc.
www.jblong.com

JH Botts LLC
www.jhbotts.com

JITECH Associates Inc.
jitech.us

JLA Industrial Coatings
JLApaint.com

JMT Consultants Inc.
www.jmtconsultants.com

KALTENBACH
www.kaltenbach.com/en

Kebei Laser Co., Ltd.
www.kblaser.com

Kinetic Cutting Systems, Inc.
www.kineticusa.com

Kloeckner Metals
www.kloecknermetals.com

Kobelco Welding of America, Inc.
www.kobelcowelding.com

KTA-Tator
kta.com

LARSA, Inc.
www.larsa4d.com

Larson Engineering, Inc.
www.larsonengr.com

LECGI Structural Engineering & Detailing
lecgi.us

LeJeune Bolt Company
www.lejeunebolt.com

LHR Safety Worksite Outfitters
www.lhrsafety.com

Lichtgitter USA
www.lichtgitterusa.com

Lincoln Electric
www.lincolnelectric.com/en

Lindapter
www.Lindapter.com

LS Industries
www.lsindustries.com

LTC Software Solutions
ltcsoftwaresolutions.com

LTC Virtual Design and Construction
www.LTCvdc.com

LUSAS
www.lusas.com

Machitech
www.machitech.com

Mac-Tech
www.mac-tech.com

Magnum Consulting
www.4magnum.com

MARKO Metal Systems
www.markosys.com

Maruichi Leavitt Pipe and Tube
www.maruichi-leavitt.com

Max Weiss Co., LLC
www.maxweiss.com

McLaren, a Division of KCI
www.mgmclaren.com

Messer Cutting Systems
us.messer-cutting.com

Metals USA Plates and Shapes
www.metalsusa.com

MetFin Shotblast Systems
www.metfin.com

Meyer Borgman Johnson
www.mbjeng.com

Mid Atlantic Global
www.midatlanticglobal.com

Miller Electric Mfg LLC
www.millerwelds.com

Miner Grating Systems, a Powerbrace Company
www.minergrating.com

Miro Industries, Inc.
www.miroind.com

MOLD-TEK Technologies Inc.
www.moldtekengineering.com

NASCC Exhibit Sales
aisc.org/nascc/exhibit

National Institute of Steel Detailing, Inc. (NISD)
www.nisd.org

Visit **aisc.org/nascc** to locate exhibitors on our floor plan.

MORE EXHIBITORS >>

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National Steel Bridge Alliance (NSBA)
aisc.org/nsba

Nelson Stud Welding
stanleyengineeredfastening.com/en/brands/Nelson

Nemetschek Group
www.nemetschek.com/en

New Millennium
www.newmill.com

Nexont, LLC
nexontengineering.com

Nexus Steel Detailing, Inc.
www.nexus-es.com

Nitto Kohki U.S.A., Inc.
www.nittokohki.com

North Shore Steel
nssco.com

Nucor – Beam Mill Group
www.nucoryamato.com

Nucor – Corporation
www.nucor.com

Nucor – Fastener Division
www.nucor-fastener.com

Nucor – Plate Mill Group
nucor.com/products/steel/plate

Nucor Skyline
www.nucorskyline.com

Nucor Tubular Products
www.nucortubular.com

Nucor Vulcraft/Verco Group
www.vulcraft.com

Oates Metal Deck & Building Products, Inc.
oatesmetaldeck.com

Ocean Machinery, Inc.
www.oceanmachinery.com

O'Donnell Metal Deck & Bar Joist
odonnellmetaldeck.com

Ohio Gratings, Inc.
www.ohiogratings.com

OpenBrIM Platform
openbrim.org

OTH Pioneer Rigging
othrigging.com

Ovation Services LLC
www.4ovation.com

P2 Programs
www.p2programs.com

Pacific Stair Corporation
www.pacificstair.com

Pan Gulf Technologies
www.pangulftech.com

Paramount Roll and Forming, Inc.
www.paramountroll.com

Peddinghaus Corporation
www.peddinghaus.com

Phoenix Engineering and Consulting, Inc.
phoenixengineering.com

Phoenix Technical Marketing
phoenixtechnicalmarketing.com

Pioneer Machine Sales
pioneermachinesales.com

Portland Bolt & Manufacturing Company
www.portlandbolt.com

Power of Design Group, LLC
www.podgrp.com

PPG Protective & Marine Coatings
www.ppgpmc.com

Pragmatic Steel Inc.
pragmatich.com

Precision Steel Systems
www.precisionsteelsystems.com

Prodevco Robotic Solutions Inc.
www.prodevcoind.com

QMC, LLC
www.qmcauditing.com

Qnect LLC
www.qnect.com

Qualis Solutions, LLC
www.qualissolutions.com

Qubatic Steel Detailing LLC
www.qubatic.com

R.J. Watson, Inc.
www.rjwatson.com

Red Cedar Steel
www.redcedarsteel.com

Research Council on Structural Connections
www.boltcouncil.org

RISA
www.risa.com

Rolling Plains Construction, Inc.
www.rollingplains.com

Rosler Metal Finishing USA
www.rosler.com

RPK Techno Solutions
www.rpktspl.com

Sanria Engineering
www.sanriaengineering.com

SCHULLER&Company
www.bocad.com

Scougal Rubber Corp.
www.scougalrubber.com

SDS2 by ALLPLAN
www.sds2.com

Seacad Services, Inc.
www.seacad.com

Seismic Bracing Company
www.thesbcllc.com

Service Steel Warehouse
www.servicesteel.org

SEU by SE Solutions, LLC
www.LearnWithSEU.com

Seyco Joist
seycojoist.com

Shachihata Inc. (U.S.A.)
Shachihata.com

Shandong Hanpu Machinery Industrial Co., Ltd.
www.hanpuindustrial.com

Sherwin-Williams Protective and Marine
protective.sherwin.com

Short Span Steel Bridge Alliance
www.shortspansteelbridges.org

SidePlate / MiTek
www.mii.com

Simpson Strong-Tie Co.
www.strongtie.com

SketchDeck.ai
www.sketchdeck.ai

Skidmore-Wilhelm
www.skidmore-wilhelm.com

SKM Industries, Inc.
www.skmproducts.com

Soitaab USA Inc.
www.soitaabusa.com

South Atlantic Galvanizing
www.southatlanticllc.com

SprayTec Coating Solutions
www.sprayteccoat.com

St. Louis Screw & Bolt
slbolt.com

Stainless Structurals
www.stainless-structurals.com

Steel and Pipe Supply
www.SteelAndPipe.com

Steel Deck Institute
www.sdi.org

Steel Dimensions India (Pvt) Ltd.
steeldimensions.ca

Steel Dynamics Long Products Group
lpg.steeldynamics.com

Steel Erectors Association of America
www.seaa.net

Steel Founders' Society of America
www.sfsa.org

Steel Joist Institute
www.steeljoist.org

Steel Plate
www.steelplate.us

Steel Tek Unlimited
www.steelteku.com

Steel Tube Institute
www.steeltubeinstitute.org

SteelCoded LLC
www.steelcoded.com

SteelSUB, LLC
steelsub.com

StruCalc
strucalc.com

Structural Bolt and Manufacturing, Inc.
www.structuralbolt.com

Structural Engineering Institute of ASCE
asce.org/SEI

Structural Stability Research Council (SSRC)
www.ssrcweb.org

Structures Online
www.structures.online

STRUMIS LLC
www.strumis.com

STRUZON Technologies Inc.
struzon.com

Sugar Steel
www.sugarsteel.com

Sumter Coatings, Inc.
www.sumtercoatings.com

Superior Industrial Insulation Company
www.superior-insulation.com

Swan Transportation
swantrans.com

Swisher Tools, LLC
www.swishertools.com

TDS Industrial Services Ltd.
www.tdsindustrial.com

Color Key: Bridge Pavilion Exhibitor | Heavy Machinery Area

Team Detailing Solutions LLC
teamdetailing.com

Techflow Inc.
www.techflowengg.com

Tecoi USA
tecoiusa.com

Terracon Consultants, Inc.
www.terracon.com

Thermal Spray Depot/Clemco
www.thermalspraydepot.com

Threaded Fasteners, Inc.
threadedfasteners.com

Threadline Products, Inc.
threadlineproducts.com

Trilogy Machinery, Inc.
www.TrilogyMachinery.com

Trimble
trimble.com/en/products/tekla

Triple-S Steel / Intsel Steel
www.sss-steel.com

TRU-FIT PRODUCTS
tfpcorp.com

TwinEngines, Inc.
www.twinengines.com

United Structure Detailing Inc.
unitedstructuredetailing.com

Unytite, Inc.
www.unytiteusa.com

V&S Galvanizing
www.hotdipgalvanizing.com

Valmont Coatings
www.valmontcoatings.com

Vectis Automation
www.VectisAutomation.com

Vectorshades LLC
www.vectorshades.com

Vegazva Technologies
www.vegazva.com

Versatile
www.versatile.ai

Viking Wheel Blast Systems
www.vikingcorporation.com

Virtek Vision
www.virtekvision.com

VIRTUELE
www.virtuele.us

voestalpine Tubulars
voestalpine.com/tubulars/en

Voortman Steel Machinery
www.voortman.net

Voss Engineering, Inc.
www.vossengineering.com

The Walsh Group
www.walshgroup.com

Whiteboard Technologies LLC
www.whiteboardtec.com

Willbanks Metals Inc.
www.willbanksmetals.com

Wrought Washer
www.wroughtwasher.com

Wurth Industry USA
wurthindustry.com/construction

X SERIES USA
www.xseriesusa.com

NASCC:
THE STEEL CONFERENCE
2025 | Louisville

NASCC:
THE STEEL CONFERENCE
2023 | Charlotte

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NASCC: THE STEEL CONFERENCE

EXHIBITOR LISTS—CONNECT BY CATEGORY

(As of November 7, 2025)

1 Bar Coding Systems and Equipment

Armatherm Thermal Bridging Solutions
CAI Software
EHS Momentum, LLC
InfoSight Corporation
P2 Programs
SteelCoded LLC
STRUMIS LLC

2 Bender/Roller

AKYAPAK USA
Albina Co. Inc.
Armatherm Thermal Bridging Solutions
Baco Enterprises Inc.
Bend-Tech
Chicago Metal Rolled Products
DAVI, Inc.
GATOR
Holloway Steel Services
Mac-Tech
Max Weiss Co., LLC
Metals USA Plates and Shapes
Paramount Roll and Forming, Inc.
Trilogy Machinery, Inc.

3 Bolting and Anchoring Systems

AA Anchor Bolt, Inc.
Abrafast.com / The Blind Bolt Co.
Acero Manufacturing
Applied Bolting Technology, Inc.
Armatherm Thermal Bridging Solutions
Baco Enterprises Inc.
Bay Standard Manufacturing
Birmingham Fastener
C.M. Mockbee Co.
Canam
Chicago Clamp Company
Chicago Jack Service, Inc.
Copper State Bolt & Nut Co.
Enerpac
Field Fastener
Florida Precision Tool
Fontana Fasteners, Inc.
Hercules Bolt Company
HYTORC
Indiana Steel Products, Inc.
Infasco
JH Botts LLC
LeJeune Bolt Company
Lindapter
Nucor – Fastener Division
Portland Bolt & Manufacturing Co.
Research Council on Structural Connections
Shandong Hanpu Machinery Industrial Co., Ltd.
St. Louis Screw & Bolt
Structural Bolt and Manufacturing, Inc.
Threaded Fasteners, Inc.
Threadline Products, Inc.
TRU-FIT PRODUCTS
Unytite, Inc.
Wrought Washer
Wurth Industry USA

Exhibitors in this list are divided by category to make it easier to find companies you'd like to connect with in Atlanta.

4 Bridge Components and Systems

AA Anchor Bolt, Inc.
Accurate Perforating
Acrow Bridge
Anatomic Iron Steel Detailing
Applied Bolting Technology, Inc.
Armatherm Thermal Bridging Solutions
Blastec
CAST CONNEX
Cleveland City Forge
Con-Serv Inc.
Consolidated Pipe & Supply Co.
Controlled Automation, Inc.
D.S. Brown
DGS Technical Services, Inc.
Fabreeka International, Inc.
FATZER AG
FICEP Corporation
GEKA USA
Graitec
GRM Custom Products
Haydon Bolts, Inc.
LS Industries
Metals USA Plates and Shapes
National Steel Bridge Alliance
Nucor – Corporation
Nucor Skyline
R.J. Watson, Inc.
Scougal Rubber Corp
Shachihata Inc. (U.S.A.)
Shandong Hanpu Machinery Industrial Co., Ltd.
Short Span Steel Bridge Alliance
Thermal Spray Depot/Clemco
Threaded Fasteners, Inc.
Valmont Coatings
Voss Engineering, Inc.
Wrought Washer

5 Career Services

American Welding Society
Be Pro Be Proud, Inc.
Vegazva Technologies

6 Coatings and Fire Protection

AMPP
Blastec
Carboline
Charlie Irwin Painting, LLC (CIP)
Doerken Coatings
EPAcoat, Inc.
Innovation Tech
JLA Industrial Coatings
PPG Protective & Marine Coatings
Rolling Plains Construction, Inc.
Sherwin-Williams Protective and Marine
SprayTec Coating Solutions
Sumter Coatings, Inc.
Superior Industrial Insulation Company
Thermal Spray Depot/ Clemco
Valmont Coatings
Wurth Industry USA

7 Construction and Project Management

Acrow Bridge
Advenser Technology Services Inc.
American Galvanizers Association
Ben Hur Construction Co.
Cano Steel
Complex Structures Group
DBM VirCon
EPAcoat, Inc.
Haydon Bolts, Inc.
ISD Group USA
KTA-Tator
Magnum Consulting
Shandong Hanpu Machinery Industrial Co., Ltd.
Steel Dimensions India (Pvt) Ltd.

8 Cranes and Lifts

Baumann USA
Chicago Jack Service, Inc.
Combilift
Enerpac
Engineered Rigging
GH Cranes & Components
Innovation Tech
OTH Pioneer Rigging
Swisher Tools, LLC

9 Detailers

3D Engineering Global LLC
4XStruct, Inc.
Advenser Technology Services Inc.
American Steel Detailing, LLC
Anatomic Iron Steel Detailing
Arteras Inc.
AYARI LLC
Bennett Services, LLC
Blackstone Group Technologies
CADeploy, Inc.
Caldim Tech Services LLC
Canam
Cronus Steel Detailing LLC
DGS Technical Services, Inc.
Drivensteel Inc.
Exact Detailing Ltd.
Gamma Steel Detailing Inc.
GIZA
Greenbrook Engineering Services
International Design Services, Inc.
IRyS Global Inc.
J. B. Long, Inc.
JITECH Associates Inc.
JMT Consultants Inc.
LECGI Structural Engineering & Detailing
LTC Virtual Design and Construction
Magnum Consulting
McLaren, a Division of KCI
MOLD-TEK Technologies Inc.
National Institute of Steel Detailing, Inc.
New Millennium
Nexont, LLC
Nexus Steel Detailing, Inc.
Ovation Services LLC
Pan Gulf Technologies
Pragmatic Steel Inc.
Qualis Solutions, LLC
Qubatic Steel Detailing LLC
RPK Techno Solutions
SCHULLER&Company
SDS2 by ALLPLAN
Seacad Services, Inc.
Steel Dimensions India (Pvt) Ltd.
Steel Tek Unlimited
Structures Online
STRUZON Technologies Inc.
TDS Industrial Services Ltd.
Team Detailing Solutions LLC
Techflow Inc.
Trimble
United Structure Detailing Inc.
Vectorshades LLC
Vegazva Technologies
Whiteboard Technologies LLC

10 Engineering Consulting

3D Engineering Global LLC
4XStruct, Inc.
Acrow Bridge
Advenser Technology Services Inc.
Anatomic Iron Steel Detailing
Atema Inc.
AYARI LLC
Bentley Systems, Inc.
CADeploy, Inc.
Caldim Tech Services LLC
CAST CONNEX
Construction Products Group of IAPMO
Cronus Steel Detailing LLC
DEICON
DGS Technical Services, Inc.
DuraFuse Frames
Engineered Rigging
Exact Detailing Ltd.
Fontana Fasteners, Inc.
GIZA
Graitec
Greenbrook Engineering Services
GRM Custom Products
HRV Conformance Verification Associates, Inc.
Infasco
International Design Services, Inc.
IRyS Global Inc.
ISD Group USA
JMT Consultants Inc.
KTA-Tator
Larson Engineering, Inc.
LECGI Structural Engineering & Detailing
Lindapter
LUSAS
Magnum Consulting
McLaren, a Division of KCI
Meyer Borgman Johnson
Miro Industries, Inc.
MOLD-TEK Technologies Inc.
New Millennium
Nexont, LLC
Ovation Services LLC
Pan Gulf Technologies
Phoenix Engineering and Consulting, Inc.
Power of Design Group, LLC
Pragmatic Steel Inc.
Qubatic Steel Detailing LLC
RPK Techno Solutions
SidePlate / MiTek
Steel Dimensions India (Pvt) Ltd.
Steel Founders' Society of America
Steel Tube Institute
Team Detailing Solutions LLC
Terracon Consultants, Inc.
United Structure Detailing Inc.
Vegazva Technologies

11 Erectors

Ben Hur Construction Co.
Complex Structures Group
Danny's Construction Co., LLC
GWY, LLC
Ironworkers / IMPACT
Red Cedar Steel
Swisher Tools, LLC
The Walsh Group
Trimble

12 Galvanizers

American Galvanizers Association
AZZ Metal Coatings
Doerken Coatings
Infasco
Portland Bolt & Manufacturing Co.
SKM Industries, Inc.
South Atlantic Galvanizing
Thermal Spray Depot/Clemco
Threaded Fasteners, Inc.
V&S Galvanizing
Valmont Coatings

13 Grating and Grating Fasteners

Grating Fasteners
Grating Systems
IKG
Indiana Grating Pvt. Ltd.
Interstate Gratings
Lichtgitter USA
Lindapter
Miner Grating Systems, a Powerbrace Company
Ohio Gratings, Inc.
Soitaab USA Inc.

14 Hand Tools/Portable Equipment & Accessories

Abrafast.com / The Blind Bolt Co.
Airgas, an Air Liquide company
American Punch Company
Badger Products USA
Chicago Jack Service, Inc.
Cleveland Punch & Die Co.
Cleveland Steel Tool
CN-Seamless
Columbia Safety and Supply
Eastern Pneumatics & Hydraulics, Inc./ McCann Equipment Ltd.
Enerpac
GRM Custom Products
GWY, LLC
Hilti Inc.
Holemaker Technology HMT
Hypertherm Inc.
HYTORC
Innovative Transport Solutions (ITS)
KTA-Tator
LS Industries
OTH Pioneer Rigging
Shachihata Inc. (U.S.A.)
Shandong Hanpu Machinery Industrial Co., Ltd.
Structural Bolt and Manufacturing, Inc.
Swisher Tools, LLC
TRU-FIT PRODUCTS
Vectis Automation
Virtek Vision
Wurth Industry USA

15 HSS Manufacturers

Atlas Tube
Bull Moose Tube Company
Cutting Edge Steel
Maruichi Leavitt Pipe and Tube
Nucor Tubular Products
Stainless Structurals
Steel Founders' Society of America
Steel Tube Institute

MORE >>
CONNECT BY CATEGORY

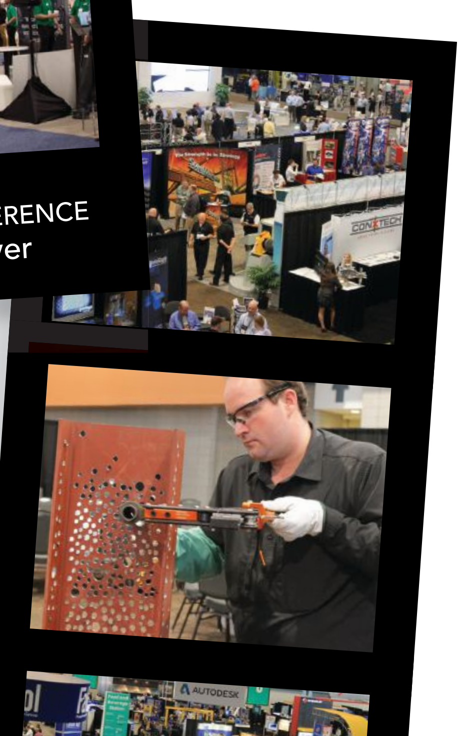
<<MORE CONNECT BY CATEGORY

16 Joists and Deck

Canam
Cano Steel
Cleveland Punch & Die Co.
COMSLAB
Construction Products Group of IAPMO
Cordeck
CSC – Canam Steel Corp.
DACS, Inc.
GEKA USA
Gonza Joist
MARKO Metal Systems
New Millennium
Nucor – Corporation
Nucor Vulcraft/Verco Group
Oates Metal Deck & Building Products, Inc.
O'Donnell Metal Deck & Bar Joist
Seyco Joist
Steel Deck Institute
Steel Joist Institute
Swisher Tools, LLC
Team Detailing Solutions LLC
Vectorshades LLC

17 Marking and Traceability

Daito Seiki Co., Ltd.
InfoSight Corporation
Messer Cutting Systems
Shachihata Inc. (U.S.A.)
Soitaab USA Inc.
STRUMIS LLC
Voortman Steel Machinery



18 Materials/Engineering/Testing and Inspection

Accurate Perforating
Advenser Technology Services Inc.
Alro Steel
American Galvanizers Assoc.
American Welding Society
AMPP
Automation International, Inc.
Carboline
Construction Products Group of IAPMO
DEICON
Doerken Coatings
Engineered Rigging
FabStation
Florida Precision Tool
HRV Conformance Verification Associates, Inc.
KTA-Tator
Steel Founders' Society of America
Terracon Consultants, Inc.
Wrought Washer

19 Mills

ArcelorMittal International
Gerdau
Nucor – Beam Mill Group
Nucor – Plate Mill Group
Stainless Structurals
Steel Dynamics Long Products Group
voestalpine Tubulars

20 Other

AA Anchor Bolt, Inc.
Accurate Perforating
ACME LASER
Alro Steel
American Institute of Steel Construction (AISC)
American Punch Company
American Welding Society
Association of Women in the Metal Industries
Badger Products USA
Baumann USA
Blair Corporation
C.M. Mockbee Co.
Caldim Tech Services LLC
Canam
Cleveland Punch & Die Co.
Columbia Safety and Supply
Consolidated Pipe & Supply Co.
Cordeck
Daito Seiki Co., Ltd.
Elevate Design Group
Enidine
Fabreeka International, Inc.
Fabricating & Metalworking Magazine
Fontana Fasteners, Inc.
Graitec
Hypertherm Inc.
Informed Infrastructure
Innovation Tech
Ironworkers / IMPACT
IRyS Global Inc.
Kebei Laser Co., Ltd.
MetFin Shotblast Systems
NASCC Exhibit Sales
National Steel Bridge Alliance
Nexont, LLC
Nitto Kohki U.S.A., Inc.
OTH Pioneer Rigging
Phoenix Technical Marketing
QMC, LLC
Research Council on Structural Connections
Rosler Metal Finishing USA
SEU by SE Solutions, LLC
Simpson Strong-Tie Co.
SKM Industries, Inc.
Steel Erectors Association of America
Steel Plate
SteelSUB, LLC
Structural Engineering Institute of ASCE
Structural Stability Research Council
Swan Transportation
Tecoi USA
TwinEngines, Inc.
Viking Wheel Blast Systems
Virtek Vision
Voss Engineering, Inc.
Whiteboard Technologies LLC
X SERIES USA

21 Safety Equipment

Airgas, an Air Liquide company
Applied Bolting Technology, Inc.
Badger Products USA
Chicago Clamp Company
Chicago Jack Service, Inc.
Columbia Safety and Supply
EHS Momentum, LLC
Enerpac
GWY, LLC
HYTORC
Innovative Transport Solutions (ITS)
LHR Safety Worksite Outfitters
Ohio Gratings, Inc.
OTH Pioneer Rigging
Skidmore-Wilhelm
Wurth Industry USA

22 Software

AKS Cutting Systems
Autodesk
Bend-Tech
Bentley Systems, Inc.
Bluebeam
Bryzos
CAI Software
Code&Steel
Controlled Automation, Inc.
Dlubal Software, Inc.
EHS Momentum, LLC
ENERCALC
FabStation
FICEP Corporation
GIZA
Graitec
IDEA StatiCa US LLC
IES, Inc.
International Design Services, Inc.
IRyS Global Inc.
ISD Group USA
LARSA, Inc.
LTC Software Solutions
LUSAS
Machitech
Messer Cutting Systems
Nemetschek Group
OpenBrIM Platform
Ovation Services LLC
P2 Programs
Pan Gulf Technologies
Pragmatic Steel Inc.
Prodevco Robotic Solutions Inc.
Qnect LLC
RISA
Sanria Engineering
SCHULLER&Company
SDS2 by ALLPLAN
Simpson Strong-Tie Co.
SketchDeck.ai
Steel Dimensions India (Pvt) Ltd.
Steel Tek Unlimited
SteelCoded LLC
SteelSUB, LLC
StruCalc
STRUMIS LLC
Trilogy Machinery, Inc.
Trimble
TwinEngines, Inc.
Versatile
Virtek Vision
VIRTUELE
Voortman Steel Machinery

23 Stairs/Railings and Misc. Steel

4XStruct, Inc.
Accurate Perforating
ACME LASER
Action Stainless
AYARI LLC
Blastec
Cano Steel
Cutting Edge Steel
Daito Seiki Co., Ltd.
EMI
Harbor Fab
IKG
Innovative Transport Solutions (ITS)
Intermark Steel
ISD Group USA
KALTENBACH
Magnum Consulting
Miro Industries, Inc.
Ohio Gratings, Inc.
Ovation Services LLC
Pacific Stair Corporation
Pragmatic Steel Inc.
RPK Techno Solutions
SCHULLER&Company
Stainless Structurals
Team Detailing Solutions LLC
Techflow Inc.
Trimble
Vectorshades LLC
Vegazva Technologies
Virtek Vision
X SERIES USA

24 Stationary Fab. Equipment

ACME LASER
AGT Robotics
Airgas, an Air Liquide company
AKS Cutting Systems
AKYAPAK USA
Automated Layout Technology LLC
Automation International, Inc.
Bend-Tech
BesCutter
Cleveland Punch & Die Co.
Cleveland Steel Tool
Controlled Automation, Inc.
Cutlite America
Daito Seiki Co., Ltd.
DAVI, Inc.
Eastern Pneumatics & Hydraulics, Inc./McCann Equipment Ltd.
EMI
FICEP Corporation
GATOR
GEKA USA
HGG Profiling Equipment BV
Hypertherm Inc.
Innovatech
KALTENBACH
Kebei Laser Co., Ltd.
Kinetic Cutting Systems, Inc.
Lincoln Electric
LS Industries
Machitech
Messer Cutting Systems
MetFin Shotblast Systems
Ocean Machinery, Inc.
Peddinghaus Corporation
Pioneer Machine Sales
Precision Steel Systems
Prodevco Robotic Solutions Inc.
Soitaab USA Inc.
Tecoi USA
Trilogy Machinery, Inc.
Vectis Automation
Viking Wheel Blast Systems
Voortman Steel Machinery
X SERIES USA

25 Steel Service Centers

Action Stainless
AKS Cutting Systems
Alro Steel
Baco Enterprises Inc.
BesCutter
Brown Strauss Steel
Chapel Steel
Consolidated Pipe & Supply Co.
Delta Steel
KALTENBACH
Kloeckner Metals
Metals USA Plates and Shapes
Nexont, LLC
North Shore Steel
Service Steel Warehouse
Soitaab USA Inc.
Stainless Structurals
Steel and Pipe Supply
Steel Founders' Society of America
Steel Plate
Sugar Steel
The Infra Group
Triple-S Steel / Intsel Steel
Willbanks Metals Inc.

26 Structural Systems and Components

Abrafast.com / The Blind Bolt Co.
ACME LASER
Acrow Bridge
Action Stainless
AKS Cutting Systems
AKYAPAK USA
Anatomic Iron Steel Detailing
Applied Bolting Technology, Inc.
Automation International, Inc.
BesCutter
Blastec
C.M. Mockbee Co.
Caldim Tech Services LLC
Cano Steel
CAST CONNEX
Chicago Clamp Company
Cleveland City Forge
Con-Serv Inc.
Construction Products Group of IAPMO
Controlled Automation, Inc.
CoreBrace
Cutting Edge Steel
DEICON
DGS Technical Services, Inc.
Doerken Coatings
DuraFuse Frames
Enidine
EVER Seismic
Fabreeka International, Inc.
FATZER AG
FICEP Corporation
Fontana Fasteners, Inc.
GATOR
GEKA USA
GRM Custom Products
Harbor Fab
Haydon Bolts, Inc.
Hercules Bolt Company
HYTORC
Infasco
Innovative Transport Solutions (ITS)
KALTENBACH
Kobelco Welding of America, Inc.
LS Industries
Mac-Tech
Messer Cutting Systems
Metals USA Plates and Shapes
MetFin Shotblast Systems
Mid Atlantic Global
New Millennium
Nexus Steel Detailing, Inc.
Nucor – Corporation
Nucor Skyline
Nucor Vulcraft/Verco Group
Ohio Gratings, Inc.
Pacific Stair Corporation
Peddinghaus Corporation
SCHULLER&Company
Seismic Bracing Company
SidePlate / MiTek
Simpson Strong-Tie Co.
Steel Deck Institute
Steel Joist Institute
Steel Tube Institute
Trilogy Machinery, Inc.
TRU-FIT PRODUCTS
Unytite, Inc.
Vectis Automation
Viking Wheel Blast Systems
Voss Engineering, Inc.
Wrought Washer
X SERIES USA

27 Welding and Stud Material

AA Anchor Bolt, Inc.
Abrafast.com / The Blind Bolt Co.
Action Stainless
AGT Robotics
Airgas, an Air Liquide company
AKYAPAK USA
American Welding Society
Atlas Tube
Automation International, Inc.
Badger Products USA
BesCutter
Cerbaco Ltd.
Cutting Edge Steel
Haydon Bolts, Inc.
Hercules Bolt Company
Lincoln Electric
Mac-Tech
Miller Electric Mfg. LLC
Nelson Stud Welding
SKM Industries, Inc.
TRU-FIT PRODUCTS
Vectis Automation
Voortman Steel Machinery

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Phoenix Solutions Group International
Hollie Schaubert, Steel Tube Institute
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