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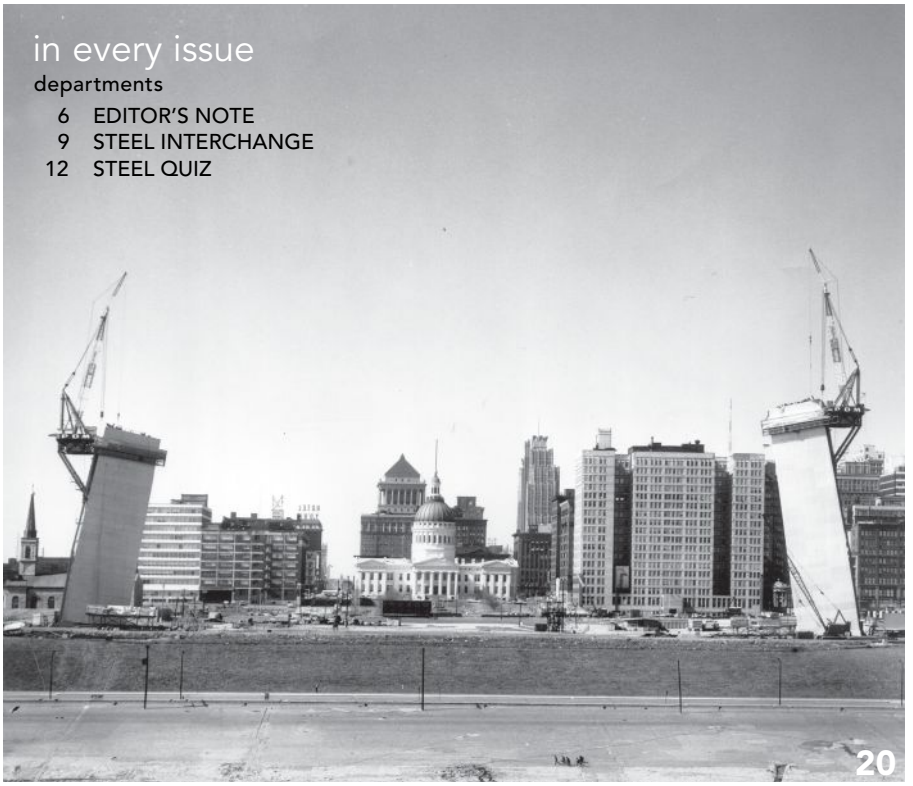

features

NASCC: The Steel Conference Final Program

Above photo: The legs of St. Louis' Gateway Arch under construction in 1963, with the creeper cranes in place. See page 20 for the whole story and more great historic photos. (Photo: Jefferson National Expansion Memorial archives)

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editor's note

This year marks my 30th NASCC: The Steel Conference. I've seen the annual event grow from around 400 attendees to more than 5,500 participants (not counting the additional 1,500 people who remotely stream the sessions, or my kids who sometimes show up).

I know why people attend: There's no better place to learn about the design and construction of fabricated structural steel buildings and bridges; there's no better opportunity to meet the top designers, educators and builders; and there's no better place to see the latest products from the leading manufacturers of everything from amazing design software to fantastic fabrication equipment. (If you want a taste of the type of sessions offered at the conference, head over to **www.aisc.org/2018nascconline** and watch one the 133 sessions from last year that we've posted online.)

What I don't know is why some people don't attend. I'm guessing the reason falls into one of three broad categories: cost, time or interest.

We try to keep the cost as low as possible, but I realize it can still be a burden. If that's the case, I recommend NASCC Live, which streams 26 of the sessions. One person from a company can register for the full price, and then additional attendees can receive PDH credits for just $10 per person. (For more information, visit **www.aisc.org/nascclive**.)

Time is not something I can do much about except to try and make sure the conference is such a great experience that it's worthwhile to attend. We do, however, move the conference around the country to try to accommodate the travel schedules of as many people as possible. *If there is a location you think we should consider in the future, please let me know!* But keep in mind that when choosing a location, we need to consider many factors, including the size of the convention center, number of available hotel rooms and number of daily flights to and from the city. For example, I'd love to go to Charleston, but the convention center is way too small and the city is too difficult to travel to for most. Likewise, we avoid amazing cities like San Francisco because the hotel and convention center prices would increase the average attendee's costs by more than $600.

Interest is the area that we can most readily address. Are there specific topics for sessions that you want to attend but we're not offering? Are there vendors who you'd like to see in the exhibit hall but that aren't there? Are there other activities we should be providing? We're always interested in trying something new (such as this 13th edition of the normally monthly *Modern Steel Construction*, which replaces our more traditional conference program). *If you have ideas, I'd love to hear them!*

We're already hard at work planning next year's Steel Conference, World Steel Bridge Symposium and SSRC Annual Stability Conference, as well as the newly planned Quality Conference. But for now, I hope to meet you in St. Louis!

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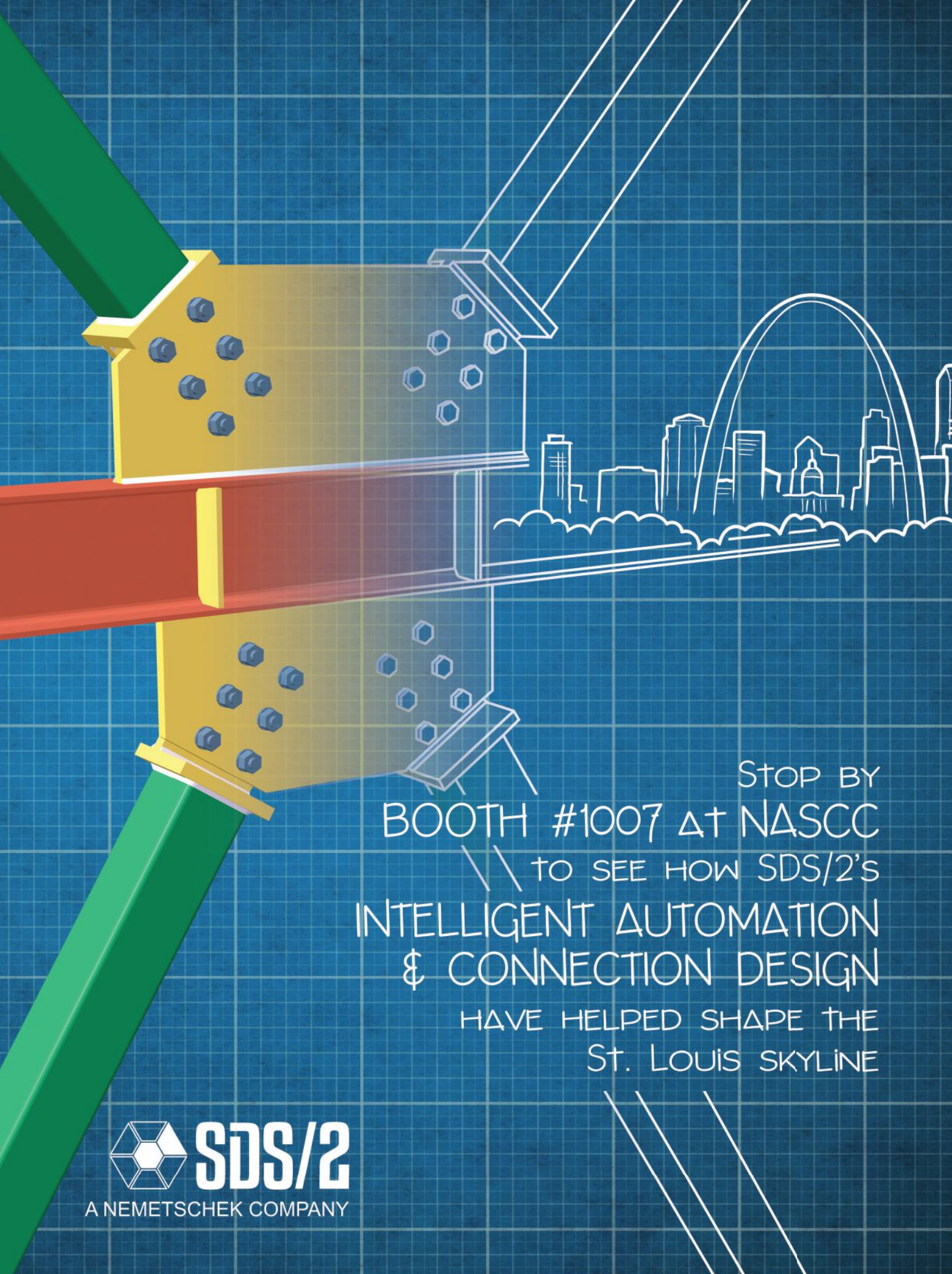
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If you've ever asked yourself "Why?" about something related to structural steel design or construction, *Modern Steel*'s monthly Steel Interchange is for you! Send your questions or comments to **solutions@aisc.org**.

steel interchange

*All AISC publications mentioned, unless noted otherwise, refer to the current version and are available at **www.aisc.org/specifications**.*

ASTM A500 Grade C

It is becoming more commonly known that ASTM A500 Grade C is the preferred material specification for hollow structural sections (HSS) shapes. Is it still possible to obtain A500 Grade B HSS shapes?

Yes, although it may make more sense to specify Grade C. From what I understand, all domestic producers of A500 HSS shapes produce to the A500 Grade C requirements. These shapes also happen to meet the requirements of A500 Grade B so they can be marketed as A500 Grade C and A500 Grade B shapes. This may not be true for HSS shapes that are not produced domestically. That said, if you specify A500 Grade B, you are likely receiving HSS shapes that would also meet the requirements of Grade C, without taking advantage of the increased strength. This is one of the reasons why Table 2-4 of the 15th Edition AISC *Steel Construction Manual* lists ASTM A500 Grade C as a preferred material specification for rectangular and round HSS. This is a change in the 14th Edition *Manual*, where Grade B was the preferred material specification. The AISC Committee on Manuals changed the preferred material grade from B to C based on reports from HSS manufacturers indicating that material currently being produced will satisfy both A500 Grade B and C.

There is also a possibility that the material a supplier has in stock cannot be certified to Grade C. Based on the information we have from producers, such material would either have to be quite old or produced by an unusual source.

Larry S. Muir, PE

EDI Naming Convention

Is there a standard governing the designation of structural steel shapes when exchanging information between computer programs—i.e., between detailing software and CNC software?

I believe the document *Naming Convention for Structural Steel Products for Use in Electronic Data Interchange (EDI)* may be what you are looking for (visit **www.aisc.org/manualresources**). If you need information related to a specific product, you should contact the manufacturer.

Larry S. Muir, PE

Fabricating Anchor Rods

While it is preferable to purchase ASTM F1554 Grade 36 anchor rods from a bolt supplier, a situation has come up where a fabricator is requesting to fabricate a few anchor rods in their shop. Is this permitted?

Yes, it is permitted for a fabricator to fabricate anchor rods in their shop. Typically, the best option would be to purchase anchor rods directly from a supplier. However, there may be situations that occur in a project where it may make sense for an experienced fabricator, with the capability to do so, to fabricate a few anchor rods. The anchor rods still must comply with the requirements in the F1554 standard. (Want access to F1554—and dozens of other ASTM standards? The 2019 edition of AISC's *Selected ASTM Standards for Structural Steel Fabrication* is a convenient resource for common ASTM standards referenced in the design, fabrication and erection of structural steel. You can purchase it at **www.aisc.org/publications**.)

F1554 is more than a *material* specification. It is a *manufacturing* specification. The fabricator must be able to demonstrate that the fabricated anchor rods meet all of the requirements in ASTM F1554. You will want to review the requirements in F1554. You may also want to familiarize yourself with the fabricator's procedures for producing the anchor rods.

Larry Kruth, PE

Beams Loaded Below Their Centroid

I am working on a project in which a walkway will be added below existing steel. In assessing the strength of the existing beams, we are finding that they are governed by lateral-torsional buckling and cannot support the increased loads. Due to conditions at the site, reinforcing the existing beams will be quite difficult and costly. Is there anything we may be overlooking in our analysis that might allow the existing beams to remain as they are?

There might be. The fact that the new structure is suspended from the existing structure is beneficial relative to the strength of the existing beams. Though it is not directly addressed in the AISC *Specification for Structural Steel Buildings* (ANSI/AISC 360), the Commentary to Section F1 provides some insight into the behavior of such conditions and states: "The equations for the limit state of lateral-torsional buckling in Chapter F assume that the loads are applied along the beam centroidal axis… if the load is suspended from an unbraced bottom flange, there is a stabilizing effect that increases the critical moment (Ziemian, 2010)." You may be able to squeeze a little more capacity out of the existing beams by accounting for this effect.

Larry S. Muir, PE

Larry Kruth is vice president of engineering and research and **Jonathan Tavarez** is a staff engineer in the Steel Solutions Center, both with AISC. **Larry Muir** is a consultant to AISC.

AISC or RCSC?

If a difference exists between the AISC *Specification* and the *RCSC Specification*, does the AISC *Specification* govern?

Yes. You can find this answer in multiple places. The first place is in Section J3 of the AISC *Specification*. Section J3.1 states: "Use of high-strength bolts shall conform to the provisions of the *Specification for Structural Joints Using High-Strength Bolts*, hereafter referred to as the *RCSC Specification*, as approved by the Research Council on Structural Connections, **except as otherwise provided in this *Specification***" (emphasis added).

So clearly the AISC *Specification* can take exception to specific requirements in the *RCSC Specification*. One example of this would be the pre-installation values in Table 7.1 of the *RCSC Specification*. The 2014 *RCSC Specification* was published prior to the development of ASTM F3125. As a result, some of the values in Table 7.1 are no longer up-to-date. The values provided in Table 7.1 are set equal to 1.05 times the minimum bolt pretension. If you look at a $1\frac{1}{8}$-in.-diameter, Grade A325 bolt, Table 7.1 provides a pre-installation verification value equal to 59 kips. Per Table J3.1 of the AISC *Specification*, the pre-installation verification value should be equal to 1.05 × 64 kips = 67 kips. Based on the requirement in Section J3.1, the AISC *Specification* controls and the minimum bolt pretension for pre-installation verification should be 67 kips, not 59 kips.

The exception described above, as well as other exceptions, are listed in the Commentary to Section J3.1 of the AISC *Specification*. In addition, the AISC *Specification* is referenced in *IBC* and the *RCSC Specification* is not. The August 2013 SteelWise article "Says Who?" (available at **www.modernsteel.com**) provides more discussion on this topic.

Larry Kruth, PE

OCBF vs. SCBF Brace Slenderness Requirements

Section F1.5b in the AISC *Seismic Provisions for Structural Steel Buildings* (ANSI/AISC 341) contains slenderness requirements for braces in V or inverted V configurations. These slender requirements are more restrictive than the slender requirements for braces in SCBF systems as addressed in Section F2.5b. Is this correct?

Yes, this is correct. The commentary for Section F1.5b states: "In V- and inverted V- frames, braces with large slenderness ratios are not permitted. This restriction is intended to limit the unbalanced forces that develop in framing members after brace buckling; see Commentary Section F2.4c." This is in some ways similar to K-braced frames, which are addressed in F2.4c and Commentary, that can lead to unbalanced lateral forces from the braces onto columns. K-braced frames are not permitted in ordinary concentrically braced frame (OCBF, see F1.4b) and special concentrically braced frame (SCBF, see F2.4c) systems.

Slenderness can be beneficial up to a point with regards to the behavior of the braces during a seismic event. Commentary Section F2.5b states: "The slenderness (L_c/r) limit is 200 for braces in SCBF. Research has shown that frames with slender braces designed for compression strength behave well due to the overstrength inherent in their tension capacity. Tremblay (2000), Tang and Goel (1989) and Goel and Lee (1992) have found that the post-buckling cyclic fracture life of bracing members generally increases with an increase in slenderness ratio. An upper limit is provided to preclude dynamic effects associated with extremely slender braces."

Jonathan Tavarez, PE

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The complete collection of Steel Interchange questions and answers is available online at **www.modernsteel.com**.

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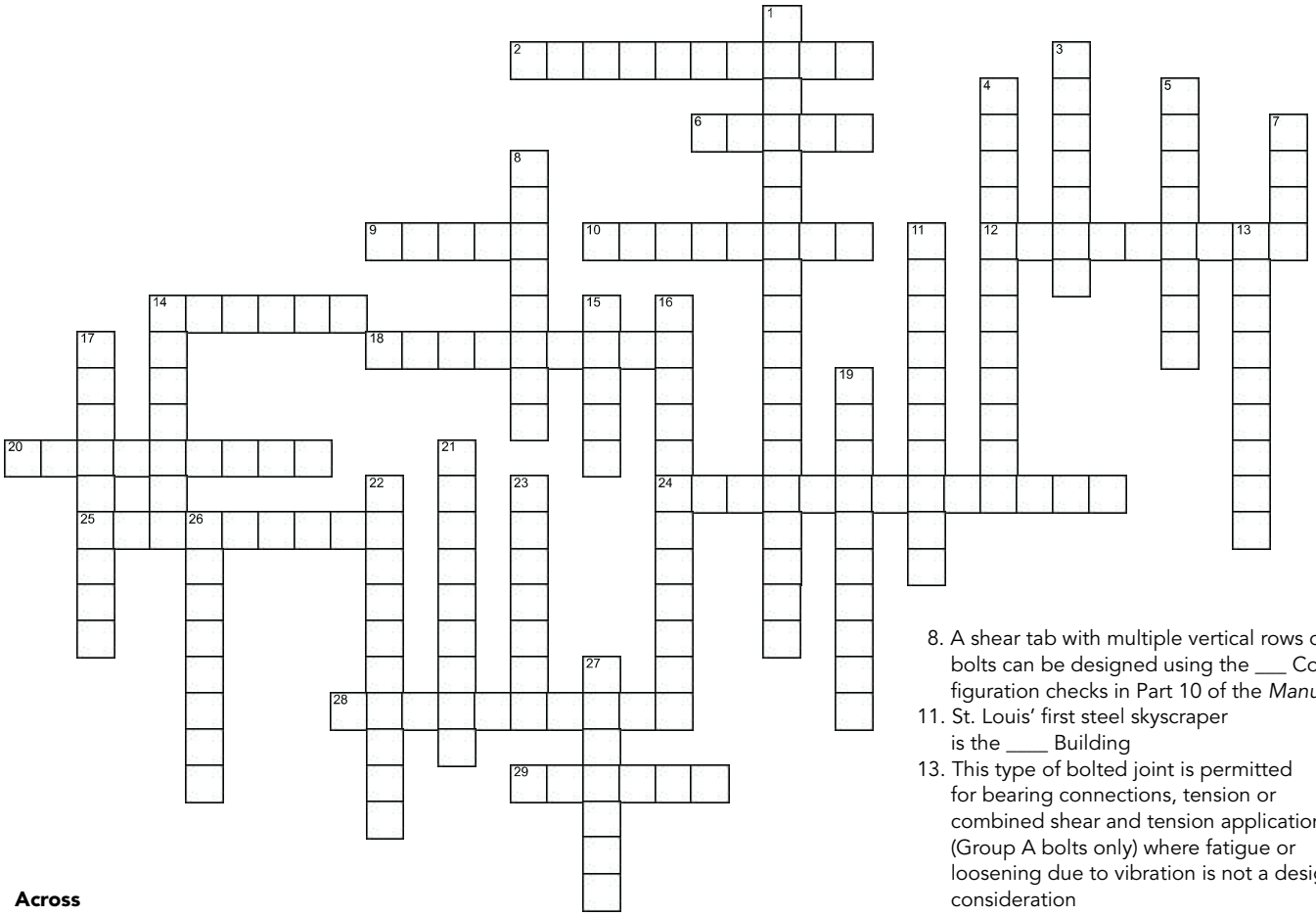
This special Steel Quiz will test your knowledge on steel design and construction—and the 2019 NASCC: The Steel Conference. Answers are on the next page. (Note: Do not include spaces in multi-word answers.)



Across

2. This truss includes vertical members connected with fixed joints capable of transferring and resisting bending moments
6. Stadium and a brewery
9. This type of bracing controls the movement at the braced point without direct interaction with adjacent braced points
10. It is permissible to use ___ loads to represent the effects of initial system imperfections
12. This kind of steel was used in a major St. Louis landmark
14. When analyzing composite sections, the ___ compatibility method assumes a linear distribution of ___ across the section (same word for both blanks)
18. Innovative composite plate shear wall system
20. This theory is permitted to be used to check the flexural strength of plate element with an applied transverse force
24. This limit state should be checked for transverse forces on plate elements, and is discussed further in Part 9 of the 15th Edition *Steel Construction Manual*
25. Lateral- ___ buckling must be checked to prevent deflection out of the bending plane and simultaneous twisting about the shear center
28. 2019 NASCC: The Steel Conference attendees will learn about the power of ____ thinking
29. This is sometimes required to ensure beams satisfy floor serviceability demands

Down

1. This occurs when a plate girder experiencing shear develops diagonal tensile forces in the web and compressive forces in the transverse stiffeners in a manner similar to a Pratt truss
3. ___-joint-penetration groove weld includes a penetration that is intentionally less than the complete thickness of the connected element
4. Steel City New Zealand
5. ___-joint-penetration welds develop the full strength of the base metal and usually do not require strength calculations
7. The world's first steel truss bridge
8. A shear tab with multiple vertical rows of bolts can be designed using the ___ Configuration checks in Part 10 of the *Manual*
11. St. Louis' first steel skyscraper is the ____ Building
13. This type of bolted joint is permitted for bearing connections, tension or combined shear and tension applications (Group A bolts only) where fatigue or loosening due to vibration is not a design consideration
14. When the width-to-thickness ratio is greater than λ_r, a compression member element is considered to be ___
15. The ___ Steel Bridge Symposium brings together bridge design engineers, construction professionals, academics and others to discuss state-of-the-art practices for enhancing steel bridge design
16. Tallest building in St. Louis is One ____ Square
17. The ___ length of a member was revised to L_c in the 2016 AISC *Specification*
19. The ability of a steel structure to recover quickly after an extreme event
21. The Annual ___ Conference includes 13 sessions, 2018 Beedle Award presentation and MAJR Medal presentation
22. ___, magnetic particle, penetrant and radiographic testing, where required, shall be performed by the QA in accordance with AWS D1.1/D1.1M
23. The 2020 NASCC: The Steel Conference will be held in this exciting city
26. Case 4 in Table D3.1 of the *Specification* was generalized to consider what condition?
27. 2019 T.R. Higgins Lecture awardee

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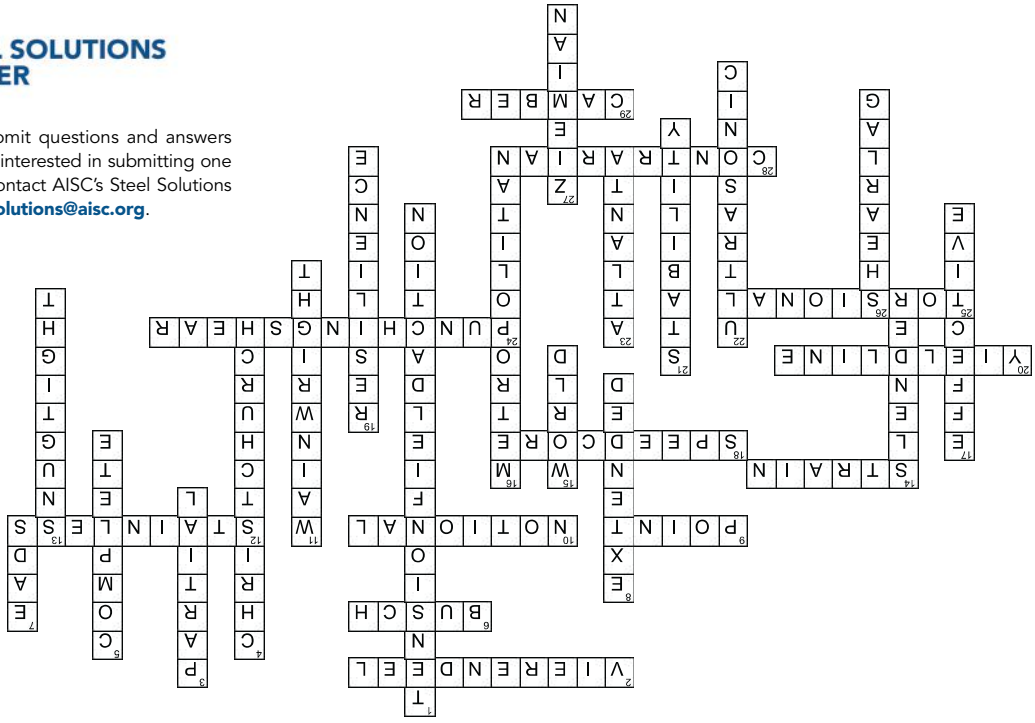

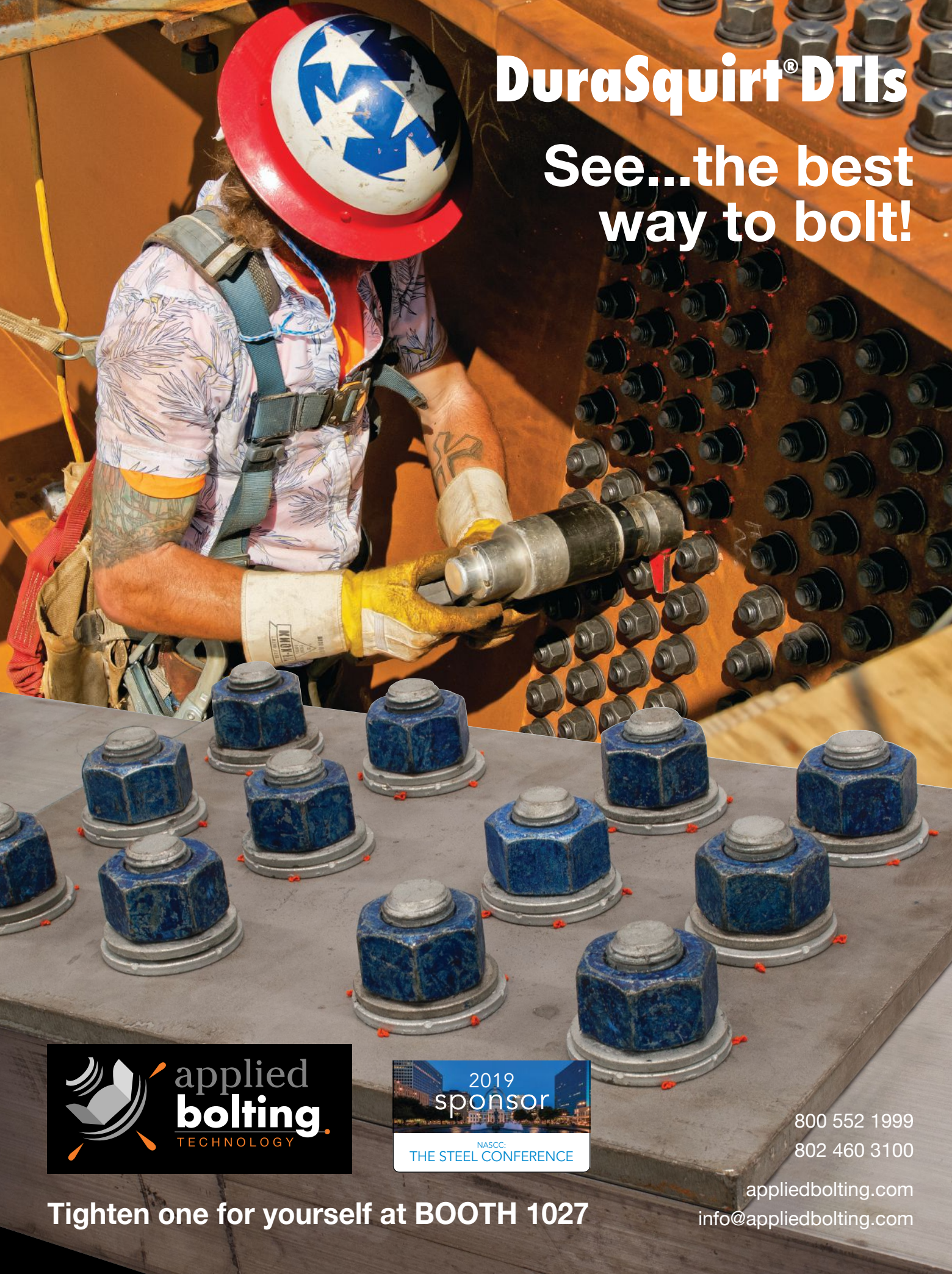
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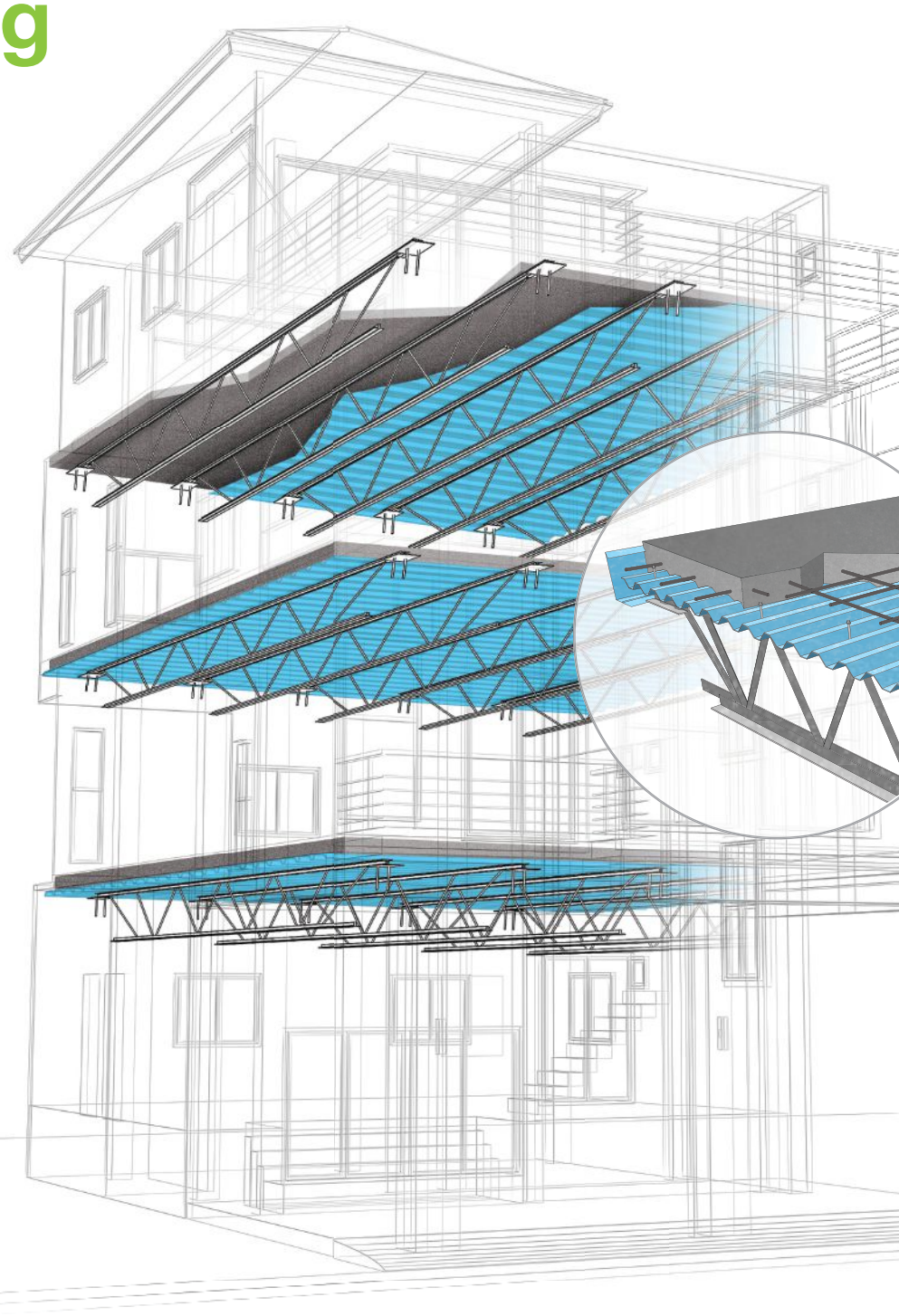

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Construction market conditions: looking back at 2018 and anticipating 2019 and beyond.

conference preview

LOOKING INTO THE CRYSTAL BALL

BY TABITHA S. STINE, SE, PE

THE CURRENT CONSTRUCTION MARKET doesn't look too shabby right now. There are lots of cranes dotting cities across the country. The good times are never going to end. Right?

The power of a positive attitude can't be denied. But if history teaches us anything, it's that every market cycle is different from the last one and reacts to factors specific to that cycle; good times today can turn into hard times tomorrow. Construction recessions or marketplace downturns are caused by different phenomena: material shortages, global economic factors, labor supply issues, housing bubbles and more. It's important to acknowledge how current market conditions may impact future business—and to determine how best to manage the potential risks that lie ahead.

How Much Will We Build?

With that in mind, let's take a brief look back at 2018—with all its social, economic and political changes—and how the domestic fabricated structural steel industry reacted. Building construction starts (measured in square feet) were up nearly 3% last year compared to 2017. This number represents a slowing of the robust growth earlier in the year, which saw double-digit gains compared to the previous year. Tariffs, rising interest rates and a tight labor market all contributed to this cooling of the market.

A lion's share of the work for our membership in the nonresidential market for 2018 was in offices, warehouses and distribution and data centers. When considering all markets on a national basis (including multifamily housing) we anticipate 2019 to be stagnant compared to the gains of 2018 when measured in square footage of construction starts—and with that anticipated stagnancy comes concern for a possible downturn as soon as 2020. But of course, this is all contingent on how the recently resolved government shutdown (the longest in U.S. history) may impact these forecasts. We do know that projects are being put on hold and GDP will most likely be impacted negatively as a result.

How Will Fabricators Fare?

According to AISC's latest "Business Barometer" survey of our member fabricators, respondents generally feel that national business conditions will continue to be "very good" and are expected to remain so through at least the first half of the year—with positive comments eclipsing negative comments by a three-to-one ratio. It's important to note that the material pricing jump that immediately followed the tariff announcement in early 2018 was felt by nearly all construction materials—not just steel—and the steel industry has responded generally positively via relaxed pricing and more typical long-term stability beginning in the third quarter.

Overall, fabrication conditions are currently robust, with substantial backlogs, a high level of speculative business activity percolating and more projects being taken off hold and moving forward thanks to the market improving in mid- to late 2018. One note of pessimism to be gleaned from the Barometer, though, is that while the next few months are expected to good, the second half of 2019 is not.

Tabitha Stine (**stine@aisc.org**) is AISC's vice president of market development.

Looking for information on steel in your city? AISC's team of structural steel specialists, located in major metropolitan areas across the country, build relationships with project decision-makers and educate them on the advantages of designing and building with structural steel.
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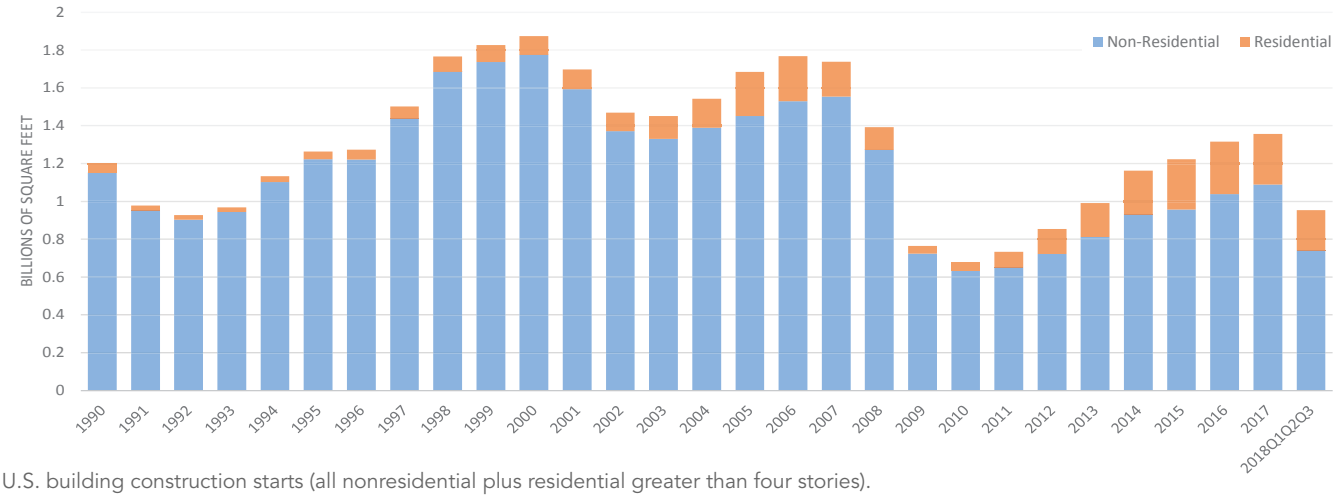

U.S. building construction starts (all nonresidential plus residential greater than four stories).

So How Much Steel Are We Talking?

AISC estimates that the volume of U.S. shipments of fabricated structural steel in 2017 was 3.5 million to 4.0 million tons. Historically, AISC has broadly estimated the size of the U.S. fabricated structural steel market based on the quantity of parallel-flange sections that U.S. mills have shipped. However, those past estimates overstated the market size by not differentiating between parallel-flange sections used for construction versus other non-construction sectors like rack systems, marine applications, trailers, commercial truck beds and mobile homes.

We have responded by refining our estimation process to more accurately calculate structural steel's domestic market size. For example, products such as H-piling, bantam beams and super-light beams are now excluded from the calculation. Because our estimate is based on the amount of steel shipped from the mills, we have also adjusted it to account for the steel waste generated during the fabrication process, which is documented in our industry-average environmental product declaration (EPD) background report at **www.aisc.org/epd**. Finally, we have made upward adjustments to account for other steel mill products that are used for fabricated structural steel applications—e.g., angles, channels, plate and hollow structural sections (HSS)—as well as the quantity of steel that is *produced* overseas but *fabricated* in the U.S.

What's Ahead in 2019?

Nonresidential construction for 2018 is expected to finish near to even compared to last year, and possibly down 3% to 4% at the end of 2019. Office construction starts in particular will finish up 6% in 2018 but are expected to slow in 2019 to only 1% growth. We still expect strong growth in distribution and data centers. When considering all markets on a national basis, including multifamily housing, it is very possible that 2019's gains will be level with 2018's. This leads to the anticipation of a possible downturn looming in 2020.

What Are the Potential Monkey Wrenches?

It's important to appreciate the many factors that can completely transform our market, for better or worse, depending on how the powers-that-be in Washington approach a variety of challenges in the coming months. Here are a few proverbial monkey wrenches that could be thrown into the system:

- **The federal government shutdown.** How will the long-term implications of on-hold federal projects trickle down to the private sector and the overall economic health of the nation?
- **Interest rates.** Rates have climbed recently. Will this trajectory continue to create a holding pattern for construction loans for large-scale projects?
- **Transportation funding.** Thanks to the lack of a long-term federal transportation bill in Washington, states currently don't have a mechanism to plan for major road and bridge projects that can be supported by federal taxpayers. Consider this a friendly reminder to write or call your local politicians!
- **Global trade war.** The tariffs of 2018 will continue to impact the construction sector directly, though perhaps not to devastating effect. But they also have the potential to instigate a worldwide trade war. If this happens and isn't resolved quickly, it has the potential to bring the U.S. economy to a screeching halt—which would be devastating to construction.

So as we anticipate a relatively good early 2019, with most major U.S. cities experiencing construction in most sectors, the second half of the year may become a time to tighten our belts and observe how the aforementioned factors will impact domestic construction and specifically the steel industry. And whatever the current market looks like, whenever possible, we encourage fabricators to become involved with design teams as early in the life of a project as possible to help reduce any perceived risks, push for collaboration and bring your value and expertise to the table. ■

*This article is a preview of the session "The Crystal Ball: Construction Market Conditions and Forecasting for Both Buildings and Bridges" at the 2019 NASCC: The Steel Conference, taking place April 3-5 in St. Louis. For more information and to register, visit **www.aisc.org/nascc**.*

Want to keep a regular eye on market conditions? AISC full members can stay up-to-date on quarterly construction statistics by visiting **www.aisc.org/industrystats**—which now reflects the final 2018 numbers.

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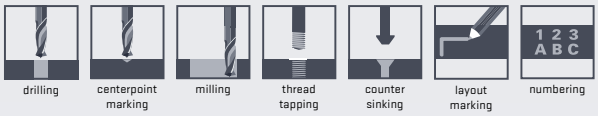





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conference preview

(NOT) SCRATCHING THE SURFACE

BY JOSHUA FREEDLAND AND CHRISTINE FREISINGER, SE, PE

Over the years, the stainless steel surface of St. Louis' Gateway Arch has developed multiple anomalies. A years-long study, with the help of a delicate rope access system, has helped reveal why.

Joshua Freedland (**jfreedland@wje.com**) is a principal and **Christine Freisinger** (**cfreisinger@wje.com**) is an associate principal, both with Wiss, Janney, Elstner Associates in Chicago.

THE GATEWAY ARCH is one of the most recognizable structures in the world.

Designed by Eero Saarinen and Associates and Severud Elstad Krueger Associates to signify the westward expansion of the U.S., the steel-framed 630-ft-tall weighted catenary arch, with legs set 630 ft apart, has been a literally and figuratively shining example of engineering ingenuity since it opened in 1965. Constructed of 143 triangular prefabricated double-wall carbon and stainless steel sections or stations, the exterior skin of ¼-in. Type 304 polished stainless steel plate (with a Number 3 finish) provides a glistening beacon between downtown St. Louis and the Mississippi River.

But over time, the skin has lost a bit of its shine, with much of the steel displaying stains. This prompted the bodies that manage the Arch—the National Park Service (NPS) and Bi-State Development Agency—to hire consulting firm Wiss, Janney, Elstner Associates, Inc. (WJE) to determine the causes of the staining. Between 2006 and 2015, WJE's field investigation identified multiple visual anomalies, leading to an evaluation of various cleaning systems and their effectiveness.

Up-close inspection, however, was a challenge. The Arch was constructed without a means to access the stainless steel except for a hatch at the observation deck—all the way at the top. At the base, WJE used aerial lifts to complete inspection of the stainless steel. To access the higher reaches, WJE designed a custom industrial rope system to provide inspection personnel with safe, hands-on access to the stainless steel skin without damaging it. The system, which allowed access to the exterior face of the north leg for the entire height and to the west intrados on the north leg, used a custom bridle system that spanned in tension from the hatch at the top of the Arch down the extrados of the north leg to the secondary anchor, and then down to the base of the north leg to the primary anchor. In installing and implementing the system, no intrusive or permanent connections were made to the Arch.

In general, the inspection revealed that the visual anomalies of the stainless steel skin could be classified into three categories:

1. Blemishes caused by alterations to the surface texture that create a visual aberration under specific lighting conditions and at certain observation angles
2. Deposits such as atmospheric pollutants
3. Discoloration via chemical alterations such as superficial corrosion staining

The blemishes typically included horizontal bands, rectangular-shaped anomalies where the derrick creeper was attached during construction, vertical streaks, brush marks adjacent to welds, large arc-shaped blemishes caused by scratches and circles either 10 in. or 18 in. in diameter. Archival research revealed that many of the blemishes result largely from original fabrication, damage during panel shipment to the site and erection and attempts to refinish panels in the field during construction.

In addition, some of the panels generally appear darker or lighter than adjacent panels under specific lighting conditions and at certain observation angles. But during the initial construction process, no differences in the surface texture or gloss were measured between these panels. The perceived visual difference is likely due to how the finish was applied (left to right versus right to left).

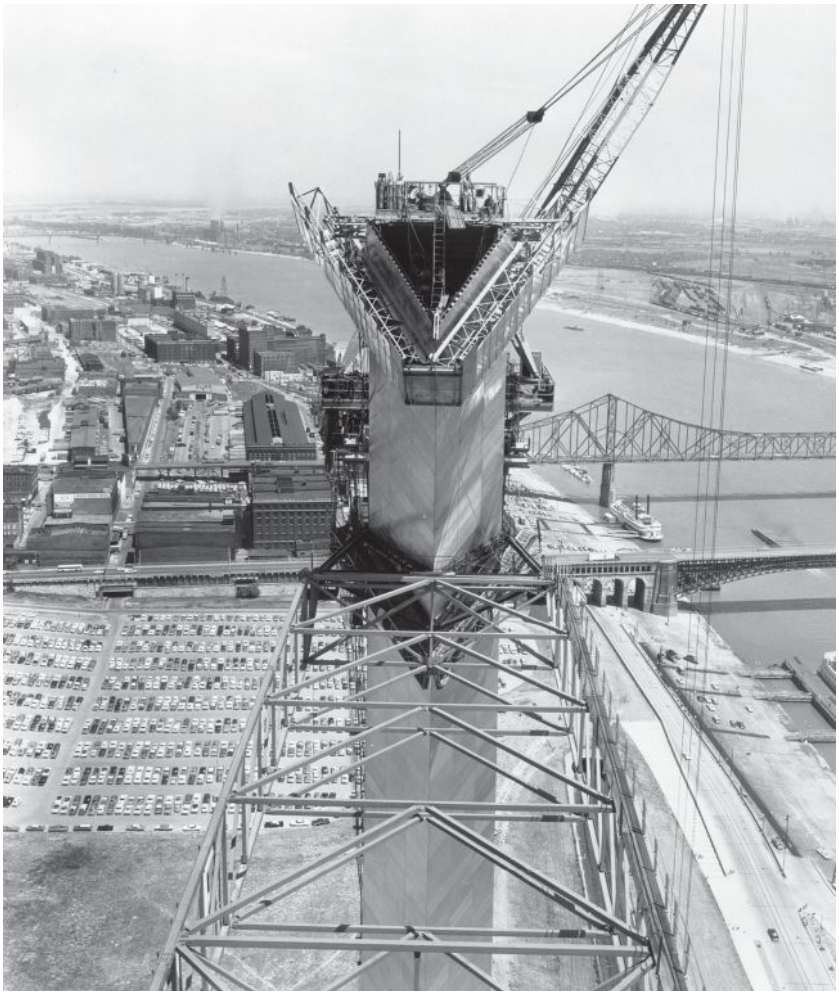
photos on this page from the Jefferson National Expansion Memorial archives

Placing a station of the Arch via creeper derrick crane.

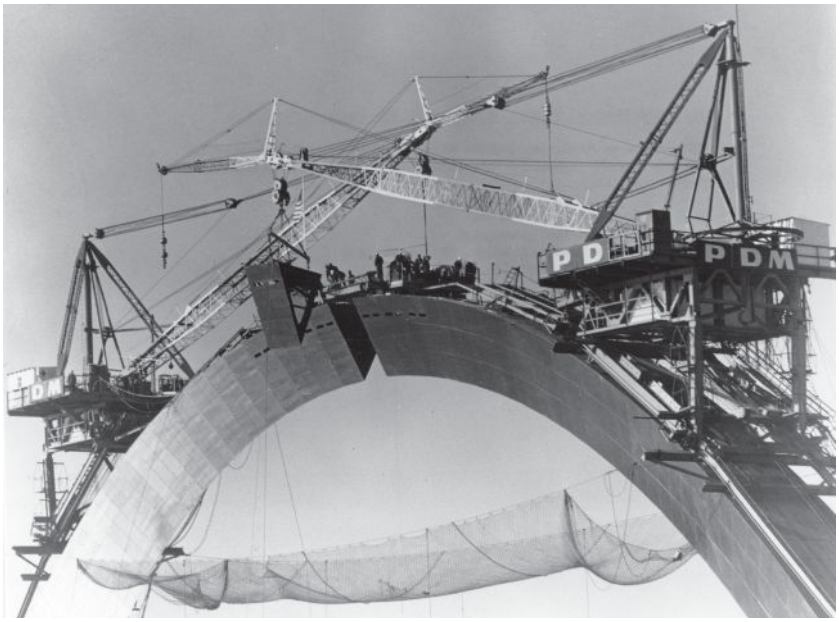
At the base of the Arch, graffiti and routine impact damage over the years have also created significant blemishes. Several of the cleaning trials partially reduced the visual appearance of the blemishes, but the most effective trials required refinishing the stainless steel. While the refinishing trials largely resulted in steel profiles similar to those present before the trials were conducted, a visual difference between the trial areas and the original finish remained. While this visual difference could likely be reduced by modifying the techniques tested, refinishing the base panels was not recommended.

Also, dark deposits were observed at various locations along the arch in areas with rougher surface texture, though these differences in relief were subtle. Physical molds of the stainless steel surface and representative welds were created to replicate ultra-fine details as small as 0.1 microns, and laboratory examination of the molds revealed that the vertical streaks below the welds corresponded to a difference in the density of the surface texture. In addition, weather patterns, such as prevailing winds and the geometry of the Arch, created run-down patterns of precipitation that have created dark areas.

Samples of the surface deposits were analyzed using light microscopy and scanning electron microscopy (SEM) with energy dispersive X-ray spectroscopy (EDS) and found to contain carbon-rich material like spores and pollen, and industrial particulates such as fly ash, ferrochrome oxide, iron and steel slag, copper, zinc, lead and titanium.



Installing a stabilizing strut to resist overturning and deflection of the cantilevered legs.



Installing the final station of the Arch, at the top of the north leg, on October 28, 1965.

photos on this page courtesy of WJE

above: Using the industrial rope access system on the north leg.

below: Access at the intrados.

above: The primary anchor points for the rope system on top of the Arch.

below: The rope system's secondary anchor point during installation.

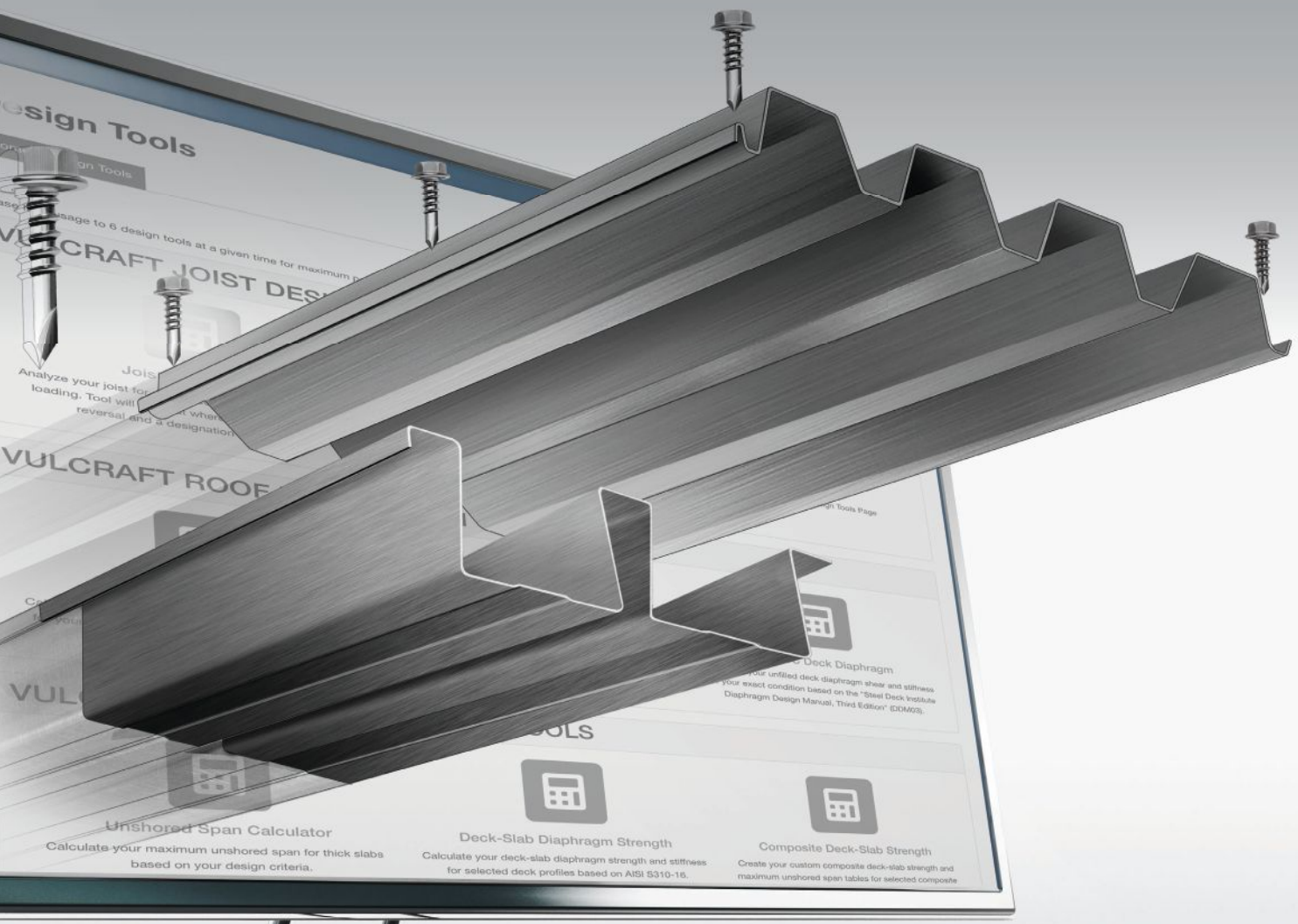
below: Cleaning-study test areas at the base of the Arch.

Discoloration of the stainless steel, such as superficial corrosion staining, was also examined. One of the more pronounced discolorations observed is the brownish-orange staining near the base of the Arch, which is likely a result of chloride surface contamination related to prior use of deicing salts. Chemical cleaning using weak acids was successful in removing the corrosion staining.

The isolated red-orange corrosion observed at the lowest two panels was determined to be caused by corrosion of steel deposits left on the surface as a result of incised graffiti. The embedded iron can only be removed with refinishing or pickling, but pickling stainless steel can dull the finish and was advised to be performed carefully using small brushes only at the embedded iron.

Overall, the investigation concluded that the exterior stainless steel of the Arch is in serviceable condition, without significant structural distress or deterioration—and again, many of these visual anomalies date back to the original construction. ■

This article is a preview of the session "The Gateway Arch: Unique Perspectives" at the 2019 NASCC: The Steel Conference, taking place April 3-5 in St. Louis. For more information and to register, visit ***www.aisc.org/nascc****.*



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conference preview

DEDICATED TO DIAPHRAGMS

BY JUDY LIU, PHD

A look at some research results on the seismic performance of steel floor and roof diaphragms.

DO YOU WANT TO gain a better understanding of diaphragm seismic performance and learn new and better approaches to diaphragm design?

The Steel Diaphragm Innovation Initiative (SDII) is a multi-year academic-industry partnership to advance the seismic performance of steel floor and roof diaphragms in steel buildings. This research is jointly funded by AISC, the American Iron and Steel Institute (AISI), the Steel Deck Institute (SDI), the Steel Joist Institute (SJI) and the Metal Building Manufacturers Association (MBMA). The team developed a five-year plan to advance the seismic performance of steel floor and roof diaphragms used in steel buildings through better understanding of diaphragm-structure interaction, new design approaches and new 3D modeling tools that provide enhanced capabilities to designers using steel diaphragms in their building systems. The work includes research support for much-needed revisions to proposed seismic codes and standards for steel diaphragms. SDII is also working on innovative steel diaphragm solutions for efficient, robust and resilient steel building systems.

SDII is more than halfway through its five-year effort, and a few of the accomplishments and ongoing activities from the third year are highlighted here.

Isolated Fastener Tests

A series of 80 tests were conducted on isolated sidelap and structural framing fasteners with flat sheets of steel deck. The fasteners were tested in this manner in order to separate fastener behavior from the effects of deck geometry, such as bends, embossments and edge distances. The sidelap fasteners tested were #10 and #12 screws. Structural framing fasteners included powder-actuated fasteners, pneumatic powder-actuated fasteners, arc seam welds, and #12 screws. Other parameters included number of deck plies for the structural fasteners (1-, 2- and 4-ply to the support), deck thickness (22-, 20-, and 18-gage) and loading (monotonic and cyclic). For the structural framing connection tests, a $^{3}/_{16}$-in.-thick plate represented the structural support steel.

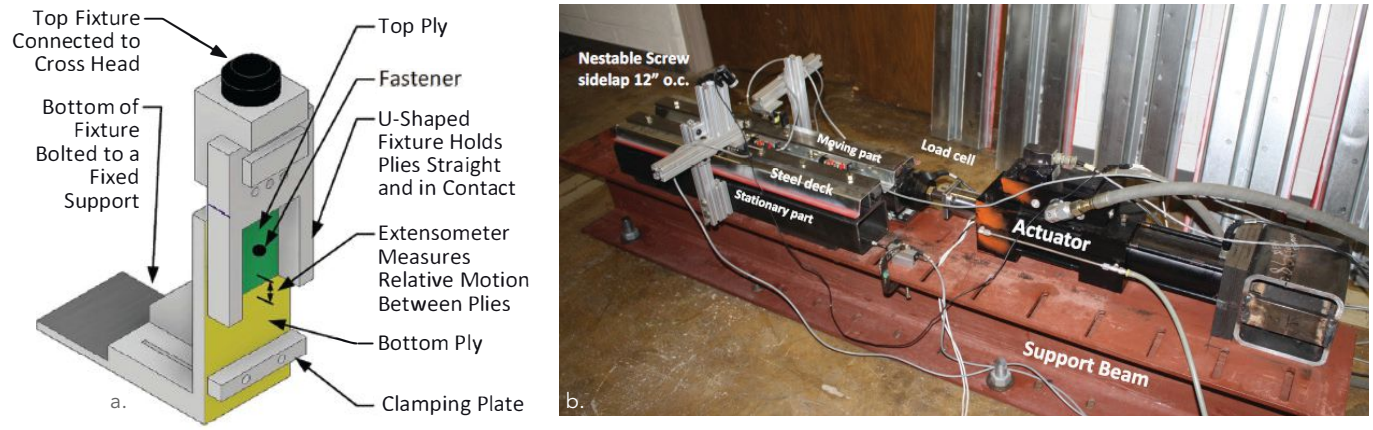
Each test specimen consisted of a single fastener and overlapping sheets of steel. The test setup for the isolated fastener tests used aluminum U-shaped fixtures to keep the deck plies flat and in contact while the specimen was loaded axially (Figure 1a, page 26). Load, cross-head displacement and relative displacement between plies were all measured, and observed failure modes included sidelap screw tilting and pullout, shear failure of structural screws, bearing failure at power actuated fasteners, tearing of the sheet around the weld and shear failure of the weld. Cyclic loading generally resulted in lower strength, with some exceptions, and arc seam welds were generally stronger than the other fasteners but also more variable in strength and failure mode. Meanwhile, comparison to companion tests showed that the presence of corrugations and realistic boundary conditions resulted in an increase in strength, 14% on average.

Sensitivity of Fastener Behavior to Installation Details

The sensitivity of sidelap fastener behavior to screw installation details was also investigated. This testing expanded upon the study of cyclic performance of steel deck sidelap and structural framing connections. Parameters for this study included screw

Judy Liu (judy.liu@oregonstate.edu) is a professor in the Civil and Construction Engineering Department at Oregon State University in Corvallis, Ore.

Lead investigators for the SDII are **Samuel Easterling**, **Matthew Eatherton** and **Cristopher Moen** (Year 1), Virginia Tech; **Jerome Hajjar**, Northeastern University; **Rafael Sabelli**, Walter P Moore; and **Benjamin Schafer**, Johns Hopkins University.

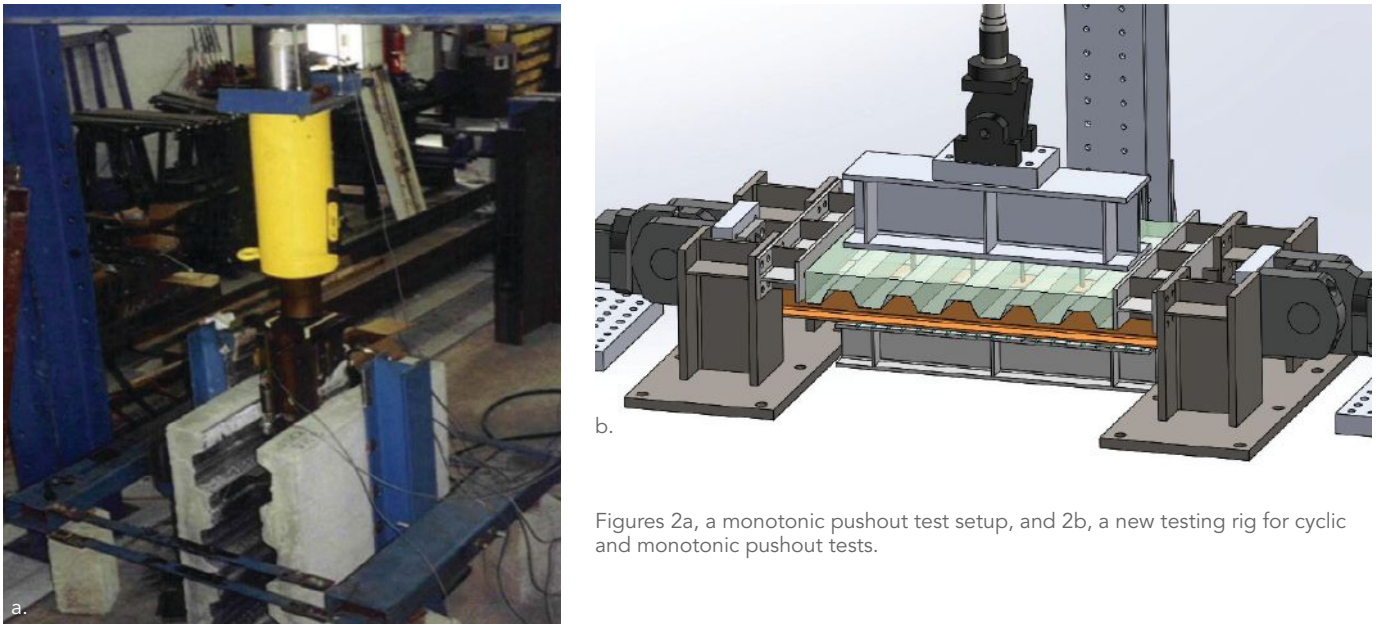


Figures 1a, an isolated fastener test specimen, and 1b, a deck sidelap test setup.

edge distances of 0.25-, 0.375- and 0.5-in., deck thicknesses of 22-, 20- and 18-gage, screw sizes of #10 and #12 and both cyclic and monotonic loading. Note that the 0.5-in. edge distance placed the screw at a bend in the deck, and results from those tests were not available at the time of this article. In the test setup, the sidelap connected the stationary side of the deck to the moving part of the specimen, which was connected to a dynamic actuator (Figure 1b). As in the other fastener tests, screw tilting and pullout were observed. For monotonic and cyclic tests, a larger edge distance resulted in a higher shear strength. The effect of edge distance on the sidelap stiffness is currently being analyzed.

Shear Connector Tests

Monotonic and cyclic composite shear connector tests, also referred to as "pushout" tests, are also underway. For the monotonic pushout tests, each side of the symmetric specimen has two shear studs that are welded to the flange of a WT and embedded in a 36-in. × 36-in. slab. A hydraulic jack applies load to the ends of the WTs (Figure 2a). Parameters for the 41 monotonic tests include type of concrete (lightweight or normal-weight), thickness of slab (4-, 6.25- or 7.5-in.) and position of the stud in the rib (strong or weak). Cyclic pushout tests are conducted using a new testing rig developed for the purpose (Figure 2b) and monotonic pushout tests will also be conducted with the new testing rig. The concrete portion of specimen is restrained at each side, and steel roller guides underneath the steel beam allow the steel portion of the specimen to move as load is applied in line with the top beam flange, thereby imposing realistic demands on the shear connectors. In the 16 monotonic and cyclic tests, effects of stud position, deck rib orientation, slab thickness and lightweight or normal-weight concrete will again be investigated. Behavior for a deck oriented parallel to an edge beam will also be studied. Stud number and spacing will include 1 at 12 in. and 2 at 12 in. on center.

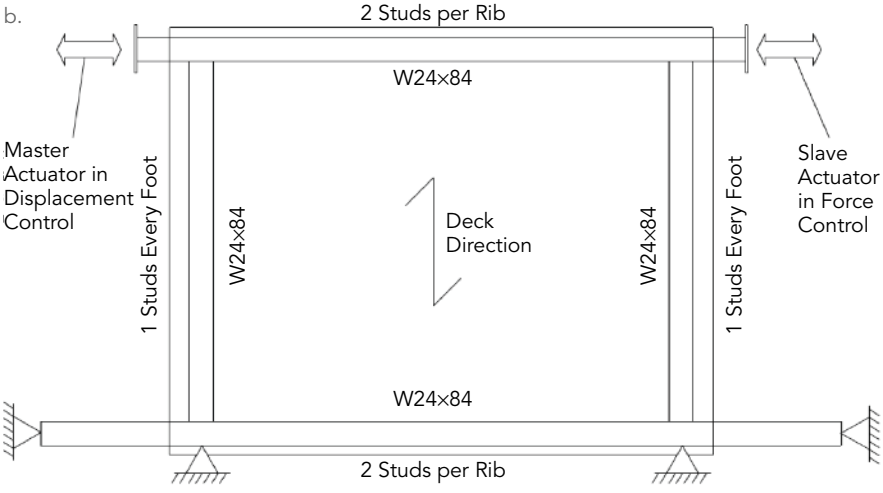


Figures 2a, a monotonic pushout test setup, and 2b, a new testing rig for cyclic and monotonic pushout tests.

Cantilever Composite Deck Diaphragm Tests

Cantilever composite deck diaphragm tests are also underway (Figure 3a). In these specimens, the composite deck is connected with perimeter studs to a steel frame, with the frame restrained at one side and cyclic displacements applied at the other side (Figure 3b). A total of six specimens will be tested to investigate effects deck depth, slab thickness, perimeter stud configuration and lightweight vs. normal-weight concrete. Four specimens have been designed to fail from diagonal concrete cracking, and two will be limited by the strength of the perimeter shear stud anchors. ■

Figures 3a, a cantilever composite deck specimen after testing, and 3b, a schematic of the test setup.



This article is a preview of the session "Seismic Behavior and Design of Steel Diaphragms" at the 2019 NASCC: The Steel Conference, taking place April 3-5 in St. Louis. For more information and to register, visit ***www.aisc.org/nascc****. The research described in the session will also be discussed in the Second Quarter 2019 issue of* Engineering Journal *(****www.aisc.org/ej****), which will be available in April.*

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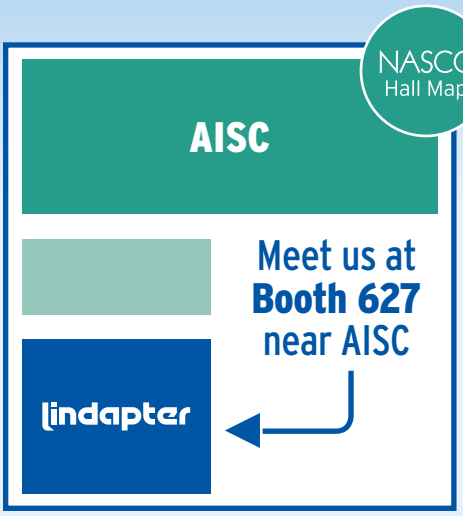

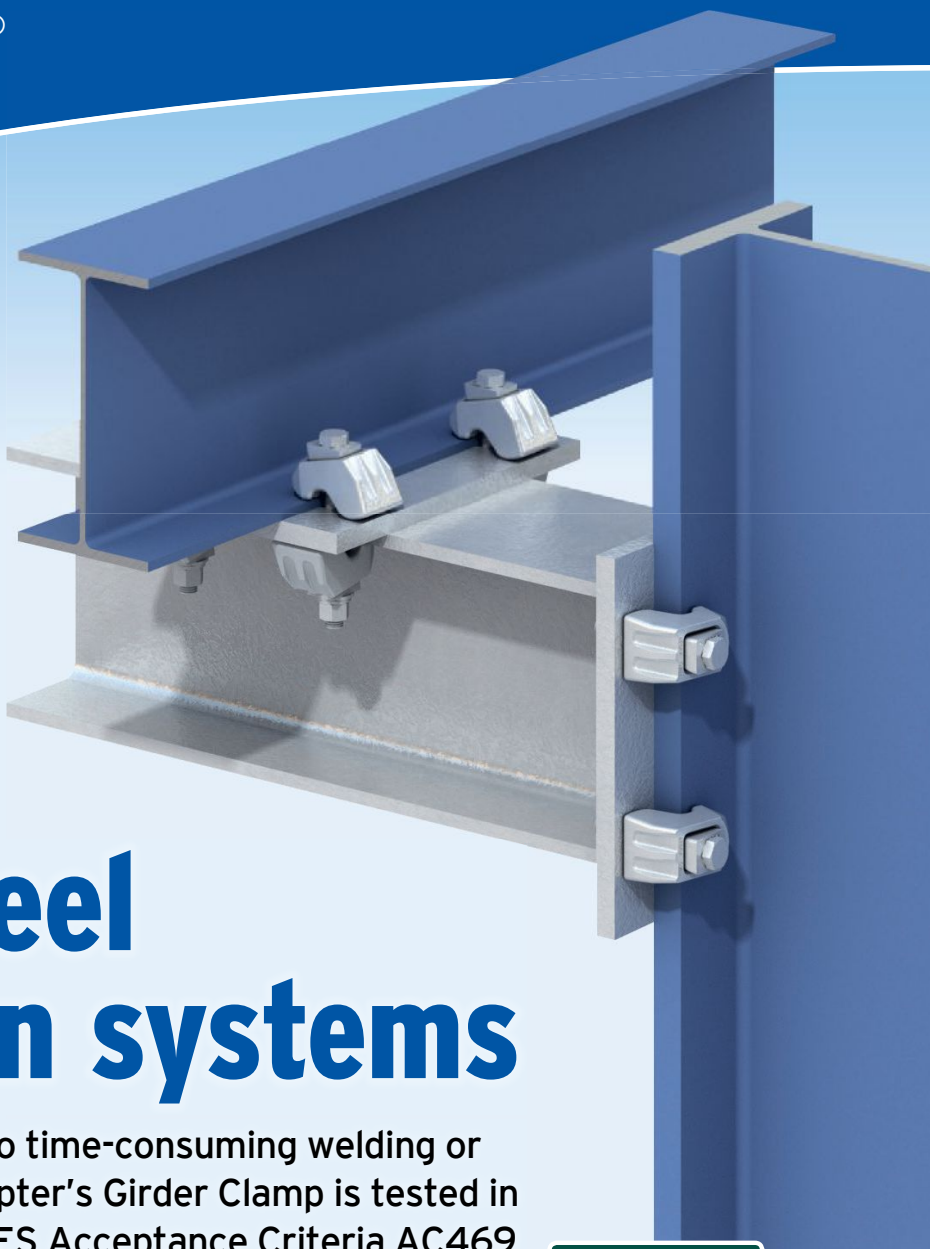

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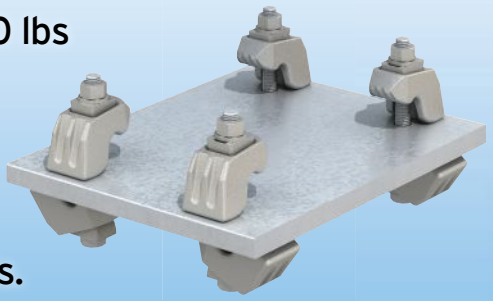

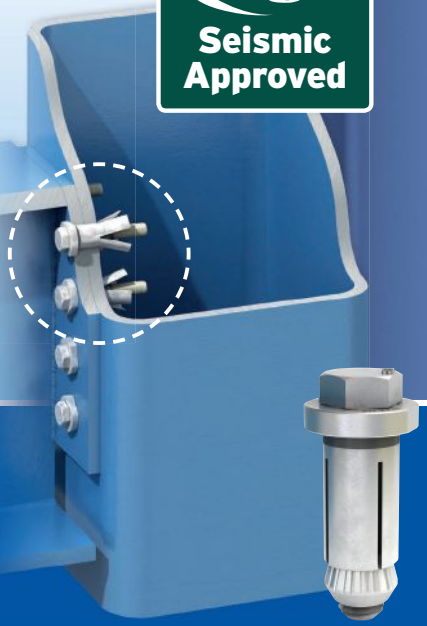

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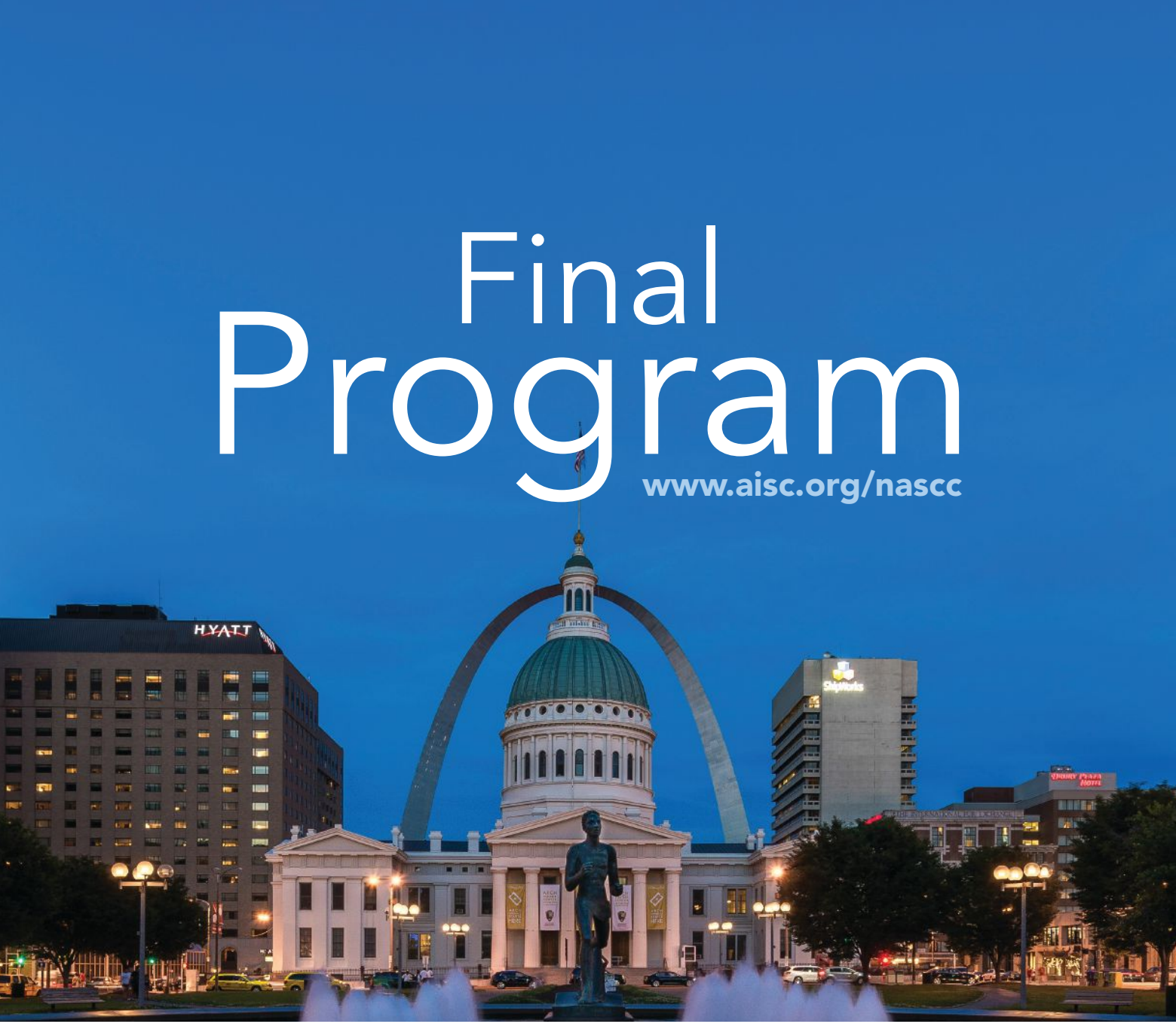

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Registration Desk and Tickets

Stop at the registration desk to register, pick up your credentials or to purchase event tickets. The registration desk is located in the Plaza Lobby on Level 1 of the convention center (see map and hours on foldout). You must wear your conference badge to all official conference events. The Conference Dinner, guest tours and short courses require a ticket for entry. The W and Th icons printed on your badge serve as your ticket to the lunches.

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Already registered? Visit the express registration kiosks to quickly print credentials. To expedite the process, simply scan the barcode located on your registration confirmation (either printed or mobile version). The kiosks are located in the Plaza Lobby on Level 1.

Conference Proceedings

The Steel Conference does not offer a conventional proceedings. Instead, approximately 45 days after the conference, we post slideshows (complete with audio from the presentations) of most of the sessions to our education archives at **www.aisc.org/educationarchives**. Proceedings for the SSRC Conference and WSBS will be also be available in the archives.

AISC Code of Conduct

The American Institute of Steel Construction is a national trade association and technical institute representing the interests of the fabricated structural steel industry. We have pride in the outstanding work of our staff and volunteers, all of whom contribute to the advancement of the use of steel in buildings and bridges. As such, we expect all of our staff, volunteers and participants in any AISC activities to behave appropriately and also to refrain from any action or language that is discriminatory or harassing.

Policy on Children

The nature and amount of equipment on display at The Steel Conference makes the exhibit floor potentially dangerous for children. Children 12 and under are not permitted on the exhibit floor.

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Attendees earn one professional development hour (PDH) for each hour of participation at a technical session at The Steel Conference (One PDH is equivalent to 0.1 CEU). Additionally, AISC is a Registered Provider with The American Institute of Architects Continuing Education System (AIA/CES), and some sessions are approved for AIA continuing education credit (LU or LU/HSW). Some industry and business focused sessions may not align with the PDH criteria for licensure requirements and have been assigned Attendance credit (AU). Session credit information (PDH, LU, LU/HSW and AU) can be found in the program and in The Steel Conference mobile app. It is ultimately up to the individual to determine whether or not the content of a session meets the requirements for his or her particular licensure. In all cases, the credits earned will be noted on the attendee's certificate.

A numeric session-specific code will be given during each session so only those who participate will have access to the code. It is critical that you keep track of your session codes as this is the only way you will be able to obtain your credits. For your convenience, you can keep track of the codes on page 122 or in The Steel Conference mobile app. Register your credit hours on the mobile app or at **www.aisc.org/nasccpdh**. Alternatively, there will be two credit recording stations located on Level 2 across from Room 260. Following submission of the corresponding codes, you can download or email yourself a PDF of your certificate. If you're having trouble registering your credits, please find us at the registration desk or contact us at **nascc@aisc.org**.

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Hotel and tour shuttles will depart from the convention center's Plaza Entrance. The Conference Dinner shuttles will depart from the entrance on Washington Avenue. Please refer to the mobile app for the shuttle schedule. More information about guest tours and ticket availability are available at the registration desk (hours listed on foldout). AISC reserves the right to cancel or modify tours based on attendance.

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short courses

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SC1 Tuesday 1:00 – 5:00 p.m. | **room 260**

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Engineers 4.0 PDHs/AU

SSRC Short Course

Nonlinear Structural Analysis Methods Used in Modern Steel Design

SC2 Tuesday 1:00 – 5:00 p.m.. | **room 261**

Speakers: Barry T. Rosson, PE, PhD,
Florida Atlantic University

$325 members* | $450 non-members

*The following qualify for Member pricing:
AISC, CISC, NSBA, IMCA, SSRC, NISD

Registration is required for this short course.

Per Chapter C of AISC's *Specification for Structural Steel Buildings*, second-order effects, geometric imperfections, and stiffness reductions due to inelasticity and residual stresses must be considered. Modern-day software programs are capable of analyzing these conditions, but designers who use them need to have a fundamental understanding of how these nonlinear analyses are completed, which elements of structural behavior are included and which are neglected, and the degree to which various methods of analysis have inherent limitations that can affect solution accuracy and consistency.

This course will provide an overview of: modeling geometric imperfections directly versus with notional loads; equilibrium in the deformed configuration using an incremental second-order analysis approach versus the approximate amplification methods in Appendix 8; elastic critical load analysis versus alternate methods to determine effective length factors; inelastic behavior and analysis of steel beams and frames; and analysis of alternating loads that produce shakedown and incremental collapse conditions.

Engineers 4.0 PDHs/AU

Seismic Design Manual, 3rd Edition, and Applications of the 2016 AISC *Seismic Provisions*

SC3 Saturday 8:00 a.m. – 5:00 p.m.. | **room 261**

Speakers: Thomas A. Sabol, Englekirk Institutional

$425 members* | $650 non-members

*The following qualify for Member pricing:
AISC, CISC, NSBA, IMCA, SSRC, NISD

Registration is required for this short course. *Seismic Design Manual*, 3rd Ed. available for purchase at the onsite bookstore.

This short course introduces the 2019 Louis F. Geschwindner Seminar Series on the 2016 AISC *Seismic Provisions* and the 3rd Edition of the *Seismic Design Manual*. It highlights proper application of key design and detailing requirements and introduces important technical changes in the recently updated *Seismic Provisions*. Design examples from the new 3rd Edition of the *Seismic Design Manual* will be included.

Engineers 8.0 PDHs/AU

1.0 PDH = 0.1 CEU; Attendance credits = AU
(check with your state licensing board for eligibility for professional credits)

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7:00 – 9:00 a.m.		room	for
J1	Fostering Innovation in Structural Steel	124	J

8:00 – 9:00 a.m.		room	for
A1	Designing for Membrane Architecture	127	E F A
E1	Ethical Cultures of High-Performance Organizations	274	E F R D
H1a	**Retractable Stadium Roofs – Challenges in Design and Construction of Large Mechanized Structures**	**275**	**E A**
L1a	Structural Fire Engineering: A Powerful Sanctioned Design Option	264	E
L15a	**Traditional and Advanced Methods for Assessing Ponding Instability**	**276**	**E**
LL1	What You Need to Know About Defending and Prosecuting Claims – Before You Get into a Dispute	132	E F R D
M1a	Post-Earthquake Reconstruction of Christchurch: Steel City New Zealand	263	E
P6	*Code of Standard Practice*: Preface, Glossary, and Sections 1, 2 & 9 – Understanding Their Legal Implications	231	E F R D
R1	Heavy and Complicated Lifts – Risks, Uncertainties and What to Look Out For	260	E R
Q1	AISC Certification Forum	225	F R
B1	Improving the Quality of Steel Bridge Fabrication through Communication	130	E
B2	Pedestrian Bridges – Unique Design and Analysis	131	E D
S1	Advances in Stability Analysis	241	E

1.0 PDHs/0.10 CEUs

9:15 – 10:15 a.m.		room	for
A2	Trends in Construction for Architects	127	E A
CS2	The Gateway Arch – Unique Perspectives	263	E F R D A
H2a	**Designing with Complex Geometries**	**275**	**E F R D A**
L2a	Design Column Reinforcement	264	E
L7b	Properly Specifying Steel Deck	230	E
L17a	**Drawing Details: The Good, the Bad, and the Ugly**	**276**	**E**
LL3	It's Time to Take Another Look at Your Subcontracts	132	E F R D
M2a	Let's Talk Seismic – In Language We Can All Understand	274	E A
P7	Get What You Want from the EOR and GC	231	F R
R2	*Code of Standard Practice*: Section 7 – An Erector's Perspective	260	E F R D
Z2	Tackling the Skilled Trade Shortage	240	E F R
Q2	What Do AISC Certification Complaints and Appeals Policies Mean to Specifiers and Participants?	225	F R
B3	Research and Construction of Press-brake-formed Steel Tub Girder Bridges	130	E F
B4	New and Exciting Changes to Welding for Bridges	131	E F D
S2	Stability of Beams and Girders	241	E
EW1*	Our Renewed Customer Focus	261	–
EW2*	The Fasten-ating Technology Behind Mechanical Deck Fasteners from Design to Inspection	265	–

1.0 PDHs/0.10 CEUs

10:30 a.m. – 12:15 p.m.		room	for
K1	KEYNOTE: The Power of Contrarian Thinking	America's Ballroom	ALL

1.0 PDHs/0.10 CEUs

noon – 2:00 p.m.
Boxed Lunch in Exhibit Hall
Must have (W) icon on badge.
Exhibit Hall opens

1:30 – 3:00 p.m.		room	for
C8a	**What I Didn't Have Time to Say in Baltimore**	**275**	**E F R D**
H3a	AISC Research: Seismic Evaluation and Retrofit of Concentrically Braced Frames	263	E
H4a	Lessons From the First SpeedCore Project	231	E F R D A
L5	The Learning Never Stops: Going Beyond a College Education	230	E
L11a	Design Guide 7: Industrial Buildings – Roofs to Anchor Rods	267	E F D
L13a	Retrofit of Existing Buildings With Steel Joists	240	E
L16a	**Structural Vibration Serviceability: FAQs and More**	**276**	**E**
LL2	Defending and Prosecuting Delay Claims	132	E F R D
M3a	The AISC 3rd Edition *Seismic Design Manual*	274	E F R
M9	Seismic Risk Assessment of Buckling Restrained Braces – Including Evaluation of Brace Residual Capacity and Building Performance – Part 1	224	E
M11a	To 3 or Not to 3	264	E
P1	Understanding Your Assets as a Manager	260	E F R D
P5	The Top 10 Things Guaranteed to Escalate Conflict (And How to Avoid Them)	127	E F R D
RT1	Fabricator Roundtable	124	F
Q3	Let's Set that Goal!	225	F R
B5	Redundancy of Steel Bridges – Part 1	130	E
B7	It's All in the Details	131	E F R D
S3	Stability under Seismic Loading	241	E
EW3*	Approaches to Connection Design: Break the Limits of Hand-Calculations with CBFEM-based Tools	261	–
EW4*	Reliability from Design to Inspection: Save Yourself the Struggle with Safe Set	265	–

1.5 PDHs/0.15 CEUs

Bolded sessions are streamed. *Exhibitor Workshops do not provide PDH/CEU credits.

Key
A | Architects D | Detailers E | Engineers R | Erectors F | Fabricators J | Educators

schedule-at-a-glance | wednesday

3:15 – 4:45 p.m.		room	for
C1a	**Engineers: Getting the Welds You Want and Need**	**276**	**E**
C6a	Thermal Steel Bridging Quantification and Solutions in Steel-Framed Structures	263	E F R D A
C7a	30+ Good Rules of Connection Design: Round 2	274	E F R D
CS1	The Structural Stability Game Show	267	E F R D
H5a	SpeedCore and Composite Plate Shear Walls: Current Research and Developments	230	E F R D
L9a	Properly Specifying Steel Joists	231	E
L10a	**New Design Guide 35 – *Storm Shelter and Safe-Room Design***	**275**	**E**
L14	What Not To Draw	127	E F R A
L18a	Distortion of Curved Members	264	E
LL5	Avoiding "Bet the Company" Legal Mistakes	132	E F R D
M4	Healthcare Design in High Seismic Areas: Old and New	240	E F A
M10	Seismic Risk Assessment of Buckling Restrained Braces – Including Evaluation of Brace Residual Capacity and Building Performance – Part 2	224	E
P2	Effectively Influence Others to Optimize Results	260	E F R D
Q4	Teamwork: No One in this Room is Smarter than All of Us	225	F R
B6	The Steel Advantage in Accelerated Bridge Construction	130	E F R D
B8	Steel Bridge Rehabilitation, Retrofit, and Reuse – Part 1	131	E F R
S4	Presentation Session for Beedle and McGuire Awards	241	E
EW5*	The Tekla PowerFab Workflow: Increased Control, Accuracy and Visibility Throughout Your Fabrication Process	261	–
EW6*	Staying on Top of Seismic Standards	265	–

1.5 PDHs/0.15 CEUs

5:00 – 6:00 p.m.		room	for
A3	Promoting Health and Wellness Through Design	127	E A
D5	What Erectors Love to Hate about Steel Detailers	267	F R D
L3a	Proactive Fracture and Fatigue Design in Steel	240	E
L8a	**Your *Code of Standard Practice* – Sections 3 and 4**	**275**	**E**
LL4	Due Diligence: Warning Flags Before You Submit Your Bid	132	E F R D
M5a	Design of Multi-Tiered Braced Frames	224	E
P8	Effective Project Management	231	E F R D
R3	Establishing an Effective Field Leadership Mentoring Program for Erectors	260	R
T3	The AISC Guide to BIM/Modeling	264	E F R D
Z6	**The Crystal Ball: Construction Market Conditions and Forecasting for Both Buildings and Bridges**	**276**	**E F R D A**
Q5	Areas of Concern and Corrective Action Requests: Streamlining the Process and Talking About the Root Cause	225	F R
B9	The Rehabilitation of the Pulaski Skyway Bridge	130	E F R D
B10	Design and Maintenance of Steel Bridges for Corrosion Control	131	E F D
S5	Stability at Elevated Temperatures	241	E

1.0 PDHs/0.10 CEUs

5:30 – 7:00 p.m.
Welcome Reception in Exhibit Hall

7:30 p.m.
Movie Night at NASCC: The Steel Conference
America's Ballroom

schedule-at-a-glance | thursday

7:00 – 7:45 a.m.		room	for
EW7*	The GIZA Process: A Collaborative Connection Design Method	261	–
EW8*	Steel Connection Design: CANCELLED Why Should Steel Detailers Care?	265	–

8:00 – 9:00 a.m.		room	for
A4	Salesforce Transit Center	127	E A
C3a	Kinked Connections – What Are They and Why Should I Care	274	E F
D1	Training Your Detailers for Quality	267	E F D
L2b	**Design Column Reinforcement**	**276**	**E**
L4a	Insidious Thermal Forces in Steel Structures: What You Need to Know	231	E A
L20a	Concrete Filled HSS	240	E
LL7	Legal Implications of Electronic Data Transfer	132	E F R D A
M8a	**Alternative Seismic Systems**	**275**	**E**
P9	Job Preplan	260	E F R D
R7	Why Do I Need My Temporary Bracing Plan Stamped?	263	E F R D
T1	Get Control of Shop Information	264	F
Q6	What Does "Management Review" Really Mean?	225	F R
B11	Steel Bridge Design and Practice in Europe and Japan	130	E F R D
B12	Fatigue: Unique Loading & Crack Detection Technology	131	E F D
S6	Stability Considerations for Localized Conditions	241	E
EW9*	RISA-3D | Fresh New Look, Same Powerful RISA	261	–

1.0 PDHs/0.10 CEUs

9:30 a.m. Exhibit Hall opens

9:15 – 10:15 a.m.		room	for
A5	Architecturally Exposed Structural Steel (AESS): Communicating for Success	127	E F R A
C2a	Bracing Success with Delegated Connection Design	132	E F D
D3	Detailing: It's Not Just That Anymore	267	F D
E2a	Engineering Ethics: When to Report Violations	231	E
G2	Overview of the Steel Forming Process	263	E F R D A
L6a	RFIs and the Waiting Game	224	E F D
L12a	**Lateral Load Transfer – From Diaphragm to Resisting Elements**	**276**	**E**
L19a	HSS: What Designers Should Know about HSS Dimensions and Material Availability	260	E F R D
P10	Fundamentals of Project Scheduling for Steel Fabrication	240	E F R D
T2	What Your Detailing Software Wished You Knew	274	E F D
Y1	**From Engineer to Field – Eliminating Problems**	**275**	**E R**
Q7	I Have a Quality Manual and Procedures – Now What?	225	F R
B13	Steel Bridge Design Resources: Introduction and Application	130	E
B14	Challenging and Unique Projects – Part 1	131	E
S7	Stability of Plates and Shells	241	E
EW10*	Streamlining Fabricator/ Erector Workflows	261	–
EW11*	Tekla Structural Designer: True BIM for Structural Engineers	265	–

1.0 PDHs/0.10 CEUs

Bolded sessions are streamed.
*Exhibitor Workshops do not provide PDH/CEU credits.

10:30 – 11:45 a.m.		room	for
K2	KEYNOTE: The Joy of Steel... So Many Possibilities	America's Ballroom	ALL

1.0 PDHs/0.10 CEUs

noon – 2:00 p.m.

Boxed Lunch in Exhibit Hall **Must have Th icon on badge.**

noon – 1:00 p.m.		room	for
H2b	Designing with Complex Geometries	231	E F R D A
J2	SCIS Afternoon Session and Lunch (noon – 1:30 p.m., no PDH/CEUs provided)	100–105	S
L1b	Structural Fire Engineering: A Powerful Sanctioned Design Option	132	E
L7a	**Properly Specifying Steel Deck**	**275**	**E**
L15b	Traditional and Advanced Methods for Assessing Ponding Instability	127	E
L17b	Drawing Details: The Good, the Bad, and the Ugly	274	E
M12a	**Seismic Behavior and Design of Steel Diaphragms**	**276**	**E F R D**
R4	Filling the Skills Gap for Ironworkers	260	F R
Y2	Cr**CANCELLED**ing Basics 101	263	E R
Z5	The Importance of Project Setup	267	E F R D
Q8	The New Certification Standard: Update for Erectors	225	R
B15	A Second Look at Corrosion: Uncoated Weathering Steel Update & High-Performance Coatings in Florida	130	E F
B16	Challenging and Unique Projects – Part 2	131	E F R D
S8	Stability of Connections and Assemblages	241	E
EW20*	RAM Structural System: How Productive Do You Want to Be?	265	–

1.0 PDHs/0.10 CEUs

2:00 – 3:30 p.m.		room	for
C1b	Engineers: Getting the Welds You Want and Need	224	E
C5a	Casting Away and Forging Ahead	230	E F A
C7b	30+ Good Rules of Connection Design: Round 2	274	E F R D
D2	Introduction to AISC Design Guide 34: *Steel Framed Stairway Design*	267	E F D A
H3b	AISC Research: Seismic Evaluation and Retrofit of Concentrically Braced Frames	263	E
H5b	SpeedCore and Composite Plate Shear Walls: Current Research and Developments	231	E F R D
J3	SCIS Direct Connect (1:30 – 3:00 p.m., no PDH/CEUs provided)	100–105	S
L9b	**Properly Specifying Steel Joists**	**276**	**E**
L10b	New Design Guide 35 – *Storm Shelter and Safe-Room Design*	264	E
L13b	**Retrofit of Existing Buildings With Steel Joists**	**275**	**E**
L16b	Structural Vibration Serviceability: FAQs and More	127	E
LL6	Crisis Management – Workplace Disasters	132	E F R D
M6	Seismic Design for Non-West Coast Engineers – Part 1	240	E
P3	Build Teamwork that Works to Win	260	E F R D
RT2	Industry Roundtable	124	F R D
Q9	Steel Erectors Panel Discussion on Quality Control	225	R
B17	Redundancy of Steel Bridges – Part 2	130	E
B18	Long Span Bridges	131	E F R D
S9	Topics in Lateral-Torsional Buckling	241	E
EW12*	BIM and BRIM for Misc. Metals	261	–
EW13*	Designing and Specifying Structural Connections using Fluorogold Slide Plates	265	–

1.5 PDHs/0.15 CEUs

3:15 p.m. – 4:15 p.m. Coffee Break in Exhibit Hall

4:00 – 5:30 p.m.		room	for
C5b	**Casting Away and Forging Ahead**	**275**	**E F A**
C6b	Thermal Steel Bridging Quantification and Solutions in Steel-Framed Structures	230	E F R D A
C8b	What I Didn't Have Time to Say in Baltimore	231	E F R D
H4b	**Lessons from the First SpeedCore Project**	**276**	**E F R D A**
L11b	Design Guide 7: Industrial Buildings – Roofs to Anchor Rods	264	E F D
L18b	Distortion of Curved Members	263	E
M3b	The AISC 3rd Edition *Seismic Design Manual*	240	E F R
M11b	To 3 or Not to 3	267	E
M7	Seismic Design for Non-West Coast Engineers – Part 2	224	E
P4	The Art of Negotiation	260	E F R D
P13	Tales from the Dark Side	124	E F R D
T4	Best Practices for Model Review: An Update	127	E F D
Z4	Solutions for Equity in the Design Industry	274	E F R D A
Q10	Let's Get Down to the Nuts and Bolts (and Welding Electrodes): All About Jobsite Storage	225	R
B19	Steel Bridge Rehabilitation, Retrofit, and Reuse – Part 1	130	E F D
B20	Challenges Encountered During Construction and Demolition	131	E R
S10	Topics in Local Stability	241	E
EW14*	Effective Connection Design Software Tools for Your Project	261	–
EW15*	AISC Advanced Steel Design in RFEM	265	–

1.5 PDHs/0.15 CEUs

7:00 p.m. – 10:00 p.m.

Conference Dinner – Anheuser-Busch Brewery

Cost: $85. Conference Dinner Tickets are included with Full Registration. Exhibitors and other registration types may purchase tickets online or at the registration desk.

exhibitor product demos | 10:00 a.m. – 3:20 p.m.

Hall 1 | Stage 1		time
PS1	Introducing Tekla PowerFab: The Complete Fabrication Solution	10:00 – 10:20 a.m.
PS2	XT Plugins – Modeling Automation in Tekla	11:00 – 11:20 a.m.
PS3	GIZA 19.0 – The Latest in Connection Design Software	11:30 – 11:50 a.m.
PS4	The Complete Workflow for Structural BIM	noon – 12:20 p.m.
PS5	Structural Analysis and Design in RFEM	1:00 – 1:20 p.m.
PS6	Fluorogold & GRM Side Plates	10:30 – 10:50 a.m.
PS7	Would You Pass an AISC Audit?	2:00 – 2:20 p.m.
PS8	Cracking the Code: What Does Your Customer Really Want?	2:30 – 2:50 p.m.
PS9	New RISA-3D Tools to Elevate Your Workflow	3:00 – 3:20 p.m.

Key

A | Architects D | Detailers E | Engineers R | Erectors F | Fabricators S | Students

7:00 – 7:45 a.m.		room	for
EW16*	Seamless Structural Analysis Utilizing RFEM and Revit/Tekla	261	–

8:00 – 9:00 a.m.		room	for
C4	**Partially Restrained Connections (25 years later) – Current Views From Past Higgins Award Winners**	**275**	**E F**
D4	Connection Design Efficiency Loss	267	E F R D
E2b	Engineering Ethics: When to Report Violations	274	E
G1	Whole-Building Life-Cycle Assessment	127	E A
H1b	Retractable Stadium Roofs – Challenges in Design and Construction of Large Mechanized Structures	231	E A
L6b	RFIs and the Waiting Game	264	E F D
L8b	Your *Code of Standard Practice* – Sections 3 and 4	263	E
L19b	**HSS: What Designers Should Know about HSS Dimensions and Material Availability**	**276**	**E F R D**
P11	Effective Communication for Project Managers	260	E F R D
Z3	Structural Engineering Engagement and Equity (SE3): 2018 Survey Results	132	E
Q11	The Paint Certification Primer	225	F
B21	New AASHTO ABC Guide Specification & Unique Projects	130	E F R D
B22	Technologies to Assist with Bridge Design, Fabrication, and Construction	131	E F R D
S11	Stability of Columns	241	E

1.0 PDHs/0.10 CEUs

9:00 a.m. Exhibit Hall opens

9:15 – 10:15 a.m.		room	for
C2b	**Bracing Success with Delegated Connection Design**	**275**	**E F D**
C9	Connection Dialogue	132	E F D
L3b	Proactive Fracture and Fatigue Design in Steel	231	E
M8b	Alternative Seismic Systems	127	E
M12b	Seismic Behavior and Design of Steel Diaphragms	274	E F R D
P12	**Your *Code of Standard Practice* – Sections 5, 6 and 8**	**276**	**F**
R5	What's New in the Realm of Safety?	260	E F R
Y3	Specification of Intumescent Fire Resistive Coatings	240	E F
Q12	The Real Secret of Calibration	225	F R
B23	2018 Prize Bridges	130	E F R D
B24	Steel Bridge Rehabilitation, Retrofit, and Reuse – Part 3	131	E F R D
S12	Stability of Structural Systems	241	E
EW17*	From Design and Analysis to Detailing and Fabrication with Autodesk Revit, Robot and Advance Steel	261	–
EW18*	Resilient Seismic Design of Steel Special Moment Frame Buildings using the Simpson Yield-Link Connection	265	–

1.0 PDHs/0.10 CEUs

10:15 – 10:45 a.m. Snack in the Exhibit Hall

10:45 – 11:45 a.m.		room	for
C3b	Kinked Connections – What are They and Why Should I Care?	132	E F
CS3	The Wilshire Grand Center	267	E F R D A
L4b	Insidious Thermal Forces in Steel Structures: What You Need to Know	263	E A
L12b	Lateral Load Transfer – From Diaphragm to Resisting Elements	264	E
L20b	**Concrete Filled HSS**	**275**	**E**
M1b	Post-Earthquake Reconstruction of Christchurch: Steel City New Zealand	274	E
M2b	**Let's Talk Seismic – In Language We Can All Understand**	**276**	**E A**
M5b	Design of Multi-Tiered Braced Frames	240	E
R6	Don't Be "Rig Poor"! – Understanding the Process of Sizing the Right Crane for Your Steel Erection Project	260	E F R
Z1	Working ON Your Business, Not Just IN Your Business	127	E F R D
B25	Rating and Evaluation of Existing Steel Bridges	130	E
B26	Advances in the Design Code & AASHTO Design Code Compared to International Codes	131	E
S13	Special Topics in Structural Stability	241	E
EW19*	Implications of Recent Advances to the FEMA P-58 Methodology for Resilient BRBF Design	261	–

1.0 PDHs/0.10 CEUs

noon – 1:30 p.m.		room	for
K3	KEYNOTE: T.R. Higgins Lecture: Structural Stability – Letting the Fundamentals Guide your Judgment	America's Ballroom	ALL

1.0 PDHs/0.10 CEUs

Bolded sessions are streamed.
*Exhibitor Workshops do not provide PDH/CEU credits.

exhibitor product demos | 9:30 – 10:50 a.m.

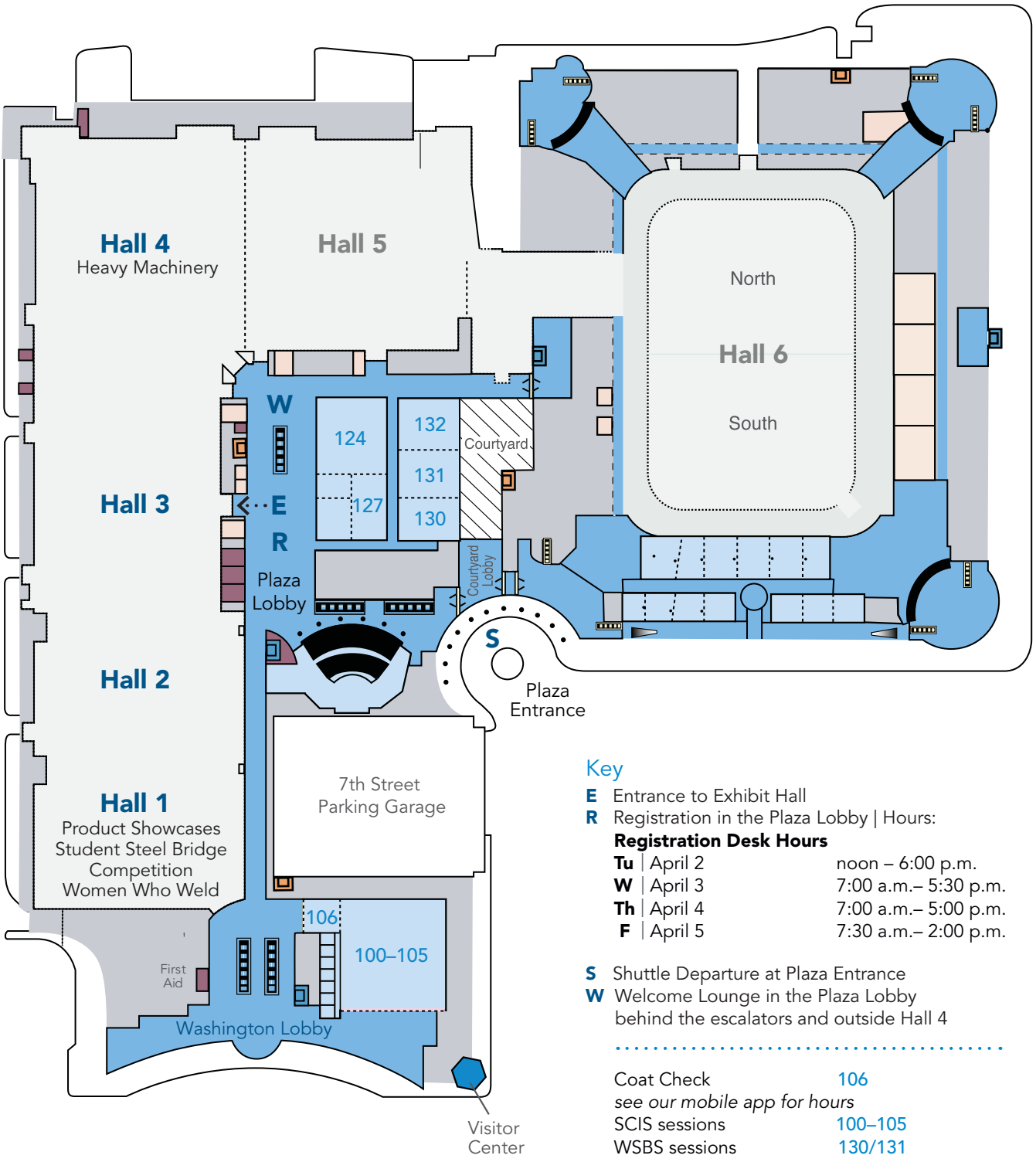
hall 1 | stage 1		time
PS10	IDEA StatiCa: The First Software that Code-checks Steel Connections of all Topologies and Loading, in Minutes	9:30 – 9:50 a.m.
PS11	The Complete Workflow for Structural BIM	10:00 – 10:20 a.m.
PS12	Fortosi: Software for Automating and Planning Truck Loading of Steel	10:30 – 10:50 a.m.

Key
A | Architects D | Detailers E | Engineers R | Erectors F | Fabricators

meeting rooms

N
W E
S

Level 1



Key

E Entrance to Exhibit Hall
R Registration in the Plaza Lobby | Hours:

Registration Desk Hours

Tu	April 2	noon – 6:00 p.m.
W	April 3	7:00 a.m.– 5:30 p.m.
Th	April 4	7:00 a.m.– 5:00 p.m.
F	April 5	7:30 a.m.– 2:00 p.m.

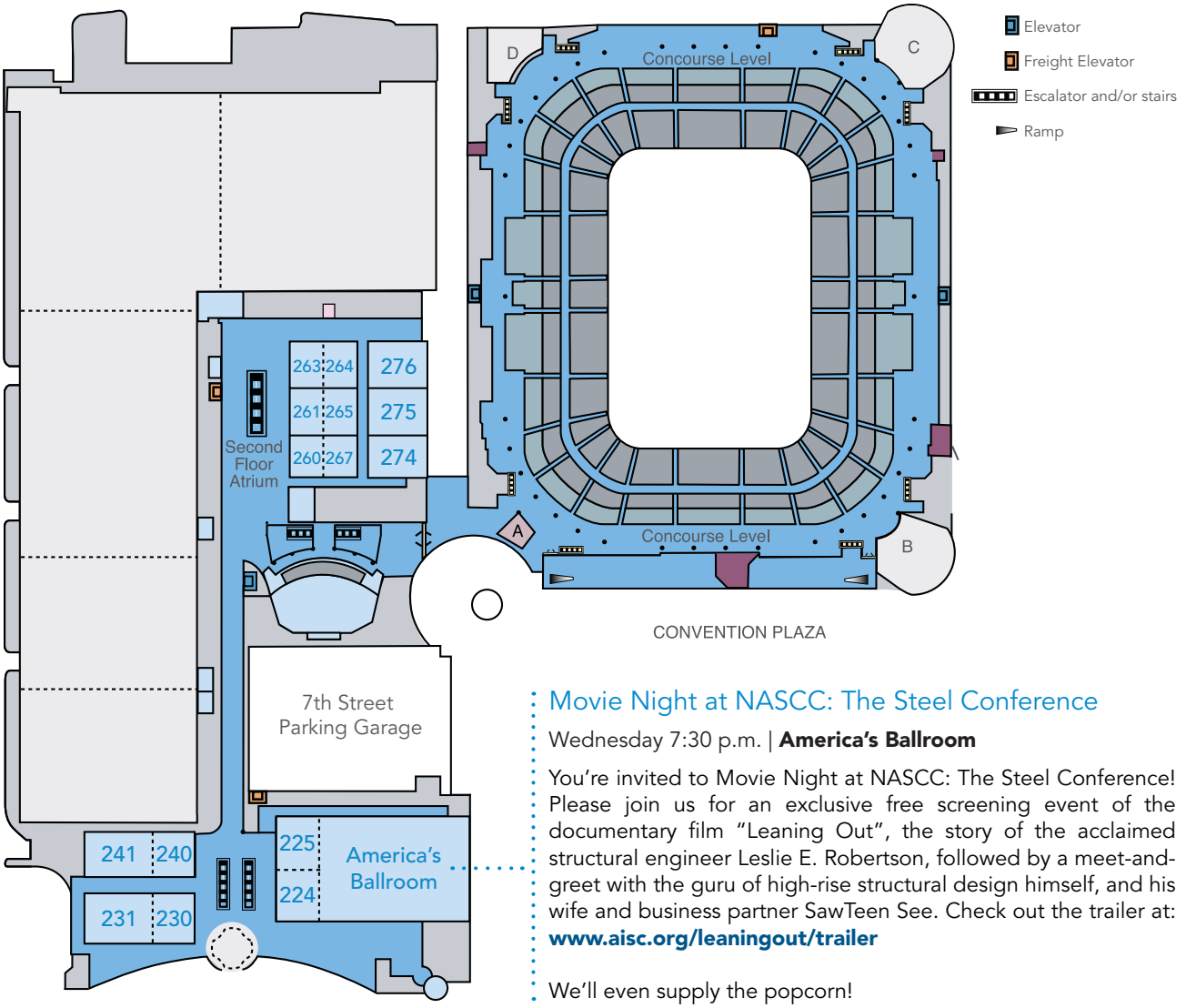
S Shuttle Departure at Plaza Entrance
W Welcome Lounge in the Plaza Lobby behind the escalators and outside Hall 4

Coat Check	106
see our mobile app for hours	
SCIS sessions	100–105
WSBS sessions	130/131

meeting rooms

N
W E
S

Level 2



Movie Night at NASCC: The Steel Conference

Wednesday 7:30 p.m. | **America's Ballroom**

You're invited to Movie Night at NASCC: The Steel Conference! Please join us for an exclusive free screening event of the documentary film "Leaning Out", the story of the acclaimed structural engineer Leslie E. Robertson, followed by a meet-and-greet with the guru of high-rise structural design himself, and his wife and business partner SawTeen See. Check out the trailer at: **www.aisc.org/leaningout/trailer**

We'll even supply the popcorn!

SEE YOU NEXT YEAR!

NASCC:
THE STEEL CONFERENCE

incorporating the World Steel Bridge Symposium and the SSRC Annual Stability Conference

in ATLANTA

Georgia World Congress Center | April 22–24, 2020

exhibit hall floor plan

America's Center | Halls 1–4

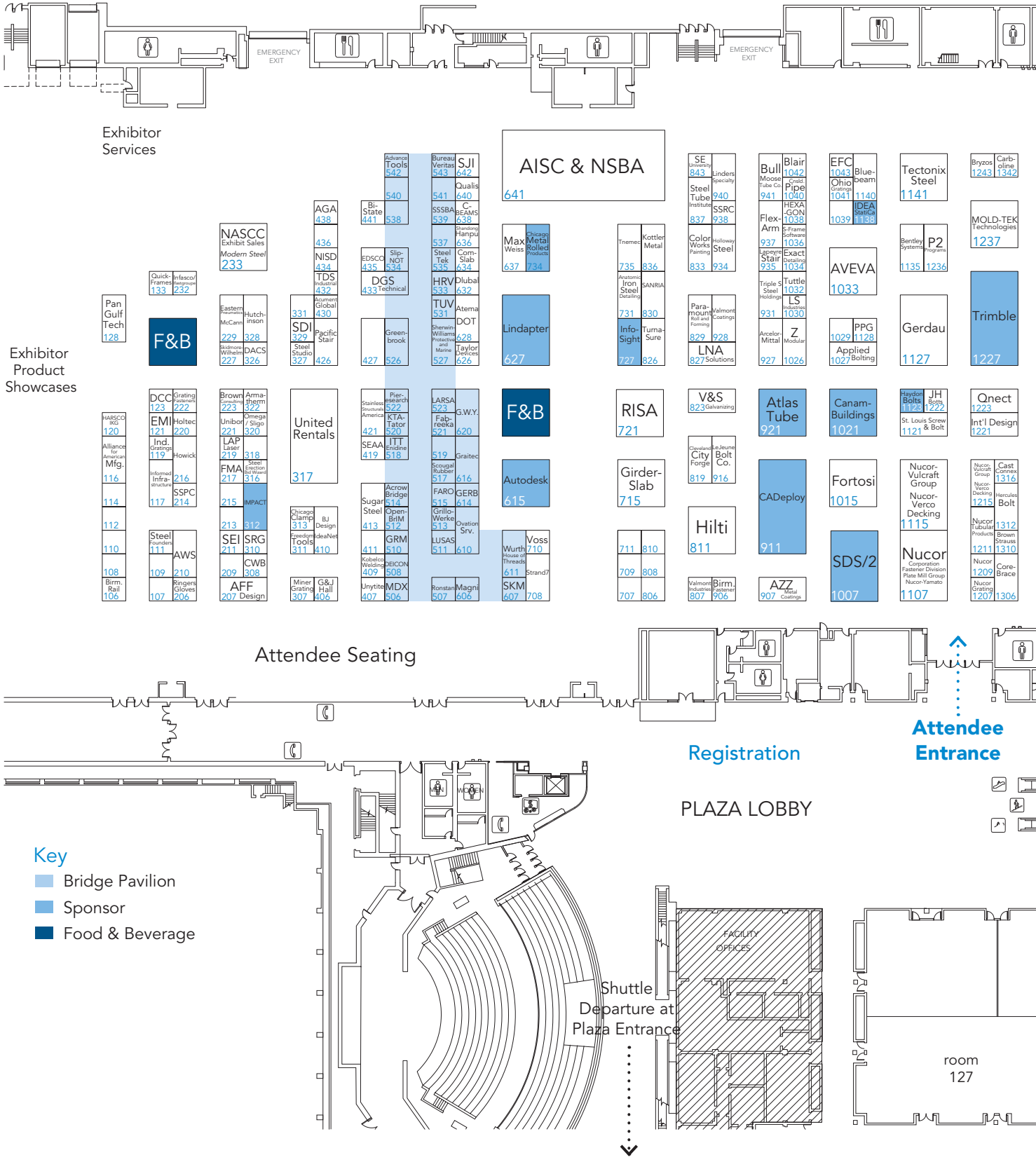


exhibit hall floor plan

America's Center | Halls 1–4

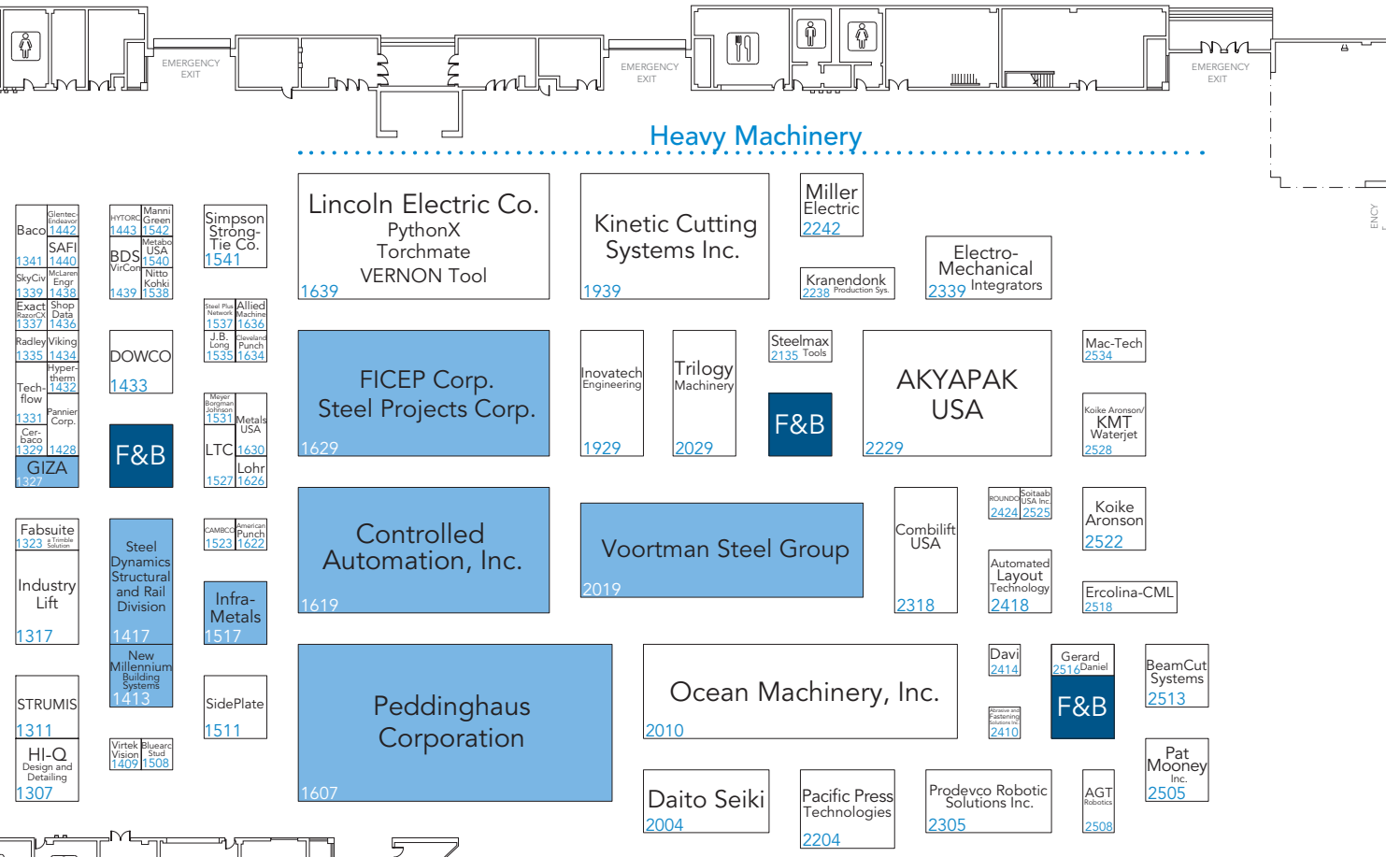


Exhibit Hall Hours

Wednesday | 4.3.19	**noon – 7:00 p.m.**
Lunch	noon – 2:00 p.m.
Welcome Reception	5:30 – 7:00 p.m.
Thursday | 4.4.19	**9:30 a.m. – 5:30 p.m.**
Lunch	noon – 2:00 p.m.
Coffee Break	3:15 – 4:15 p.m.
Friday | 4.5.19	**9:00 a.m. – 1:00 p.m.**
Snack Break	10:15 – 10:45 a.m.

Key

- Bridge Pavilion
- Sponsor
- Food & Beverage

exhibitor list by booth number

as of February 21

106 Birmingham Rail & Locomotive
111 Steel Founders Society of America
116 Alliance for American Manufacturing
117 Informed Infrastructure
119 Indiana Gratings Pvt. Ltd. – India
120 HARSCO IKG
121 Engineering Ministries International
123 Danny's Construction Company, LLC
128 Pan Gulf Technologies Pvt. Ltd.
133 QuickFrames USA
206 Ringers Gloves
207 AFF Design Services LLC
210 American Welding Society
211 Structural Engineering Institute of ASCE
214 SSPC: The Society for Protective Coatings
216 Howick Ltd.
217 Fabricators & Manufacturers Association
219 LAP Laser LLC
220 Holtec Consulting Pvt. Ltd.
221 Unibor
222 Grating Fasteners
223 Brown Consulting Services, Inc.
227 Skidmore-Wilhelm
229 Eastern Pneumatics & Hydraulics, Inc./ McCann Equipment Ltd.
232 Infasco / Ifastgroupe
233 *Modern Steel Construction* magazine
307 Miner Grating Systems, a Powerbrace Company
308 CWB Group
310 SRG Onesource LLC
311 Freedom Tools LLC
312 Ironworkers / IMPACT
313 Chicago Clamp Company
316 Steel Erection Bid Wizard
317 United Rentals, Inc.
320 Omega Steel & Sligo Steel
322 Armatherm
326 DACS, Inc.
327 Steel Studio, Inc.
328 Hutchinson Industries, Inc.
329 Steel Deck Institute
406 G & J Hall Tools
407 Unytite, Inc.
409 Kobelco Welding of America, Inc.
410 BJ Design Services
410 IdeaNet Solutions Inc.
413 Sugar Steel Corporation
419 Steel Erectors Association of America
421 Stainless Structurals America
426 Pacific Stair Corporation
430 Acument Global Technologies
432 TDS Industrial Services Ltd.
433 DGS Technical Services, Inc.
434 National Institute of Steel Detailing, Inc.
435 EDSCO Fasteners
438 American Galvanizers Association
441 Bi-State Fabricators Association
506 MDX Software
507 Ronstan Tensile Architecture
508 DEICON
510 GRM Custom Products
511 LUSAS
512 OpenBrIM Platform
513 Grillo-Werke AG
514 Acrow Bridge
515 FARO Technologies Inc.
517 Scougal Rubber Corp
518 ITT Enidine
520 KTA-Tator
521 Fabreeka International, Inc.
522 Pieresearch
523 LARSA, Inc.
526 Greenbrook Engineering Services
527 Sherwin-Williams Protective and Marine
531 TUV Rheinland Industrial Solutions, Inc.
533 HRV Conformance Verification Associates, Inc.
534 SlipNOT Metal Safety Flooring
535 Steel Tek Unlimited
539 Short Span Steel Bridge Alliance
542 Advance Tools LLC
543 Bureau Veritas North America
606 Magni Group, Inc.
607 SKM Industries, Inc.
610 Ovation Services LLC
611 Wurth House of Threads
614 GERB Vibration Control Systems
615 Autodesk, Inc.
616 Graitec
620 G.W.Y., Inc.
626 Taylor Devices, Inc.
627 Lindapter
628 Atema Inc.
628 DOT Quality Services
632 Dlubal Software, Inc.
634 ComSlab
636 Shandong Hanpu Machinery Industrial Co., Ltd.
637 Max Weiss Co., LLC
638 C-BEAMS
640 Qualis Solutions, LLC
641 American Institute of Steel Construction (AISC)
641 National Steel Bridge Alliance (NSBA)
642 Steel Joist Institute
708 Strand7 Pty Ltd
710 Voss Engineering, Inc.
715 Girder-Slab Technologies, LLC
721 RISA
727 InfoSight Corporation
731 Anatomic Iron Steel Detailing
734 Chicago Metal Rolled Products
735 Tnemec Company, Inc.
807 Valmont Industries, Inc.
811 Hilti Inc.
819 Cleveland City Forge
823 V & S Galvanizing
826 TurnaSure, LLC
827 LNA Solutions
829 Paramount Roll and Forming, Inc.
830 SANRIA
833 Color Works Painting, Inc.
836 Kottler Metal Products, Inc.
837 Steel Tube Institute
843 SE University by SE Solutions, LLC
906 Birmingham Fastener
907 AZZ Metal Coatings
911 CADeploy, Inc.
916 LeJeune Bolt Company
921 Atlas Tube, A Division of Zekelman Industries
927 ArcelorMittal International
928 Valmont Coatings
931 Triple S Steel Holdings
934 Holloway Steel Services
935 Lapeyre Stair
937 FlexArm Inc.
938 Structural Stability Research Council
940 Linders Specialty Company, Inc.
941 Bull Moose Tube Company
1007 SDS/2
1015 Fortosi
1021 Canam-Buildings
1026 Z Modular, a division of Zekelman Industries
1027 Applied Bolting Technology, Inc.
1030 LS Industries
1032 TUTTLE A Dant Clayton Division
1033 AVEVA Inc.
1034 Exact Detailing
1036 S-Frame Software
1038 HEXAGON PPM
1040 Consolidated Pipe & Supply Company
1041 Ohio Gratings, Inc.
1042 Blair Corporation
1043 EFC International
1107 Nucor – Corporation
1107 Nucor – Fastener Division
1107 Nucor – Plate Mill Group
1107 Nucor – Yamato Steel Company
1115 Nucor – Verco Decking, Inc.
1115 Nucor – Vulcraft Group
1121 St. Louis Screw & Bolt
1123 Haydon Bolts, Inc.
1127 Gerdau
1128 PPG Protective & Marine Coatings
1135 Bentley Systems, Inc.
1138 IDEA StatiCa
1140 Bluebeam Inc.
1141 Tectonix Steel, Inc.
1207 Nucor Grating
1209 Nucor – Corporation
1209 Nucor – Fastener Division
1209 Nucor – Plate Mill Group
1209 Nucor – Yamato Steel Company
1211 Nucor Tubular Products
1215 Nucor – Verco Decking, Inc.
1215 Nucor – Vulcraft Group
1221 International Design Services, Inc.
1222 JH Botts LLC
1223 Qnect LLC
1227 Trimble
1236 P2 Programs
1237 MOLD-TEK Technologies Inc.
1243 Bryzos
1306 CoreBrace, LLC
1307 HI-Q Design and Detailing Pvt. Ltd.
1310 Brown Strauss Steel
1311 STRUMIS LLC
1312 Hercules Bolt Company
1316 Cast Connex Corporation
1317 Industry Lift
1323 Fabsuite, a Trimble Solution
1327 GIZA
1329 Cerbaco Ltd.
1331 Techflow Inc.
1335 Radley Corporation
1337 RazorCX Technologies
1337 Exact Detailing
1339 SkyCiv Engineering
1341 Baco Enterprises Inc.
1342 Carboline Company
1409 Virtek Vision International
1413 New Millennium Building Systems
1417 Steel Dynamics Structural and Rail Division
1428 Pannier Corporation
1432 Hypertherm Inc.
1433 DOWCO Consultants Ltd.
1434 Viking Blast & Wash Systems
1436 Shop Data Systems, Inc.
1438 McLaren Engineering Group
1439 BDS VirCon
1440 SAFI
1442 Glentec-Endeavor Engineering Inc.
1443 HYTORC
1508 Bluearc Stud Welding
1511 SidePlate Systems, Inc.
1517 Infra-Metals Co.
1523 CAMBCO, Inc.
1527 LTC, Inc.
1531 Meyer Borgman Johnson
1535 J. B. Long, Inc.
1537 Steel Plus Network
1538 Nitto Kohki U.S.A., Inc.
1540 Metabo USA
1541 Simpson Strong-Tie Co.
1542 Manni Green Tech USA Inc.
1607 Peddinghaus Corporation
1619 Controlled Automation, Inc.
1622 American Punch Company
1626 Lohr Structural Fasteners, Inc.
1629 FICEP Corporation
1629 Steel Projects Corp.
1630 Metals USA
1634 Cleveland Punch & Die Co.
1636 Allied Machine & Engineering
1639 Lincoln Electric Company
1639 PythonX, A Lincoln Electric Company
1639 Torchmate, A Lincoln Electric Company
1639 VERNON Tool, A Lincoln Electric Company
1929 Inovatech Engineering, A Lincoln Electric Company
1939 Kinetic Cutting Systems, Inc.
2004 Daito Seiki Co., Ltd.
2010 Ocean Machinery, Inc.
2019 Voortman Steel Group
2029 Trilogy Machinery, Inc.
2135 Steelmax Tools LLC
2204 Pacific Press Technologies
2229 AKYAPAK USA
2238 Kranendonk Production Systems BV
2242 Miller Electric Mfg. LLC
2305 Prodevco Robotic Solutions Inc.
2318 Combilift USA
2339 Electro-Mechanical Integrators, Inc.
2410 Abrasive and Fastening Solutions Inc.
2414 Davi, Inc.
2418 Automated Layout Technology LLC
2424 ROUNDO
2505 Pat Mooney Inc.
2508 AGT Robotics
2513 BeamCut Systems
2516 Gerard Daniel Worldwide
2518 Ercolina – CML USA, Inc.
2522 Koike Aronson, Inc.
2525 Soitaab USA Inc
2528 KMT Waterjet Systems
2528 Koike Aronson, Inc.
2534 Mac-Tech

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as of February 21

- Abrasive and Fastening Solutions Inc. 2410
- Acrow Bridge 514
- Acument Global Technologies 430
- Advance Tools LLC 542
- AFF Design Services LLC 207
- AGT Robotics 2508
- AKYAPAK USA 2229
- Alliance for American Manufacturing 116
- Allied Machine & Engineering 1636
- American Galvanizers Association 438
- American Institute of Steel Construction (AISC) 641
- American Punch Company 1622
- American Welding Society 210
- Anatomic Iron Steel Detailing 731
- Applied Bolting Technology, Inc. 1027
- ArcelorMittal International 927
- Armatherm 322
- Atema Inc. 628
- Atlas Tube, A Division of Zekelman Industries 921
- Autodesk, Inc. 615
- Automated Layout Technology LLC 2418
- AVEVA Inc. 1033
- AZZ Metal Coatings 907
- Baco Enterprises Inc. 1341
- BDS VirCon 1439
- BeamCut Systems 2513
- Bentley Systems, Inc. 1135
- Birmingham Fastener 906
- Birmingham Rail & Locomotive 106
- Bi-State Fabricators Association 441
- BJ Design Services 410
- Blair Corporation 1042
- Bluearc Stud Welding 1508
- Bluebeam Inc. 1140
- Brown Consulting Services, Inc. 223
- Brown Strauss Steel 1310
- Bryzos 1243
- Bull Moose Tube Company 941
- Bureau Veritas North America 543
- CADeploy, Inc. 911
- CAMBCO, Inc. 1523
- Canam-Buildings 1021
- Carboline Company 1342
- Cast Connex Corporation 1316
- C-BEAMS 638
- Cerbaco Ltd. 1329
- Chicago Clamp Company 313
- Chicago Metal Rolled Products 734
- Cleveland City Forge 819
- Cleveland Punch & Die Co. 1634
- Color Works Painting, Inc. 833
- Combilift USA 2318
- ComSlab 634
- Consolidated Pipe & Supply Company 1040
- Controlled Automation, Inc. 1619
- CoreBrace, LLC 1306
- CWB Group 308
- DACS, Inc. 326
- Daito Seiki Co., Ltd. 2004
- Danny's Construction Company, LLC 123
- Davi, Inc. 2414
- DEICON 508
- DGS Technical Services, Inc. 433
- Dlubal Software, Inc. 632
- DOT Quality Services 628
- DOWCO Consultants Ltd. 1433
- Eastern Pneumatics & Hydraulics, Inc./ McCann Equipment Ltd. 229
- EDSCO Fasteners 435
- EFC International 1043
- Electro-Mechanical Integrators, Inc. 2339
- Engineering Ministries International 121
- Ercolina – CML USA, Inc. 2518
- Exact Detailing 1034 | 1337
- Fabreeka International, Inc. 521
- Fabricators & Manufacturers Association 217
- Fabsuite, a Trimble Solution 1323
- FARO Technologies Inc. 515
- FICEP Corporation 1629
- FlexArm Inc. 937
- Fortosi 1015
- Freedom Tools LLC 311
- G & J Hall Tools 406
- G.W.Y., Inc. 620
- Gerard Daniel Worldwide 2516
- GERB Vibration Control Systems 614
- Gerdau 1127
- Girder-Slab Technologies, LLC 715
- GIZA 1327
- Glentec-Endeavor Engineering Inc. 1442
- Graitec 616
- Grating Fasteners 222
- Greenbrook Engineering Services 526
- Grillo-Werke AG 513
- GRM Custom Products 510
- HARSCO IKG 120
- Haydon Bolts, Inc. 1123
- Hercules Bolt Company 1312
- HEXAGON PPM 1038
- Hilti Inc. 811
- HI-Q Design and Detailing Pvt. Ltd. 1307
- Holloway Steel Services 934
- Holtec Consulting Pvt. Ltd. 220
- Howick Ltd. 216
- HRV Conformance Verification Associates, Inc. 533
- Hutchinson Industries, Inc. 328
- Hypertherm Inc. 1432
- HYTORC 1443
- IDEA StatiCa 1138
- IdeaNet Solutions Inc. 410
- Indiana Gratings Pvt. Ltd. – India 119
- Industry Lift 1317
- Infasco / Ifastgroupe 232
- Informed Infrastructure 117
- InfoSight Corporation 727
- Infra-Metals Co. 1517
- Inovatech Engineering, A Lincoln Electric Company 1929
- International Design Services, Inc. 1221
- Ironworkers / IMPACT 312
- ITT Enidine 518
- J. B. Long, Inc. 1535
- JH Botts LLC 1222
- Kinetic Cutting Systems, Inc. 1939
- KMT Waterjet Systems 2528
- Kobelco Welding of America, Inc. 409
- Koike Aronson, Inc. 2522 | 2528
- Kottler Metal Products, Inc. 836
- Kranendonk Production Systems BV 2238
- KTA-Tator 520
- LAP Laser LLC 219
- Lapeyre Stair 935
- LARSA, Inc. 523
- LeJeune Bolt Company 916
- Lincoln Electric Company 1639
- Lindapter 627
- Linders Specialty Company, Inc. 940
- LNA Solutions 827
- Lohr Structural Fasteners, Inc. 1626
- LS Industries 1030
- LTC, Inc. 1527
- LUSAS 511
- Mac-Tech 2534
- Magni Group, Inc. 606
- Manni Green Tech USA Inc. 1542
- Max Weiss Co., LLC 637
- McLaren Engineering Group 1438
- MDX Software 506
- Metabo USA 1540
- Metals USA 1630
- Meyer Borgman Johnson 1531
- Miller Electric Mfg. LLC 2242
- Miner Grating Systems, a Powerbrace Company 307
- *Modern Steel Construction* magazine 233
- MOLD-TEK Technologies Inc. 1237
- National Institute of Steel Detailing, Inc. 434
- National Steel Bridge Alliance 641
- New Millennium Building Systems 1413
- Nitto Kohki U.S.A., Inc. 1538
- Nucor –
  - Corporation 1107 | 1209
  - Grating 1207
  - Fastener Division 1107 | 1209
  - Plate Mill Group 1107 | 1209
  - Tubular Products 1211
  - Verco Decking, Inc. 1115 | 1215
  - Vulcraft Group 1115 | 1215
  - Yamato Steel Company 1107 | 1209
- Ocean Machinery, Inc. 2010
- Ohio Gratings, Inc. 1041
- Omega Steel & Sligo Steel 320
- OpenBrIM Platform 512
- Ovation Services LLC 610
- P2 Programs 1236
- Pacific Press Technologies 2204
- Pacific Stair Corporation 426
- Pan Gulf Technologies Pvt. Ltd. 128
- Pannier Corporation 1428
- Paramount Roll and Forming, Inc. 829
- Pat Mooney Inc. 2505
- Peddinghaus Corporation 1607
- Pieresearch 522
- PPG Protective & Marine Coatings 1128
- Prodevco Robotic Solutions Inc. 2305
- PythonX, A Lincoln Electric Company 1639
- Qnect LLC 1223
- Qualis Solutions, LLC 640
- QuickFrames USA 133
- Radley Corporation 1335
- RazorCX Technologies 1337
- Ringers Gloves 206
- RISA 721
- Ronstan Tensile Architecture 507
- ROUNDO 2424
- SAFI 1440
- SANRIA 830
- Scougal Rubber Corp. 517
- SDS/2 1007
- SE University by SE Solutions, LLC 843
- S-Frame Software 1036
- Shandong Hanpu Machinery Industrial Co., Ltd. 636
- Sherwin-Williams Protective and Marine 527
- Shop Data Systems, Inc. 1436
- Short Span Steel Bridge Alliance 539
- SidePlate Systems, Inc. 1511
- Simpson Strong-Tie Co. 1541
- Skidmore-Wilhelm 227
- SKM Industries, Inc. 607
- SkyCiv Engineering 1339
- SlipNOT Metal Safety Flooring 534
- Soitaab USA Inc. 2525
- SRG Onesource LLC 310
- SSPC: The Society for Protective Coatings 214
- St. Louis Screw & Bolt 1121
- Stainless Structurals America 421
- Steel Deck Institute 329
- Steel Dynamics Structural and Rail Division 1417
- Steel Erection Bid Wizard 316
- Steel Erectors Association of America 419
- Steel Founders Society of America 111
- Steel Joist Institute 642
- Steel Plus Network 1537
- Steel Projects Corp. 1629
- Steel Studio, Inc. 327
- Steel Tek Unlimited 535
- Steel Tube Institute 837
- Steelmax Tools LLC 2135
- Strand7 Pty. Ltd. 708
- Structural Engineering Institute of ASCE 211
- Structural Stability Research Council 938
- STRUMIS LLC 1311
- Sugar Steel Corporation 413
- Taylor Devices, Inc. 626
- TDS Industrial Services Ltd. 432
- Techflow Inc. 1331
- Tectonix Steel, Inc. 1141
- Tnemec Company, Inc. 735
- Torchmate, A Lincoln Electric Company 1639
- Trilogy Machinery, Inc. 2029
- Trimble 1227
- Triple S Steel Holdings 931
- TurnaSure, LLC 826
- TUTTLE A Dant Clayton Division 1032
- TUV Rheinland Industrial Solutions, Inc. 531
- Unibor 221
- United Rentals, Inc. 317
- Unytite, Inc. 407
- V & S Galvanizing 823
- Valmont Coatings 928
- Valmont Industries, Inc. 807
- VERNON Tool, A Lincoln Electric Company 1639
- Viking Blast & Wash Systems 1434
- Virtek Vision International 1409
- Voortman Steel Group 2019
- Voss Engineering, Inc. 710
- Wurth House of Threads 611
- Z Modular, a division of Zekelman Industries 1026

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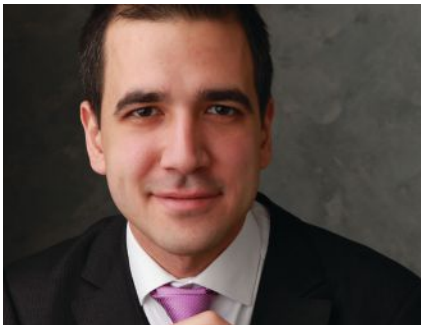

The Power of Contrarian Thinking

K1 Wednesday 10:30 a.m. – 12:15 p.m.
America's Ballroom

Speaker: Ozan Varol,
Lewis & Clark Law School

We're genetically programmed to follow the herd. Thousands of years ago, conformity to our tribe was essential to our survival. Not anymore! Continued success in the modern world requires continued innovation. Businesses can't get ahead if they're simply following. Ozan Varol's articles and keynotes on contrarian thinking have been a smash hit with everyone from Silicon Valley entrepreneurs to New York Times bestselling authors. In this talk, Ozan will explain how you can cultivate extraordinary thinking to produce extraordinary results in your life and business.

bio:

Varol is a rocket scientist, award-winning law professor, and bestselling author. A native of Istanbul, Turkey, Ozan grew up in a family of no English speakers. He learned English as a second language and moved to the United States by himself at 17 to attend Cornell University and major in planetary sciences. While there, he served on the operations team for the 2003 Mars Exploration Rovers project that sent two rovers–Spirit and Opportunity–to Mars. He built stuff that went to the red planet and wrote code that snaps photos of the Martian surface. Then, he walked away from it all and became a law professor to influence others to make interplanetary leaps on this planet. He graduated first in his class from law school, earning the highest grade point average in his law school's history since the introduction of the 4-point grading scale. He's currently a professor at Lewis & Clark Law School in beautiful Portland, Oregon. He has written numerous articles that are taught in colleges, graduate schools, and the United States Military Academy. His work has been featured in various domestic and foreign media, including *Wall Street Journal*, *Newsweek*, BBC, *TIME*, CNN, *Washington Post*, *Slate*, and *Foreign Policy*. He has advised the U.S. Department of Defense, given lectures at foreign constitutional courts, and presented at businesses, non-profits, and government institutions, including the U.S. Department of State. He is the author of the book, *The Democratic Coup d'État*, published by Oxford University Press. When he's not teaching, Ozan can be found lecturing or blogging about contrarian thinking, swinging kettlebells, hanging out with his wife Kathy and his dog Einstein, and swearing at his television during Turkish soccer games.

ALL 1.0 AU

1.0 PDH = 0.1 CEU; Attendance credits = AU
(check with your state licensing board for eligibility for professional credits)

The Joy of Steel... So Many Possibilities

K2 Thursday 10:30 – 11:45 a.m.
America's Ballroom

Speaker: Jon D. Magnusson, SE, PE, NAE, Magnusson Klemencic Associates

This is the story of one engineer's decades-long journey of discovery of the surprising and almost limitless ways structural steel can be used. Many projects provide new lessons on what is possible. Even "forgotten" solutions from the 1960s still have applicability today. Many recent projects have succeeded by creating new approaches ranging from inventing new structural systems to advanced construction methodology to seismic isolation. What does all of this mean for the future of steel construction? The most important discovery of this personal journey is that while it may appear to be about steel, it is really about people. People working together to create incredible structures.

bio:

Magnusson is Senior Principal at Magnusson Klemencic Associates consulting structural/civil engineers with offices in Seattle and Chicago. The 185-person firm has provided engineering services for projects in 48 states and 54 countries. Jon earned his BSCE at the University of Washington and then his MSCE at the University of California, Berkeley. Immediately after graduation in 1976, he joined the 36-person firm Skilling Helle Christiansen Robertson, which 27 years later would ultimately be renamed Magnusson Klemencic Associates. At the age of 30 he was promoted to Principal, then elected CEO at the age of 34 and served in that capacity for the next 25 years. His whole career has been focused on the engineering of "architectural" structures. Jon is a licensed professional engineer in 24 states. He is an Honorary Member of the national American Institute of Architects, a Distinguished Member of ASCE, and a member of the both the National Academy of Engineering and the National Academy of Construction. He has received the AISC Designer Lifetime Achievement Award, the Fritz Medal, and the 2014 ASCE OPAL for Design.

ALL 1.0 PDHs/AU

T.R. Higgins Lecture: Structural Stability – Letting the Fundamentals Guide Your Judgment

K3 Friday noon – 1:30 p.m.
America's Ballroom

Speaker: Ronald D. Ziemian, PhD, Bucknell University

One of the great things about working with structural steel is that most design provisions are based on first principles and fairly predictable experimental test results. This is especially true when assessing structural stability. The primary objective of this lecture is to show how most stability problems can be understood by focusing on the big picture rather than on the details of the seemingly complex mathematics. The presentation will begin by identifying those factors that primarily impact the buckling strength of a system, member, or cross section. Drawing on several example applications, the proper use of today's computational analysis tools will be demonstrated as a means for enhancing engineering judgement. A case will be made for how a fundamental understanding of structural stability is often sufficient for today's steel designers, whether applying the direct analysis method to assess system strength or a column curve to evaluate the strength of a compression member. The lecture will also include an overview of the author's paper "Formulation and Validation of Minimum Brace Stiffness for Systems of Compression Members," which was in part the basis for the T.R. Higgins Award.

bio:

Ronald D. Ziemian is a professor at Bucknell University. He received his BSCE, MENG, and PhD degrees from Cornell University. In addition to authoring papers on the design and analysis of steel and aluminum structures, Ron is co-author of the textbook *Matrix Structural Analysis* (Wiley, 2000), the developer of the educational analysis software MASTAN2, and the editor for the 6th edition of the *Guide to Stability Design Criteria for Metal Structures* (Wiley, 2010). He is the Co-Editor in Chief of Elsevier's *Journal of Constructional Steel Research*. Ron is a member of AISC's Committee on Specifications, chairs AISC's TC3 – Loads, Analysis and Stability, and previously chaired AISC's TG on Inelastic Analysis and Design. He also serves on the AISI and Aluminum Association Specification Committees, is active with the Steel Joist Institute, and the former chair of the Structural Stability Research Council. Ron was awarded the ASCE Norman Medal (1994), the AISC Special Achievement Award (2006), and the ASCE Shortridge Hardesty Award (2013) for his contributions to the profession related to the stability analysis and design of metal structures.

ALL 1.0 PDHs/AU

1.0 PDH = 0.1 CEU; Attendance credits = AU
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Kauai, Hawaii- "Bridge in A Garden"
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NASCC: THE STEEL CONFERENCE sessions

business

Working ON Your Business, Not Just IN Your Business

Z1 Friday 10:45 – 11:45 a.m. | **room 127**

Speakers: Brad Bourne, Universal Steel Inc.; David Harwell, Central Texas Iron Works; Rex Lewis, Puma Steel; Jeff Dave, Dave Steel

Moderator: Bray Bourne, Universal Steel, Inc.

Want to learn the secrets of a successful business? With a combined work history of almost 200 years in the steel business, this experienced panel will discuss what has worked for them as they've led their companies over the past 50 years.

Engineers, Fabricators, Erectors, Detailers — 1.0 AU

Tackling the Skilled Trade Shortage

Z2 Wednesday 9:15 – 10:15 a.m. | **room 240**

Speakers: Samantha Farr, Women Who Weld; Mariana Ludmer, Advanced Weldtec, Inc.; Matt Miller, American Welding Society

Moderator: Jennifer Traut-Todaro, AISC

This session will focus on the skilled trade staffing challenges facing the steel market, the barriers to entry and an incredible effort bringing women into the highly skilled and rewarding field of welding. Women Who Weld is a Detroit-based nonprofit organization with national reach, teaching in-need women how to weld and find employment. You will learn about the intricacies of the skilled trade staffing challenges facing the nation and how you can get involved.

Engineers, Fabricators, Erectors — 1.0 AU

Structural Engineering Engagement and Equity (SE3): 2018 Survey Results

Z3 Friday 8:00 – 9:00 a.m. | **room 132**

Speakers: Andrea K. Reynolds, SE, PE, LEED AP, and Bethanie Rider, PE, SmithGroup, Inc.

Moderator: Jennifer Traut-Todaro, AISC

The NCSEA Structural Engineering Engagement and Equity (SE3) Committee's mission is to study and promote engagement and equity in the structural engineering profession. This presentation focuses on the results of the second biennial nationwide survey of structural engineering professionals completed in 2018. The survey investigated overall career satisfaction and equity across metrics such as career development, trajectory and advancement; compensation, benefits and flexibility; work environment and work-life balance; and the effects of caring for children or other dependents.

Engineers — 1.0 PDHs/AU

Solutions for Equity in the Design Industry

Z4 Thursday 4:00 – 5:30 p.m. | **room 274**

Speakers: Natalie Tse, Tipping Structural Engineers; Elizabeth Mattfield, New York City Department of Buildings; Jennifer Traut-Todaro, AISC; Aimee Rowbottom, Jacobs

Moderator: Jennifer Traut-Todaro, AISC

The building and construction industry is at the forefront of progressing towards a more diverse and collaborative workplace as individuals advance change in their own environments. This year's unique panel will share their efforts to promote change outside of their offices with active participation in technical and professional organizations. Committee participation and leadership career benefits, committee diversity and barriers to entry are just a few topics that will be covered.

Engineers, Fabricators, Erectors, Detailers, Architects — 1.5 PDHs/LU/AU

1.0 PDH = 0.1 CEU; AIA credits = LU; Attendance credits = AU
(check with your state licensing board for eligibility for professional credits)

The Importance of Project Setup

Z5 Thursday noon – 1:00 p.m. | **room 267**

Speaker: Mark Holland, PE, Paxton & Vierling Steel Co.

Moderator: James Stever, Virtual Steel Technologies, Inc.

The key to a successful project is proper planning and setup before modeling and detailing begins. There is more to good project management than having a schedule, calendar and cell phone. This session will review some of the key points to good and proper project setup, including review of documents, procedures, field vs. shop assembly, sequencing, connection selection, safety, coordination and delivery.

Engineers, Fabricators, Erectors, Detailers — 1.0 AU

The Crystal Ball: Construction Market Conditions and Forecasting for Both Buildings and Bridges

Z6* Wednesday 5:00 – 6:00 p.m. | **room 276**

Speakers: Tabitha Stine, SE, PE, LEED AP, AISC

The current economic climate has a great impact on the construction market. By focusing efforts on developing markets, businesses can be better prepared for possible slowdowns in certain geographic areas or by types of projects. You will gain knowledge of the current construction conditions and a sense of design and construction trends that can help your businesses. You will also learn about historical market conditions for both the building and bridge markets and how we are working to increase those markets.

Engineers, Fabricators, Erectors, Detailers, Architects — 1.0 LU/AU

*streamed session

case study

The Structural Stability Game Show

CS1 Wednesday 3:15 – 4:45 p.m. | **room 267**

Speakers: Cliff Bishop, Exponent, Inc.; Patricia Clayton, UT Austin; John Hooper, SE, PE, MKA; Larry Griffis, Walter P Moore; Ronald Ziemian, PhD, Bucknell

This session is a game show format where a panel of engineers and academics will present their views on the root cause of a structure collapse. The audience then votes on which cause was the most likely. Finally, the moderator will explain the true nature of the collapse.

Engineers, Fabricators, Erectors, Detailers — 1.5 PDHs/AU

The Gateway Arch – Unique Perspectives

CS2 Wednesday 9:15 – 10:15 a.m. | **room 263**

Speakers: Christine Freisinger, SE, PS, and Joshua Freedland, Wiss, Janney, Elstner Associates, Inc.

Moderator: Luke Johnson, AISC

The National Park Service and WJE investigated the Gateway Arch, including the visible stains on the stainless steel skin from 2005 to 2014. The team used a combination of traditional techniques such as field microscopy and high-powered spotter scopes and innovative technologies such as casting molds of the surface, helmet-mounted video cameras and cloud-based real-time communication to facilitate the challenging investigation. This presentation will discuss development of the access program, the staining assessment, cleaning trials and the overall conclusions of the investigation.

Engineers, Fabricators, Erectors, Detailers, Architects — 1.0 PDHs/LU/HSW/AU

The Wilshire Grand Center

CS3 Friday 10:45 – 11:45 a.m. | **room 267**

Speakers: Brett Manning, Jake Doherty and Steve Carroll, Schuff Steel; Patrick M. Hassett, SE, Hassett Engineering, Inc.

Moderator: Lynda Leigh

At 73 stories and 1,100 feet, the Wilshire Grand Center in downtown Los Angeles was completed in 2017, making it the tallest building in the United States west of the Mississippi. The building lateral system was engineered to withstand high seismic lateral loads and resulted in some very unique structural features. Schuff Steel was the fabricator and erector for the project and will share some of these challenges, as well as ways they were overcome to complete this unique and iconic structure.

Engineers, Fabricators, Erectors, Detailers, Architects — 1.0 PDHs/AU

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connections

*streamed session

Engineers: Getting the Welds You Want and Need

C1a* Wednesday 3:15 – 4:45 p.m. | **room 276**
C1b Thursday 2:00 – 3:30 p.m. | **room 224**

Speaker: Robert Shaw, PE, Steel Structures Technology Center

Moderator: John Kennedy, Structural Affiliates International

Most practicing structural engineers are familiar with the design provisions for welded structural connections, but many struggle with accurately conveying their design details and ensuring that mechanical properties and quality are achieved. This session will provide guidance on welding symbols, joint details, document submittals, welding procedure specification (WPS) review and specifying inspection and nondestructive testing.

Engineers — 1.5 PDHs/AU

Bracing Success with Delegated Connection Design

C2a Thursday 9:15 – 10:15 a.m. | **room 132**
C2b* Friday 9:15 – 10:15 a.m. | **room 275**

Speaker: Carol Drucker, DZSE

Don't waste time showing too much information that isn't used or that can unnecessarily complicate your design. This session will include tips for successful delegated vertical bracing design and what information should be included on drawings, which will help you limit RFIs and resubmittals.

Engineers, Fabricators, Detailers — 1.0 PDHs/AU

Kinked Connections – What Are They and Why Should I Care?

C3a Thursday 8:00 – 9:00 a.m. | **room 274**
C3b Friday 10:45 – 11:45 a.m. | **room 132**

Speaker: Clifford Schwinger, PE, The Harman Group

If not addressed and configured during design, kinked connections—those where loads create secondary moments and stresses as they flow through—can add unnecessary additional cost and complexity to the structure. This session reviews the importance of eliminating kinked connections when possible.

Engineers, Fabricators — 1.0 PDHs/AU

Partially Restrained Connections (25 years later) – Current Views From Past Higgins Award Winners

C4* Friday 8:00 – 9:00 a.m. | **room 275**

Speaker: Roberto Leon, PE, PhD, DM ASCE, Virginia Tech

Over the last 25 years, designers have come to implicitly recognize the behavior and advantages of partially restrained (PR) connections. This presentation will review that progress, with emphasis on how we can apply PR connections in new construction and evaluation of existing structures.

Engineers, Fabricators — 1.0 PDHs/AU

Casting Away and Forging Ahead

C5a Thursday 2:00 – 3:30 p.m. | **room 230**
C5b* Thursday 4:00 – 5:30 p.m. | **room 275**

Speakers: Jennifer Pazdon, PE, Cast Connex; David Poweleit, Steel Founders Society of America

Steel casting and forging technologies present an opportunity to create structures, particularly connections, that meet aesthetic and performance standards previously inconceivable with traditional fabrication methods. Castings offer geometric freedom while forgings offer high quality in heavy sections. These technologies are readily available in North America and are currently in use on small to super-tall projects. Learn more about practical casting and forging applications as well as current research and an upcoming design guide.

Engineers, Fabricators, Architects — 1.5 PDHs/LU/AU

Thermal Steel Bridging Quantification and Solutions in Steel-Framed Structures

C6a Wednesday 3:15 – 4:45 p.m. | **room 263**
C6b Thursday 4:00 – 5:30 p.m. | **room 230**

Speakers: Jerome Hajjar, PE, PhD, Northeastern University; Kara Peterman, PhD, University of Massachuetts Amherst; Mark Webster, PE, LEED AP BD+C, Simpson Gumpertz & Heger; James D'Aloisio, PE, LEED AP, Klepper, Hahn & Hyatt

This presentation summarizes research efforts at Northeastern University focusing on experimental tests and thermal analyses of composite fiber-reinforced polymer thermal shim plies within steel connections such as shelf angles, roof posts and canopy beams. Topics covered include quantifying the structural performance of thermal break solutions using these polymer shims, quantifying the typical magnitude of thermal loss reduction, identifying which conditions of thermal bridging represent significant energy loss that should be mitigated or avoided and addressing creep in thermoplastic shim elements.

Engineers, Fabricators, Erectors, Detailers, Architects — 1.5 PDHs/LU/GCBI/AU

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(check with your state licensing board for eligibility for professional credits)

connections

*streamed session

30+ Good Rules of Connection Design: Round 2

C7a Wednesday 3:15 – 4:45 p.m. | **room 274**
C7b Thursday 2:00 – 3:30 p.m. | **room 274**

Speakers: Carol Drucker, SE, PE, DZSE; William Thornton, Cives Steel Company; Patrick Fortney, PE, University of Cincinnati; Dominick D'Antonio, W&W Steel Erectors; Supe Snehal, Pan Gulf Technology

Moderator: Carrie Warner, WSP

A panel of industry experts—a connection engineer, detailer, educator, erector and fabricator—give their best rules on cost-effective, buildable connections. This presentation updates and expands upon the oft-cited 2004 *Modern Steel Construction* article on the rules on connection design.

Engineers, Fabricators, Erectors, Detailers 1.5 PDHs/AU

What I Didn't Have Time to Say in Baltimore

C8a* Wednesday 1:30 – 3:00 p.m. | **room 275**
C8b Thursday 4:00 – 5:30 p.m. | **room 231**

Speaker: Duane Miller, PE, ScD, The Lincoln Electric Co.

At last year's conference in Baltimore, Duane Miller presented a keynote lecture, "Important Lessons I've Learned in the Past Forty Years," and a second lecture on the new edition of Design Guide 21 on welding. In St. Louis, material from "the cutting room floor" from both sessions will be repurposed for this session. A mixture of welding-related lessons and managerial principles will be discussed. This session promises to offer everyone at least one lesson that will be career- and life-changing.

Engineers, Fabricators, Erectors, Detailers 1.5 PDHs/AU

Connection Dialogue

C9 Friday 9:15 – 10:15 a.m. | **room 132**

Panelists: Charles Hongell, WSP Mountain; Jerod Hoffman, MBJ; Tony Harasimowicz, KPFF; Stephen Blumenbaum, Walter P Moore

Can improving the quality of connections reduce project costs and speed construction? This panel of industry experts will share real-life scenarios and discuss ways to ensure better project delivery. Discussions will focus on the value of data and collaboration to support a steel project's positive delivery—from design to detailing to fabrication to erection.

Engineers, Fabricators, Detailers 1.0 PDHs/AU

constructability

From Engineer to Field – Eliminating Problems

Y1* Thursday 9:15 – 10:15 a.m. | **room 275**

Speakers: Nyckey Heath, PE, M.C.E., and Carl Williams, PE, Bosworth Steel Erectors, Inc.

Moderator: Harvey C. Swift, STSC, IMPACT

Bosworth Steel Erectors, Inc. (an AISC member and Certified Erector) share their firm's experiences as an AISC Certified Erector and explain how the design engineer of record can help eliminate structural steel field problems upfront by providing adequate information on design drawings and approval drawings to the steel fabricator and erector.

Engineers, Erectors 1.0 PDHs/AU

Critical Lift Planning Basics 101

Y2 Thursday noon – 1:00 p.m. | **room 2**

CANCELLED

Speakers: Will Jacobs, SE, PE, Stanley D. Lindsey and Associates

Moderator: Matt Messing, Orange County Ironworks, LLC

This session will explore the basics of critical lift planning, focusing on mobile cranes for those who may be unfamiliar with this aspect of the industry. Specific topics will include categorization of critical lifts, a general overview of crane behavior, key concerns for critical lifts and requirements for documenting critical lift plans.

Engineers, Erectors 1.0 PDHs/AU

Specification of Intumescent Fire Resistive Coatings

Y3 Friday 9:15 – 10:15 a.m. | **room 240**

Speaker: Sean Younger, Carboline Company

Moderator: Lynda Leigh

This seminar is an introduction into specification of intumescent fire resistive coatings used for commercial construction. It will define the benefits of water, solvent and epoxy-based intumescent Fire Resistive Materials (IFRM), and detail where each type should be specified and used. It will also outline how fire resistive materials are tested and certified, and discuss the challenges facing the fireproofing industry regarding product selection and the importance of having the right materials for different types of applications and exposure environments.

Engineers, Fabricators 1.0 PDHs/AU

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design & analysis

*streamed session

Structural Fire Engineering: A Powerful Sanctioned Design Option

L1a Wednesday 8:00 – 9:00 a.m. | **room 264**
L1b Thursday noon – 1:00 p.m. | **room 132**

Speaker: Kevin LaMalva, PE, Simpson Gumpertz & Heger Inc.

Moderator: Eric Siew, Gooder-Henrichsen

Structural fire protection is often viewed by structural engineers as a nuisance. However, it represents one of the most promising opportunities for structural engineers to provide value-added services moving forward. ASCE/SEI 7 now permits designers to use structural fire engineering as an alternative to the code-default prescriptive method. This alternative approach must be in conducted in accordance with the new Appendix E section of ASCE/SEI 7, which requires analysis of structural performance under fire exposure. In this context, a structural system may be optimized for ambient and fire loads, which presents nearly endless possibilities in terms of design freedom, as well as enhanced intrinsic structural fire safety.

Engineers — 1.0 PDHs/AU

Design Column Reinforcement

L2a Wednesday 9:15 – 10:15 a.m. | **room 264**
L2b* Thursday 8:00 – 9:00 a.m. | **room 276**

Speaker: Bo Dowswell, ARC International, LLC

Moderator: Allan Strong, WesTech Engineering Inc.

This session is your practical guide to designing reinforced columns with the 2016 AISC *Specification*! It will primarily focus on the Effective Length Method, which has traditionally been used for the design of reinforced columns. It will also present a new method, similar to the Direct Analysis Method. The effect of pre-load, a stepped-member approach for the design of columns with partial-length reinforcement, the local buckling of stitch-welded reinforcing plates, and the required weld strength connecting the reinforcement to the existing column will also be discussed.

Engineers — 1.0 PDHs/AU

Proactive Fracture and Fatigue Design in Steel

L3a Wednesday 5:00 – 6:00 p.m. | **room 240**
L3b Friday 9:15 – 10:15 a.m. | **room 231**

Speaker: Paul McMullin, Ingenium Design

Moderator: Brent Tobler, WesTech Engineering Inc.

This session will offer a holistic structural integrity approach to fracture control, based on fracture mechanics and inspection.

Engineers — 1.0 PDHs/AU

Insidious Thermal Forces in Steel Structures: What You Need to Know

L4a Thursday 8:00 – 9:00 a.m. | **room 231**
L4b Friday 10:45 – 11:45 a.m. | **room 263**

Speaker: Barry Arnold, ARW Engineers

Moderator: Troy M. Dye, ARW Engineers

This session will boost your knowledge of how changes in temperature and structural detailing of members and systems adversely affect individual members and entire buildings. Attendees will leave with a better understanding of how damage and failures from thermal forces can be minimized and how damage can be economically repaired.

Engineers, Architects — 1.0 PDHs/LU/HSW/AU

The Learning Never Stops: Going Beyond a College Education

L5 Wednesday 1:30 – 3:00 p.m. | **room 230**

Speakers: Michael Chisholm, Degenkolb Engineers; Adam Friedman, SE, PE, CSD

Moderator: Jules Van de Pas, SE, PE, CSD

An engineering degree prepares an engineer to kick off their career, but some of the best lessons don't come from textbooks. In this session two young engineers share the most important lessons they have learned since graduating and embarking on their careers.

Engineers — 1.5 PDHs/AU

RFIs and the Waiting Game

L6a Thursday 9:15 – 10:15 a.m. | **room 224**
L6b Friday 8:00 – 9:00 a.m. | **room 264**

Speaker: Michael Herriges, PE, DZSE

On projects where every day counts, RFIs can easily chip away at the schedule and reducing the need for RFIs can have a big impact. This session will provide tips on writing RFIs with the right information to limit the number of submitted RFIs and get information as soon as possible.

Engineers, Fabricators, Detailers — 1.0 PDHs/AU

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Properly Specifying Steel Deck

L7a* Thursday noon – 1:00 p.m. | **room 275**
L7b Wednesday 9:15 – 10:15 a.m. | **room 230**

Speaker: Tom Sputo, SE, PE, PhD, Sputo & Lammert Engineering / Steel Deck Institute

Moderator: Bob Paul, Steel Deck Institute

There is a right way to specify steel deck products in your project. And there are many wrong ways. Properly specifying the steel floor and roof deck is actually quite simple, and properly specifying the deck is one way to gain economy in your project. That is the Good Way. Then there are the Bad and the Just Plain Ugly ways, which cost the project in time, money, and performance. This session will show how to properly specify steel deck using information from the SDI Standards and other publications, and provide other tips and ideas to make specifying steel deck easy, including various architectural, acoustical and fire resistance related topics.

Engineers 1.0 PDHs/AU

Your *Code of Standard Practice* – Sections 3 and 4

L8a* Wednesday 5:00 – 6:00 p.m. | **room 275**
L8b Friday 8:00 – 9:00 a.m. | **room 263**

Speaker: Michael West, CSD

Moderator: David Ratterman, Stites & Harbison, PLLC

Like any industry, those involved in the design, purchase, fabrication and erection of structural steel have developed trade practices. The AISC *Code of Standard Practice* provides the framework for a common understanding of the acceptable standards when contracting for structural steel, making it useful for anyone associated with construction in structural steel. This session will present the *COSP* sections 3 and 4.

Engineers 1.0 PDHs/AU

Properly Specifying Steel Joists

L9a Wednesday 3:15 – 4:45 p.m. | **room 231**
L9b* Thursday 2:00 – 3:30 p.m. | **room 276**

Speakers: Tim Holtermann, SE, PE, Canam Buildings; Keith Juedemann, PE, Valley Joist

Moderator: Michael Whittle, Vulcraft – SC

Open web steel joists are an efficient, economical method of framing a building, but there are some basics that should be covered before you set off down that trail. This presentation will highlight the current codes and specifications that apply to steel joist construction and give you insight into the best way to plan your project.

Engineers 1.5 PDHs/AU

New Design Guide 35: *Storm Shelter and Safe-Room Design*

L10a* Wednesday 3:15 – 4:45 p.m. | **room 275**
L10b Thursday 2:00 – 3:30 p.m. | **room 264**

Speakers: Roger A. LaBoube, PE, PhD, Missouri University of Science & Technology; Marc S. Barter, SE, PE, Barter & Associates

Moderator: Margaret Matthew, AISC

High-wind events such as hurricanes and tornadoes have created a call for storm shelters or safe rooms to be provided in schools and other critical-occupancy buildings. This session will offer an introduction to a new design guide on the topic, covering load criteria, building envelope considerations, framing systems, design considerations and design examples.

Engineers 1.5 PDHs/AU

Design Guide 7: *Industrial Buildings – Roofs to Anchor Rods*

L11a Wednesday 1:30 – 3:00 p.m. | **room 267**
L11b Thursday 4:00 – 5:30 p.m. | **room 264**

Speaker: James M. Fisher, PE, PhD

Moderator: Margaret Matthew, AISC

This session highlights the updates and new material in the third edition of Design Guide 7, which provides guidance for the design of both light and heavy industrial buildings with and without overhead cranes. Design Guide 7 has been updated to the current 2016 AISC *Specification* and the 15th Edition *Steel Construction Manual*.

Engineers, Fabricators, Detailers 1.5 PDHs/AU

Lateral Load Transfer – From Diaphragm to Resisting Elements

L12a* Thursday 9:15 – 10:15 a.m. | **room 276**
L12b Friday 10:45 – 11:45 a.m. | **room 264**

Speaker: Thomas Meyer, SE, PE, MKA

Moderator: Steven Armstrong, SMBH, Inc.

This session looks at various ways to transfer loads from diaphragms and collectors to the vertical elements of the lateral force-resisting system. Using examples from real projects, this course will address the challenges that arise when making connections from steel framing to resisting elements of other materials such as concrete or masonry.

Engineers 1.0 PDHs/AU

*streamed session

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design & analysis

*streamed session

Retrofit of Existing Building With Steel Joists

L13a Wednesday 1:30 – 3:00 p.m. | **room 240**
L13b* Thursday 2:00 – 3:30 p.m. | **room 275**

Speakers: Bruce Brothersen, SE, PE, Vulcraft - Nucor; Walter Worthley, PE, Valley Joist

Moderator: Martin Madison, New Millennium Building Systems

In this session, learn methods to evaluate and modify existing open web steel joists for revised loading conditions.

Engineers — 1.5 PDHs/AU

What Not to Draw

L14 Wednesday 3:15 – 4:45 p.m. | **room 127**

Speakers: Amanda Dean, PE, Associate AIA, Huitt-Zollars; Michael Mass, Turner Construction; Amaya Labrador, AIA, EDAC, Browne McGregor Architects, Inc.

Moderator: Alex Morales, AISC

For AEC professionals, drawings are everything and communication is key. This interactive panel discussion shares anecdotal experiences from the perspective of an architect, engineer, and general contractor on factors that can either make or break drawings that are instrumental to a successful project. The discussion is meant to be casual and informational, with questions from the audience taken at the end.

Engineers, Fabricators, Erectors, Architects — 1.5 PDHs/LU/HSW/AU

Traditional and Advanced Methods for Assessing Ponding Instability

L15a* Wednesday 8:00 – 9:00 a.m. | **room 276**
L15b Thursday noon – 1:00 p.m. | **room 127**

Speaker: Mark Denavit, University of Tennessee, Knoxville

Ponding, the accumulation of water on roofs that can cause progressively increasing deformations and even collapse, is a design consideration for all buildings. The most common method of assessing roofs for ponding was developed over 50 years ago and has many limitations. A new design method uses computer analysis to capture the behavior of roofs under ponding conditions more accurately. This presentation will review ponding requirements in current design specifications, introduce the new method of analysis, and compare the traditional and advanced methods through examples.

Engineers — 1.0 PDHs/AU

Structural Vibration Serviceability: FAQs and More

L16a* Wednesday 1:30 – 3:00 p.m. | **room 276**
L16b Thursday 2:00 – 3:30 p.m. | **room 127**

Speakers: Thomas Murray, PE, PhD, Virginia Tech; Brad Davis, University of Kentucky

Moderator: Jon Skinner, McLaren Engineering Group

Human-induced vibration is an important limit state for floors, stairs, and other structures. This session will address the most common questions and misconceptions about structural vibration serviceability. It will also answer questions about the updated evaluation methods for sensitive equipment and several other applications featured in the second edition of Desgin Guide 11.

Engineers — 1.5 PDHs/AU

Drawing Details: The Good, the Bad, and the Ugly

L17a* Wednesday 9:15 – 10:15 a.m. | **room 276**
L17b Thursday noon – 1:00 p.m. | **room 274**

Speakers: Matthew Kawczenski, SE, PE, F.SEI, McLaren Engineering Group; Mike Kempfert, PE, CSD

All contract documents have details to convey information, but not all details are created equal. This session will review examples of drawing details for clarity and simplification, identify issues such as load path, and explore potential corrections to bad details.

Engineers — 1.0 PDHs/AU

Distortion of Curved Members

L18a Wednesday 3:15 – 4:45 p.m. | **room 264**
L18b Thursday 4:00 – 5:30 p.m. | **room 263**

Speakers: Ken Pecho, Chicago Metal Rolled Products; Bo Dowswell, ARC International

The cross-sectional distortion of curved members can occur both during the forming process and when the member is subjected to service loads. In this session, Ken Pecho will describe the mechanics of the forming process and its effect on the final properties of curved members. Bo Dowswell will then discuss the effect of distortion on the member design strength under service loads, including the effect of distortion caused by the forming process. This session will focus on practical methods for reducing distortion and calculating its effect on the member strength, with design examples showing applications of the equations from AISC Design Guide 33.

Engineers — 1.5 PDHs/AU

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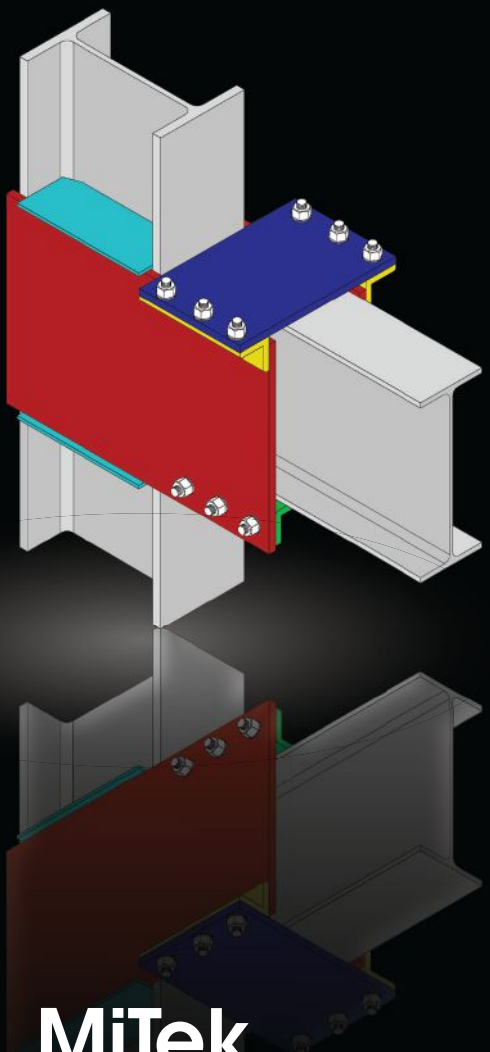

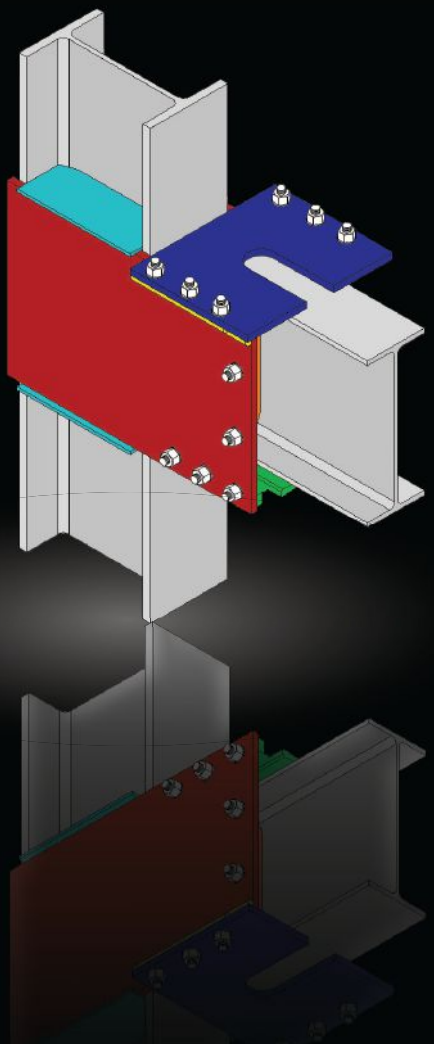

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St. Louis Missouri	America's Center Convention Complex	April 3–5 2019

AIA LU		SESSION TITLE	DAY(S)
1.0†	A1	Designing for Membrane Architecture	W
1.0†	A2	Trends in Construction for Architects	W
1.0†	A3	Promoting Health and Wellness Through Design	W
1.0*	A4	Salesforce Transit Center	Th
1.0†	A5	Architecturally Exposed Structural Steel (AESS): Communicating for Success	Th
1.5	C5	Casting Away & Forging Ahead	Th
1.5*	C6	Thermal Steel Bridging Quantification and Solutions in Steel-Framed Structures	W | Th
1.0†	CS2	The Gateway Arch – Unique Perspectives	W
1.5†	D2	Intro to AISC Design Guide 34: Steel Framed Stairway Design	Th
1.0*†	G1	Whole-Building Life-Cycle Assessment	F
1.0*	G2	Overview of the Steel Forming Process	Th
1.0†	H1	Retractable Stadium Roofs – Challenges in Design and Construction of Large Mechanized Structures	W | F
1.0	H2	Designing with Complex Geometries	W | Th
1.5†	H4	Lessons From the First SpeedCore Project	W | Th
1.0†	L4	Insidious Thermal Forces in Steel Structures: What You Need to Know	Th | F
1.5†	L14	What Not to Draw	W
1.0	LL7	Legal Implications of Electronic Data Transfer	Th
1.0†	M2	Let's Talk Seismic – In Language We Can All Understand	W | F
1.5†	M4	Healthcare Design in High Seismic Areas: Old and New	W
1.5	Z4	Solutions for Equity in the Design Industry	Th
1.0	Z6	The Crystal Ball: Construction Market Conditions and Forecasting for Both Buildings and Bridges	W

* sessions also eligible for GBCI CE credits
† sessions also eligible for HSW credits

design & analysis

*streamed session

HSS: What Designers Should Know about HSS Dimensions and Material Availability

L19a Thursday 9:15 – 10:15 a.m. | **room 260**
L19b* Friday 8:00 – 9:00 a.m. | **room 276**

Speaker: Kim Olson, PE, FORSE Consulting

Many architects want HSS sections with particular sizes and appearances when designing their buildings. Are the shapes they want always available? Do the members have visible seams? This session will review the differences between HSS and pipe sections, explain how HSS are formed, and discuss the availability and minimum quantity orders for various HSS shapes.
Engineers, Fabricators, Erectors, Detailers 1.0 PDHs/AU

Concrete Filled HSS

L20a Thursday 8:00 – 9:00 a.m. | **room 240**
L20b* Friday 10:45 – 11:45 a.m. | **room 275**

Speaker: Jason McCormick, PE, PhD, University of Michigan

Concrete filled tubes provide several advantages over an equivalent steel or steel-reinforced concrete member. Fire resistance, construction efficiency and buckling resistance are all increased when a cementitious material is placed in the void of a tube. These advantages have led to their increased used over the past decades and recent developments with concrete filled tubes. This session will explore the design and practical implications of using concrete filled HSS on your next project.
Engineers 1.0 PDHs/AU

designer

Designing for Membrane Architecture

A1 Wednesday 8:00 – 9:00 a.m. | **room 127**

Speaker: Marco Cano, PE, Fractal Structural Engineering

Moderator: Katherine Quigg, AISC

This presentation will provide an overview of the analysis, design and fabrication of membrane structures—with the hope of increasing collaboration between architects and engineers to design successful membrane structures. It will also discuss form-finding to generate the geometry of a membrane structure, as well as design assumptions and fabrication of a membrane's structure, patterning, welding and some typical connections.
Engineers, Fabricators, Architects 1.0 PDHs/LU/HSW/AU

Trends in Construction for Architects

A2 Wednesday 9:15 – 10:15 a.m.| **room 127**

Speaker: Tabitha Stine, SE, PE, LEED AP, AISC

Moderator: Brian Ward, AISC

As technology marches forward, many trends in construction continue to impact the way we design and construct our built environment. From augmented reality to understanding resilient design, this session will cover trends impacting architects as we take on projects in the near future.
Engineers, Architects 1.0 PDHs/LU/HSW/AU

Promoting Health and Wellness Through Design

A3 Wednesday 5:00 – 6:00 p.m. | **room 127**

Speaker: Amaya Labrador, AIA, EDAC, Browne McGregor Architects, Inc.

Moderator: Larry Flynn, AISC

Experience an architect's perspective on what it means to design healthy spaces and how design can be used to help achieve healthy environments. This session includes an overview of how steel can be used as an advantageous building block in achieving this design approach.
Engineers, Architects 1.0 PDHs/LU/HSW/AU

Salesforce Transit Center

A4 Thursday 8:00 – 9:00 a.m.| **room 127**

Speaker: Bruce Gibbons, Thornton Tomasetti

The new Salesforce Transit Center in San Francisco connects 11 transit systems, is pursuing LEED Gold Certification and has a 5.4-acre rooftop park. And thanks to a performance-based approach, the structure is designed to survive a maximum earthquake event without significant loss of function.
Engineers, Architects 1.0 PDHs/LU/GBCI/AU

Architecturally Exposed Structural Steel (AESS): Communicating for Success

A5 Thursday 9:15 – 10:15 a.m.| **room 127**

Speaker: Terri Meyer Boake, University of Waterloo

This session will look at the new AISC method for specifying architecturally exposed structural steel (AESS), specifically the new method of tiered categories that reflect distance to view, use of space, desired finish and budget. Numerous case studies will illustrate how this new approach has been successfully applied to projects.
Engineers, Fabricators, Erectors, Architects 1.0 PDHs/LU/HSW/AU

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detailing

Training Your Detailers for Quality

D1 Thursday 8:00 – 9:00 a.m. | **room 267**

Speaker: Brain Cobb, PE, Structural Detailing, LLC

Moderator: James Stever, Virtual Steel Technologies, Inc.

Training detailers is much different today than it was even 10 or 20 years ago. Too many detailers and detailing firms think it is just about software. As we now move toward a model-based steel design, detailing, manufacturing and construction paradigm, the questions become: How do you bring new human resources into your operations? What is your training program for your detailers? And how are you ensuring quality in the final data and drawings? This session will address these concerns and others.

Engineers, Fabricators, Detailers 1.0 AU

Intro to AISC Design Guide 34: *Steel Framed Stairway Design*

D2 Thursday 2:00 – 3:30 p.m. | **room 267**

Speaker: Adam Friedman, SE, PE, CSD

Moderator: Ross Jones, Delta Structural Steel Svcs.

Typically, there is not much information given in the contract documents for stairs defined as delegated design components, and much is left to the delegated designer and detailer. This session will present best practices and help define an approach for the set-up, design and detailing of steel framed stairways, as well as help ensure that your designs meet the contract document, applicable building code and OSHA and ADA requirements.

Engineers, Fabricators, Detailers, Architects 1.5 PDHs/LU/HSW/AU

Detailing: It's Not Just That Anymore

D3 Thursday 9:15 – 10:15 a.m. | **room 267**

Speaker: Mark Turman, Southern New Jersey Steel

Moderator: Bray Bourne, Universal Steel, Inc.

What is detailing today? What software is needed? What does the fabricator/detailer relationship look like today? Attend this session for a discussion of all of these questions and more.

Fabricators, Detailers 1.0 AU

Connection Design Efficiency Loss

D4 Friday 8:00 – 9:00 a.m. | **room 267**

Speakers: David Wright, Carpenter Wright Engineers; David McBride and Robert Johnson, McGill Engineering Inc.

Moderator: Sam Boykin, SteelFab Inc.

Many projects with delegated connection design responsibilities hit roadblocks that derail the schedule early in detailing process. This forces the delegated connection design engineer to send RFIs requesting essential information from the EOR so they can complete their design—which in turn delays the detailing schedule and possibly the project. The end result is a project that is behind schedule with significant efficiency loss. The concept of a pre-detailing conference, which can help avoid these types of issues, is presented in this session.

Engineers, Fabricators, Erectors, Detailers 1.0 PDHs/AU

What Erectors Love to Hate about Steel Detailers

D5 Wednesday 5:00 – 6:00 p.m. | **room 267**

Speakers: David Deem and Colby Tribble, Deem Structural Services, LLC

Moderator: Joel Hicks, Blackstone Group

The course is intended to help educate detailers on best practices for enhancement of erection productivity and safety, while staying in compliance with industry regulations as well as budgetary restraints.

Fabricators, Erectors, Detailers 1.0 AU

erection

Heavy and Complicated Lifts – Risks, Uncertainties and What to Look Out For

R1 Wednesday 8:00 – 9:00 a.m. | **room 260**

Speakers: Luiz Macedo and Rafael Macedo, Emasa Engineering

Moderator: Jerod Hoffman, Meyer Borgman Johnson

This session will present key erection engineering design aspects required for successful and economical modularized construction lifts of steel structures. Through the discussion of real cases for landmark projects (World Cup Stadium, Freeform roofs and Industrial projects) this session discusses the practical execution, highlighting the risks, uncertainties and opportunities involved in this strategy of construction.

Engineers, Erectors 1.0 PDHs/AU

Code of Standard Practice: Section 7 – An Erector's Perspective

R2 Wednesday 9:15 – 10:15 a.m. | **room 260**

Speaker: Philip Torchio, Williams Erection (ret.)

Moderator: David Ratterman, Stites & Harbison, PLLC

This session explores Section 7 of the AISC *Code of Standard Practice* from an erector's perspective. This session focuses on what the erector's obligations are as well as the responsibilities and requirements of the owner, engineer, fabricator and controlling contractor.

Engineers, Fabricators, Erectors, Detailers 1.0 PDHs/AU

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erection

Establishing an Effective Field Leadership Mentoring Program for Erectors

R3 Wednesday 5:00 – 6:00 p.m. | **room 260**

Speakers: Nyckey Heath, PE, Bosworth Steel Erectors, Inc.; Harvey C. Swift, STSC, IMPACT

Moderator: Harvey C. Swift, STSC, IMPACT

This session provides a detailed explanation of how one erection firm established an organized and formal mentoring program for field leadership. You'll delve into how that program allowed the company to grow its market share, backlog and preferred status in the eyes of its customer base, and ultimately its bottom line.

Erectors 1.0 AU

Filling the Skills Gap for Ironworkers

R4 Thursday noon – 1:00 p.m. | **room 260**

Speaker: Tim Eldridge, Steel Erectors Association of America

Moderator: Mark Yerke, S&R Enterprises LLC

This session will cover the SEAA Ironworker Craft Training Program and why and how you should make ironworker craft training an integral part of your business model.

Fabricators, Erectors 1.0 AU

What's New in the Realm of Safety?

R5 Friday 9:15 – 10:15 a.m. | **room 260**

Speakers: Wayne Creasap, TAUC

Moderator: Ted Sheppard, The DuRoss Group, Inc.

This session provides an industry safety and health update for engineers, fabricators and erectors. The discussion will focus on regulatory and industry standards to reduce or eliminate workplace hazards.

Engineers, Fabricators, Erectors 1.0 AU

Don't Be "Rig Poor"! – Understanding the Process of Sizing the Right Crane for Your Steel Erection Project

R6 Friday 10:45 – 11:45 a.m. | **room 260**

Speakers: Keith Rind, W.O. Grubb

Moderator: Mark Yerke, S&R Enterprises LLC

This session provides an in-depth look at how to properly size cranes for steel erection, including capacity, reach, efficiency, cost, etc.

Engineers, Fabricators, Erectors 1.0 AU

Why Do I Need My Temporary Bracing Plan Stamped?

R7 Thursday 8:00 – 9:00 a.m. | **room 263**

Speaker: Mark Yerke, S&R Enterprises LLC

This session focuses on giving you a better understanding of the erector's responsibility on a project, specifically the temporary bracing of a structure during erection, and why more and more specifications are requiring a PE-stamped bracing plan to be submitted prior to erection.

Engineers, Fabricators, Erectors, Detailers 1.0 PDHs/AU

ethics

Ethical Cultures of High-Performance Organizations

E1 Wednesday 8:00 – 9:00 a.m. | **room 274**

Speaker: Daniel Murphy, PE, Meyer Borgman Johnson

Ethical breaches are reported daily in the media, and design and construction professionals face challenges of operating ethically every day. The course will explore the basics of ethical behavior and the benefits that can be enjoyed by individuals and firms that develop a strong ethical brand.

Engineers, Fabricators, Erectors, Detailers 1.0 PDHs/AU

Engineering Ethics: When to Report Violations

E2a Thursday 9:15 – 10:15 a.m. | **room 231**
E2b Friday 8:00 – 9:00 a.m. | **room 274**

Speaker: Brent Wright, PE, Wright Engineering, LLC

Moderator: Bray Bourne, Universal Steel, Inc.

When is it appropriate to report a violation? This session will dive into this very important question.

Engineers 1.0 PDHs/AU

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innovation

*streamed session

Retractable Stadium Roofs – Challenges in Design and Construction of Large Mechanized Structures

H1a* Wednesday 8:00 – 9:00 a.m. | **room 275**
H1b Friday 8:00 – 9:00 a.m. | **room 231**

Speaker: Andrew Agosto, SE, PE, Uni-Systems Engineering

Moderator: Jerod Hoffman, Meyer Borgman Johnson

Through case studies of retractable roofs such as AT&T Stadium, Marlins Park and Mercedes-Benz Stadium, the speaker will share the unique challenges of designing and constructing large mechanized structures. The presentation will include an overview of retractable roof drive systems, a detailed look at mechanized structure versus static structure stiffness considerations and imposed loads including braking, skewing and impact.

Engineers, Architects — 1.0 PDHs/LU/HSW/AU

Designing with Complex Geometries

H2a* Wednesday 9:15 – 10:15 a.m. | **room 275**
H2b Thursday noon – 1:00 p.m. | **room 231**

Speaker: Robert Baxter, MKA

Moderator: Ben Klingenstein, MKA

Complex geometries require complex structural solutions. However, finding a solution that is affordable and constructible is the difference between making the architect's vision a reality or not. This session will identify tools that can be used to work with complex geometries, as well as show examples of how complex geometry problems were solved/simplified and brought to life.

Engineers, Fabricators, Erectors, Detailers, Architects — 1.0 PDHs/LU/AU

AISC Research: Seismic Evaluation and Retrofit of Concentrically Braced Frames

H3a Wednesday 1:30 – 3:00 p.m. | **room 263**
H3b Thursday 2:00 – 3:30 p.m. | **room 263**

Speakers: Charles Roeder and Dawn Lehman, University of Washington

Moderator: James Malley, SE, Degenkolb Engineers

Prior to around 1988, concentrically braced frames (CBFs) used for seismic lateral force-resisting systems were not designed to promote ductile response using capacity-based design of the braced-frame beams. AISC recently sponsored a study at the University of Washington to investigate weaker beams in these frames, both to evaluate existing structures and to develop more efficient beam designs. This session discusses the seismic behavior of these systems, recent research and a seismic retrofit design example of a braced-frame system.

Engineers — 1.5 PDHs/AU

Lessons From the First SpeedCore Project

H4a Wednesday 1:30 – 3:00 p.m. | **room 231**
H4b* Thursday 4:00 – 5:30 p.m. | **room 276**

Speakers: Ron Klemencic, SE, PE, Hon. AIA, MKA; Amit H. Varma, Purdue University; Michel Bruneau, PEng, PhD, F.CAE, F.ASCE, University at Buffalo

Rainier Square in Seattle is the first project to use the new SpeedCore system (also called a concrete-filled composite plate shear wall). This session will look at how the project is proceeding and the lessons learned from its design, fabrication and erection. Ongoing research will also be examined.

Engineers, Fabricators, Erectors, Detailers, Architects — 1.5 PDHs/LU/HSW/AU

SpeedCore and Composite Plate Shear Walls: Current Research and Developments

H5a Wednesday 3:15 – 4:45 p.m. | **room 230**
H5b Thursday 2:00 – 3:30 p.m. | **room 231**

Speakers: Soheil Shafaei, Purdue University; Morgan Broberg, Purdue University; Emre Kizilarslan, University at Buffalo; Saahas Bhardwaj, Purdue University

This session will showcase findings from the latest research in composite plate shear walls and their application to the innovative SpeedCore system. Research projects funded by the Charles Pankow Foundation and AISC are ongoing at Purdue University and the University at Buffalo on various topics including experimental behavior, numerical analysis, seismic design and fire-resistant design. Graduate students from Purdue and the University at Buffalo will present their findings.

Engineers, Fabricators, Erectors, Detailers — 1.5 PDHs/AU

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legal

What You Need to Know About Defending and Prosecuting Claims – Before You Get into a Dispute

LL1 Wednesday 8:00 – 9:00 a.m. | **room 132**

Speaker: Angela Richie, Gordon & Rees

What do you do when you need to pursue payment for work you have performed or when someone says that steel doesn't work? This session will teach you everything you need to know about prosecuting and defending claims before you find yourself in a dispute.

Engineers, Fabricators, Erectors, Detailers 1.0 AU

Defending and Prosecuting Delay Claims

LL2 Wednesday 1:30 – 3:00 p.m. | **room 132**

Speaker: Angela Richie, Gordon & Rees

Have you ever had a project where the design changed or was late? Did the late design or change push your fabrication schedule into a period where you already had other work scheduled? Did you know that you may be entitled to compensation for such changes? Have you ever been accused of delaying project? Do you know how to defend yourself against such claims? Learn how in this session!

Engineers, Fabricators, Erectors, Detailers 1.5 AU

It's Time to Take Another Look at Your Subcontracts

LL3 Wednesday 9:15 – 10:15 a.m. | **room 132**

Speaker: Angela Richie, Gordon & Rees

When was the last time you looked at your subcontracts to downstream vendors? Your subcontracts may be the most important document you issue or negotiate if a problem occurs. What would happen if your erector's lack of job site supervision resulted in a significant job-site accident? What would happen if the structural engineer that designed the connection made a significant error resulting in a partial collapse of a structure? What would happen if, after the steel was erected, fireproofing applied to the structure started to fall off? Learn how to evaluate your subcontracts for potential issues in this session.

Engineers, Fabricators, Erectors, Detailers 1.0 AU

Due Diligence: Warning Flags Before You Submit Your Bid

LL4 Wednesday 5:00 – 6:00 p.m. | **room 132**

Speakers: Steven Henderson and Gregory Parsons, Stites & Harbison, PLLC

What if you unwittingly lost all your profit and more on the day you signed the contract for a job? This course covers legal red flags, how to spot them, and how to deal with them.

Engineers, Fabricators, Erectors, Detailers 1.0 AU

Avoiding "Bet the Company" Legal Mistakes

LL5 Wednesday 3:15 – 4:45 p.m. | **room 132**

Speakers: Steven Henderson and Gregory Parsons, Stites & Harbison, PLLC

"Bet the Company" mistakes can occur in two distinct phases of project involvement: during the prebid phase when you are reviewing the bidding documents and during the performance phase when you're dealing with the unexpected. This course will provide practical advice for arming and protecting your company during both of these phases.

Engineers, Fabricators, Erectors, Detailers 1.5 AU

Crisis Management – Workplace Disasters

LL6 Thursday 2:00 – 3:30 p.m. | **room 132**

Speaker: Frank Kollman, JD, Kollman & Saucier, P.A.

This session explores the proper responses to the chaos of a workplace disaster from a legal, ethical and practical viewpoint.

Engineers, Fabricators, Erectors, Detailers 1.5 AU

Legal Implications of Electronic Data Transfer

LL7 Thursday 8:00 – 9:00 a.m. | **room 132**

Speaker: Steven Henderson, Stites & Harbison, PLLC

Architects, engineers, and contractors increasingly rely on the collaborative exchange of electronic data. This session will explore the legal implications of electronic data transfer (EDT) related to contract documents, electronic data protocols, exchange of data in conjunction with BIM, as well as practical advice on mitigating risks associated with electronic data.

Engineers, Fabricators, Erectors, Detailers, Architects 1.0 LU/AU

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project management

Understanding Your Assets as a Manager

P1 Wednesday 1:30 – 3:00 p.m. | **room 260**

Speaker: Dan Coughlin, The Coughlin Company

Moderator: Glenn Tabolt, PE, STS Steel, Inc.

The first resource you should look to convert into results is yourself as a manager. In this session we will conduct a deep dive into understanding how you're hard-wired, how you process ideas, how you make decisions, how you approach situations, and how to temporarily shift your approach in order to be more effective.

Engineers, Fabricators, Erectors, Detailers 1.5 AU

Effectively Influence Others to Optimize Results

P2 Wednesday 3:15 – 4:45 p.m. | **room 260**

Speaker: Dan Coughlin, The Coughlin Company

Moderator: Glenn Tabolt, PE, STS Steel, Inc.

This session focuses on your interactions with other people, how to meet their individual needs, how to communicate effectively with them, and how to influence their thinking to improve results.

Engineers, Fabricators, Erectors, Detailers 1.5 AU

Build Teamwork that Works to Win

P3 Thursday 2:00 – 3:30 p.m. | **room 260**

Speaker: Dan Coughlin, The Coughlin Company

Moderator: Glenn Tabolt, PE, STS Steel, Inc.

Learn how you as a manager can create effective group dynamics that emphasize a healthy culture, a meaningful common purpose with measurable outcomes, and the vulnerability necessary to work together to achieve your goals.

Engineers, Fabricators, Erectors, Detailers 1.5 AU

The Art of Negotiation

P4 Thursday 4:00 – 5:30 p.m. | **room 260**

Speaker: Jim Reeves, ClearBridge Consulting

Moderator: Glenn Tabolt, PE, STS Steel, Inc.

Negotiating in a high-stakes, fast paced industry is tough and can be stressful. This session will provide tips on how to negotiate effectively, get the results you want, and manage those tough, hard-bargaining negotiators, even when you think you have little leverage. We'll talk about what you bring to the negotiating table, how you can influence others at the table, different styles and approaches, the importance of preparation, and specific table tactics that will help you become a more effective negotiator.

Engineers, Fabricators, Erectors, Detailers 1.5 AU

The Top 10 Things Guaranteed to Escalate Conflict (And How to Avoid Them)

P5 Wednesday 1:30 – 3:00 p.m. | **room 127**

Speaker: Jim Reeves, ClearBridge Consulting

Building and maintaining strong business relationships are critical in a world in which we must interact, coordinate, trust and rely on each other in order to succeed. Conflict, if not managed, can cause tremendous damage to those relationships and cost everyone time and money. In this session, we'll look at the top 10 things that people often do to cause and escalate conflict, and explore ways of managing conflict to avoid escalation to build stronger, more productive relationships.

Engineers, Fabricators, Erectors, Detailers 1.5 AU

Code of Standard Practice: Preface, Glossary, and Sections 1, 2 & 9 – Understanding Their Legal Implications

P6 Wednesday 8:00 – 9:00 a.m. | **room 231**

Speaker: David Ratterman, Stites & Harbison, PLLC

The AISC *Code of Standard Practice* is an important legal bulwark of the fabricated structural steel industry in the United States. It protects project owners, architects, structural engineers, fabricators, detailers and erectors alike. All have participated in its formulation, and all benefit from its provisions. This session will discuss important legal implications of the Preface, Glossary, and Sections 1, 2 and 9, and the binding nature of many of its provisions.

Engineers, Fabricators, Erectors, Detailers 1.0 PDHs/AU

Get What You Want from the EOR and GC

P7 Wednesday 9:15 – 10:15 a.m. | **room 231**

Speakers: Nyckey Heath, PE, and Carl Williams, PE, Bosworth Steel Erectors, Inc.

Moderator: Ted Sheppard, The DuRoss Group, Inc.

This session will discuss how a fabricator/erector can get what they want from the engineer of record and general contractor by asking the right questions on RFIs, providing solutions they prefer and better communicating what needs to be done in the field.

Fabricators, Erectors 1.0 PDHs/AU

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Effective Project Management

P8 Wednesday 5:00 – 6:00 p.m. | **room 231**

Speaker: Keith Riding, Cives Steel Company

Moderator: Glenn Tabolt, PE, STS Steel, Inc.

Effective project management is crucial to the success of any project, and excellent project management can change your businesses world for the better. In this session you will learn the key steps to being an effective project manager, including how to get a newly awarded project started successfully and seeing it through to completion. You will learn how to handle the dreaded revisions that inevitably always come, as well as what it takes to be an excellent project manager.

Engineers, Fabricators, Erectors, Detailers 1.0 AU

Job Preplan

P9 Thursday 8:00 – 9:00 a.m. | **room 260**

Speaker: Chris Landstrom, Cives Steel Company

Moderator: Glenn Tabolt, PE, STS Steel, Inc.

Your company has just been awarded that new project you have been chasing diligently for months and you have been chosen to manage it. Now what? Having an effective meeting with your team can enable you to build the best possible plan for achieving and exceeding the project goals. In this session you will be provided with information on how to provide an effective pre-planning meeting, who should be involved and some items to consider before it gets started to avoid problems down the road.

Engineers, Fabricators, Erectors, Detailers 1.0 AU

Fundamentals of Project Scheduling for Steel Fabrication

P10 Thursday 9:15 – 10:15 a.m. | **room 240**

Speaker: Mark Holland, Paxton & Vierling Steel Co.

This session will provide the basics of planing and scheduling the steel fabrication and erection process from award to final billing. Attendees will learn the fundamentals of Critical Path Scheduling (CPM) and how to determine the level of detail required to predict outcome but still allow efficient updates to the schedule. Attendees will learn practical strategies to manage shop and customer demands including concepts of baseline, resource management, and presentation of the schedule in different forms.

Engineers, Fabricators, Erectors, Detailers 1.0 AU

Effective Communication for Project Managers

P11 Friday 8:00 – 9:00 a.m. | **room 260**

Speaker: Mark Holland, Paxton & Vierling Steel Co.

Effective communication is key to successful project management. Learn how to improve your communication skills, when to use an email, a letter, or meet face to face. The session will focus on how to communicate with the shop, the customer, the engineer, the detailer, your owner and others involved in project execution.

Engineers, Fabricators, Erectors, Detailers 1.0 AU

Your *Code of Standard Practice* – Sections 5, 6 and 8

P12* Friday 9:15 – 10:15 a.m. | **room 276**

Speaker: Roger O'Hara, PE, Supreme Steel

Moderator: David Ratterman, Stites & Harbison, PLLC

Like any industry, those involved in the design, purchase, fabrication and erection of structural steel have developed trade practices. The AISC *Code of Standard Practice* provides the framework for a common understanding of the acceptable standards when contracting for structural steel, making it useful for anyone associated with construction in structural steel. This session will explore AISC *Code of Standard Practice* Section 5: Materials, Section 6: Shop Fabrication and Delivery, and Section 8: Quality Control.

Fabricators 1.0 PDHs/AU

Tales from the Dark Side

P13 Thursday 4:00 – 5:30 p.m. | **room 124**

Panelists: Aparna Bapu, JLL; Tom Faraone, Turner Construction Co.; Alice Tao, PE, New Line Structures

Moderator: Lynda Leigh

Many designers have the perception that you are going to the "dark side" when you switch from being a designer to working for a subcontractor, general contractor, or owner. However, those who have made the switch have much to share with designers of what they have learned they learned after venturing to the "dark side." This session will have speakers give insights on "I wish I knew A when I worked at B," how to better the communication on projects with insights learned from being in a different role in the industry, as well talk about the potential career as well as even personal growth to be experienced by making a change to a different role.

Engineers, Fabricators, Erectors, Detailers 1.5 AU

roundtables

Fabricator Roundtable

RT1 Wednesday 1:30 – 3:00 p.m. | **room 124**

Fabricators rarely get to talk with their peers in a non-competitive setting. This workshop allows groups of fabricators from different regions of the country, assisted by a moderator, to sit down in small groups and discuss issues critical to the operation and functioning of a structural steel fabrication shop. Discussions will range from dealing with escalation clauses to implementing quality systems. Take advantage of this annual event to learn and explore opportunities with your peers!

Fabricators Only 1.5 AU

1.0 PDH = 0.1 CEU; Attendance credits = AU
(check with your state licensing board for eligibility for professional credits)

roundtables

*streamed session

Industry Roundtable

RT2 Thursday 2:00 – 3:30 p.m. | **room 124**

This roundtable is an opportunity for fabricators, erectors, detailers, service centers and producers to talk openly with each other in a non-competitive setting. Expanding on the popular fabricator roundtable, this workshop enables team players to sit down in small groups and discuss common issues encountered when working together. Each group will be moderated and discussions will range from contractual issues to improving communication and working with BIM. Use this opportunity to explore ideas with your peers, customers and vendors.

Fabricators, Erectors, Detailers — 1.5 AU

seismic

Post-Earthquake Reconstruction of Christchurch: Steel City New Zealand

M1a Wednesday 8:00 – 9:00 a.m. | **room 263**
M1b Friday 10:45 – 11:45 a.m. | **room 274**

Speaker: Michel Bruneau, PEng, PhD, F.CAE, F.ASCE, University at Buffalo

After the 2010–2011 Canterbury earthquakes, much of the Christchurch central business district was demolished and a new city has emerged in its place. Where reinforced concrete buildings dominated, new construction features an extensive number of steel structures and new structural systems for seismic resistance. Interviews with key reconstruction professionals along with data collected from various sources has helped identify some of the drivers influencing the choice of structural materials and systems. This session presents the results of this study.

Engineers — 1.0 PDHs/AU

Let's Talk Seismic – In Language We Can All Understand

M2a Wednesday 9:15 – 10:15 a.m. | **room 274**
M2b* Friday 10:45 – 11:45 a.m. | **room 276**

Speaker: Brent Maxfield, The Church of Jesus Christ of Latter-day Saints

Moderator: Troy Dye, ARW Engineers

The intent of this session is to help bridge the current seismic communication gap. Intended for both non-technical and technical audiences, this session will help engineers explain seismic concepts to a non-technical audience, and will help the non-technical audience better grasp the intent of modern seismic design. An understanding of these concepts will help facilitate informed decisions regarding earthquake risk.

Engineers, Architects — 1.0 PDHs/LU/HSW/AU

The AISC 3rd Edition *Seismic Design Manual*

M3a Wednesday 1:30 – 3:00 p.m. | **room 274**
M3b Thursday 4:00 – 5:30 p.m. | **room 240**

Speakers: James Malley, SE, Degenkolb Engineers; Michael Gannon, SE, AISC

Moderator: Alex Kladiva, SE, PE, Burns and McDonnell

The newly released 3rd Edition of the AISC *Seismic Design Manual* addresses new design provisions with updated tables, examples and aids for steel building design and construction in seismic regions. This session will provide an overview of the most important new information contained in the manual. The new design provisions will be summarized, including some discussion of the rationale behind the revisions and the resulting benefits. Design examples will also be presented.

Engineers, Fabricators, Erectors — 1.5 PDHs/AU

Healthcare Design in High Seismic Areas: Old and New

M4 Wednesday 3:15 – 4:45 p.m. | **room 240**

Speakers: Jay Love, SE, and Daniel Zepeda, SE, Degenkolb Engineers

Moderator: Alex Kladiva, SE, PE, Burns and McDonnell

Seismic design of healthcare facilities has evolved tremendously over the past 50 years. This session will have a two-part focus. The first part will discuss seismic retrofit and rehabilitation design of existing healthcare facilities, taking you through post-Northridge regulations, performance-based analysis and design for retrofit, and agency review processes. The second part explores the design and construction of new hospital facilities using new technologies, drawing from a case study of a recently completed $1.2B medical center featuring an SMF augmented by viscous wall dampers, which dramatically reduced story drifts and overall steel costs.

Engineers, Fabricators, Architects — 1.5 PDHs/LU/HSW/AU

Design of Multi-Tiered Braced Frames

M5a Wednesday 5:00 – 6:00 p.m. | **room 224**
M5b Friday 10:45 – 11:45 a.m. | **room 240**

Speaker: John Rolfes, SE, PE, CSD

Multi-tiered braced frames (MT-BFs) consist of multiple vertically oriented bracing panels that lack intersecting perpendicular framing or diaphragms at the levels between the bracing panels. Due to the ductility demands during a seismic event these frames require special consideration. This presentation will discuss the applicable provisions of the AISC *Seismic Provisions* and the latest developments related to the design and performance of MT-BFs.

Engineers — 1.0 PDHs/AU

1.0 PDH = 0.1 CEU; AIA credits = LU, HSW; Attendance credits = AU
(check with your state licensing board for eligibility for professional credits)

Seismic Design for Non-West Coast Engineers – Part 1

M6 Thursday 2:00 – 3:30 p.m. | **room 240**

Speaker: Michael Engelhardt, PE, PhD, University of Texas at Austin

This two-part session will address basic concepts of seismic design. Part 1 will start with a brief historical perspective of earthquakes, followed by a discussion on the basics of earthquake loading, building dynamic response and the use of ductility in resisting earthquakes.

Engineers 1.5 PDHs/AU

Seismic Design for Non-West Coast Engineers – Part 2

M7 Thursday 4:00 – 5:30 p.m. | **room 224**

Speaker: Michael Engelhardt, PE, PhD, University of Texas at Austin

This two-part session will address basic concepts of seismic design. Part 2 will focus on the performance of steel structures in past earthquakes, computing earthquake loads using the equivalent lateral force method, basic concepts of detailing steel to achieve ductile response, options for structural steel lateral force resisting systems and an overview of the AISC *Seismic Provisions*.

Engineers 1.5 PDHs/AU

Alternative Seismic Systems

M8a* Thursday 8:00 – 9:00 a.m. | **room 275**
M8b Friday 9:15 – 10:15 a.m. | **room 127**

Speakers: Patrick McManus, Novel Structures; Jim Harris, J.R. Harris & Company

Moderator: Jack Petersen, Martin/Martin Consulting Engineers

This session is aimed at demystifying the qualification of alternative seismic force resisting systems using ASCE 7-16, the new ICC AC494 and the FEMA P-695 methodology. A new dual system consisting of steel moment frames and steel braced frames, and a new steel braced frame system with fuse element connectors will be presented as examples. You will also learn the available paths for qualification of moment-frame systems as compared to other steel systems.

Engineers 1.0 PDHs/AU

Seismic Risk Assessment of Buckling Restrained Braces – Including Evaluation of Brace Residual Capacity and Building Performance – Part 1

M9 Wednesday 1:30 – 3:00 p.m. | **room 224**

Speakers: Brandt Saxey, SE, LEED AP, Corebrace; Chia-Ming Uang, University of California at San Diego; Curt Haselton, Haselton Baker Risk Group

This two-part presentation will examine both the performance of the Buckling Restrained Brace (BRB) member itself as well as the performance of BRB framed buildings. Part 1 of the presentation will review the results of recent fatigue testing of BRBs with the goal of being able to determine the remaining life of a BRB member after it has been subjected to an earthquake.

Engineers 1.5 PDHs/AU

Seismic Risk Assessment of Buckling Restrained Braces – Including Evaluation of Brace Residual Capacity and Building Performance – Part 2

M10 Wednesday 3:15 – 4:45 p.m. | **room 224**

Speakers: Brandt Saxey, SE, LEED AP, Corebrace; Chia-Ming Uang, University of California at San Diego; Curt Haselton, Haselton Baker Risk Group

This two-part presentation will examine both the performance of the buckling restrained braced frame (BRB) member itself as well as the performance of buckling restrained braced frame (BRBF) buildings. Part 2 will discuss a method for seismic risk assessment of BRBF buildings, including detailed evaluation of residual drifts resulting from a seismic event. This assessment process uses the FEMA P-58 risk assessment framework and includes an updated method to predict seismic structural responses without needing to build a full detailed nonlinear structural model.

Engineers 1.5 PDHs/AU

To 3 or Not to 3

M11a Wednesday 1:30 – 3:00 p.m. | **room 264**
M11b Thursday 4:00 – 5:30 p.m. | **room 267**

Speakers: Patrick Fortney, University of Cincinnati; John Hooper, Magnusson Klemencic Associates

Moderator: Kim Olson, FORSE Consulting

Specifying a seismic force resisting system (SFRS) with an *R* greater than 3 results in designing for less force. However, it comes at a price! The connections are more expensive due to more stringent strength and detailing requirements. Alternatively, foundations can be sized for smaller loads. This session will examine this trade off and how the selection of a SFRS affects the total building cost, not just the steel tonnage.

Engineers 1.5 PDHs/AU

Seismic Behavior and Design of Steel Diaphragms

M12a* Thursday noon – 1:00 p.m. | **room 276**
M12b Friday 9:15 – 10:15 a.m. | **room 274**

Speakers: Jerry Hajjar, Northeastern University; W. Sam Easterling and Matt Eatherton, Virginia Tech; Ben Schafer, Johns Hopkins University

For years the focus of seismic design of steel buildings has primarily been on the vertical lateral force resisting system. New design methods in ASCE 7, new findings in 3D models of buildings and new experimental research are all shedding new light on the role of diaphragms in the seismic performance of steel buildings. The Steel Diaphragm Innovation Initiative (SDII), a cooperative effort between industry, academia and federal research will provide their latest findings and give the audience a view of the future of steel diaphragm seismic design.

Engineers, Fabricators, Erectors, Detailers 1.0 PDHs/AU

1.0 PDH = 0.1 CEU; Attendance credits = AU
(check with your state licensing board for eligibility for professional credits)

sustainability

Whole-Building Life-Cycle Assessment

G1 Friday 8:00 – 9:00 a.m. | **room 127**

Speakers: Mark Thimons, American Iron & Steel Institute – Steel Market Development Institute; Brandie Sebastian, American Iron and Steel Institute

Moderator: Ben Pitchford, New Millenium Building Systems

Several codes, standards and building rating systems now require or encourage the development of a whole-building life-cycle assessment (LCA) for new building designs. This session will investigate how these assessments are achieved, including identification of some of the potential pitfalls in the process.

Engineers, Architects — 1.0 PDHs/LU/HSW/GBCI/AU

Overview of the Steel Forming Process

G2 Thursday 9:15 – 10:15 a.m. | **room 263**

Speaker: Casimaro Liborio, Gerdau

Moderator: Bray Bourne, Universal Steel, Inc.

This session will provide an in-depth look at how steel scrap is sourced, processed at the mill and recycled again for continual use.

Engineers, Fabricators, Erectors, Detailers, Architects — 1.0 PDHs/LU/GBCI/AU

technology

Get Control of Shop Information

T1 Thursday 8:00 – 9:00 a.m. | **room 264**

Speaker: Rich Steffens, Douglas Steel

Learn how to get control of your records and begin the process of transitioning to digital data storage.

Fabricators — 1.0 AU

What Your Detailing Software Wished You Knew

T2 Thursday 9:15 – 10:15 a.m. | **room 274**

Speakers: Ian Coats, AutoDesk; Mark Allphin, Trimble; Doug Evans, SDS/2

Moderator: Luke Faulkner, AISC

This session is a panel discussion with leading detailing software providers. They will field your questions and discuss what separates great users from good users of detailing software.

Engineers, Fabricators, Detailers — 1.0 AU

The AISC Guide to BIM/Modeling

T3 Wednesday 5:00 – 6:00 p.m. | **room 264**

Speaker: Luke Faulkner, AISC

This session will provide an introduction to the new AISC guide on BIM/Modeling for the Steel Industry. You will receive a comprehensive overview of the content and learn how to use the new guide, as well as have the opportunity to ask any questions you may have about the guide.

Engineers, Fabricators, Erectors, Detailers — 1.0 PDHs/AU

Best Practices for Model Review: An Update

T4 Thursday 4:00 – 5:30 p.m. | **room 127**

Speakers: Andrew Gayer, SE, PE, LEED AP, Jacobs; James Scwartz, SDS/2; Brian Cobb, PE, Structural Detailing, LLC

Moderator: Luke Faulkner, AISC

This session will offer an updated look at shop model review from industry experts and delve into tips and tricks as well as best practices for this rapidly evolving methodology.

Engineers, Fabricators, Detailers — 1.5 PDHs/AU

1.0 PDH = 0.1 CEU; AIA credits = LU, HSW; GBCI = eligible for GBCI CE credits; Attendance credits = AU
(check with your state licensing board for eligibility for professional credits)

educator

Fostering Innovation in Structural Steel

J1 Wednesday 7:00 – 9:00 a.m. | **room 124**
breakfast at 7:00 a.m., program at 7:30 a.m.

Speakers: David Dinehart, Villanova University; Joel Lanning, University of California, Irvine; Kimberly Stillmaker, California State University, Fresno

Open to AISC educator members ONLY.

Join fellow educators for a breakfast, presentation, and discussion on how to foster innovation in students when it comes to structural steel design.

- SSBC: Enhancing Steel Education and Inspiring Creativity In Steel Design by Joel Lanning and Kimberly Stillmaker
- Teaching Modules to Instill an Entrepreneurial Mindset by David Dinehart

note: Full-time faculty members who teach at U.S. universities that attend the Educator Session can be eligible to receive **up to $300 in travel assistance** from AISC. Travel reimbursement requests are submitted following the conference. Receipts are required for reimbursement. Registration is required for this complimentary session.

students connecting with industry sessions

Afternoon Session and Lunch

J2 Thursday noon – 1:30 p.m.
rooms 100–105

Speakers: John Hooper, Magnusson Klemencic Associates; Shelley Finnigan, ArcelorMittal

Open to AISC student members ONLY.

Students will have the opportunity to hear career insights from two distinguished construction industry and design professionals. This two part session will provide upcoming graduates with unique perspectives on the professional world they will soon enter. Students attending the SCIS Afternoon Session will receive a complimentary lunch.

Direct Connect

J3 Thursday 1:30 – 3:00 p.m.
rooms 100–105

Open to AISC student members ONLY.

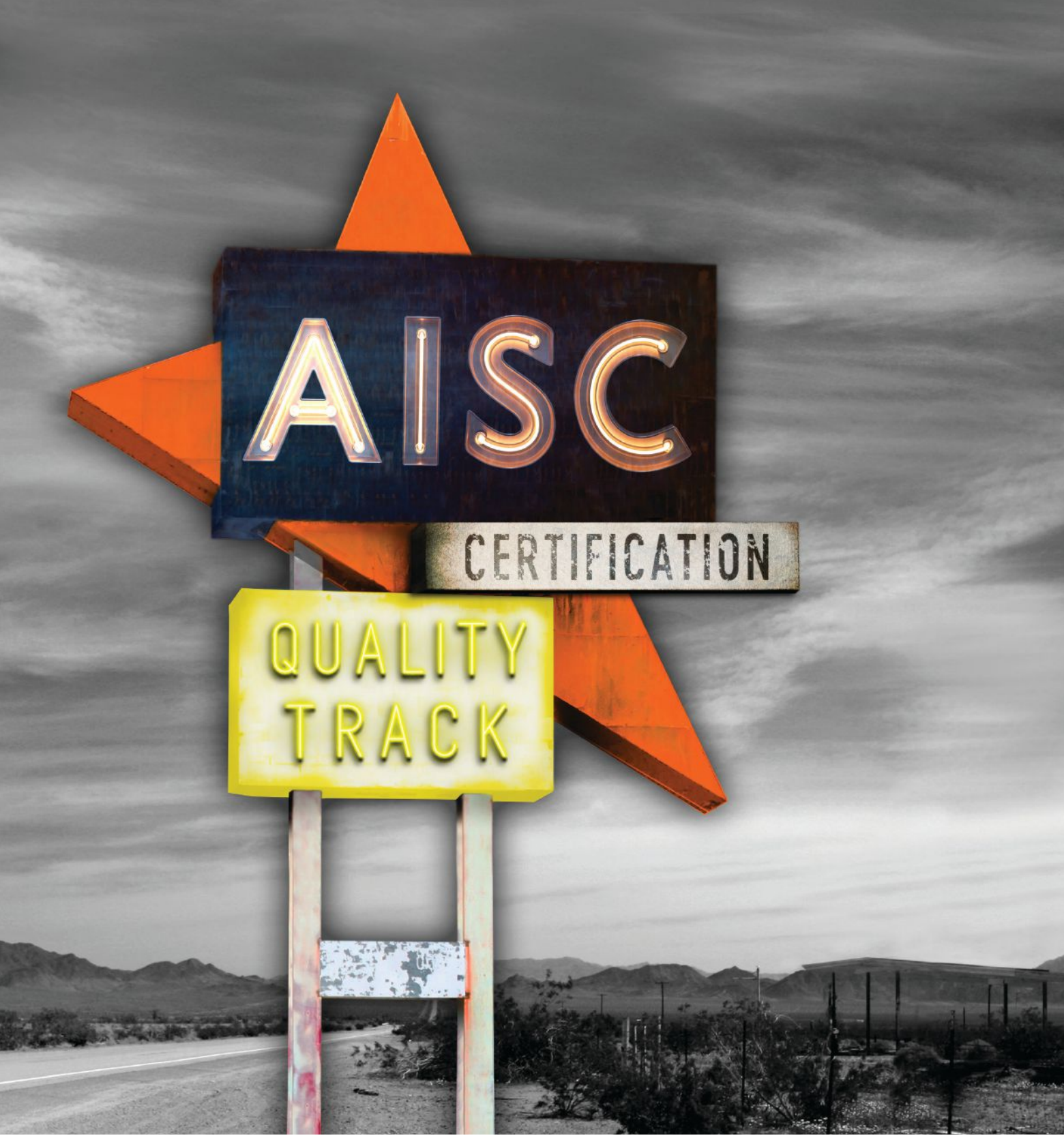
Ever wish you could grab a cup of coffee with the top designers of the leading SE firms? At this event, students will have the opportunity to connect and interact with leading industry experts from design and construction companies around North America in a relaxed setting. While most firms at this event may not be hiring, this is a great opportunity to meet significant designers and make key contacts at major firms.

note: AISC Student Members who are full-time students at U.S. universities that attend SCIS can be eligible to receive **up to $175 in travel assistance** from AISC. Travel reimbursement requests are submitted following the Conference. Receipts are required for reimbursement. Additionally, AISC Student Members that attend SCIS can be eligible to join us at the Conference Dinner. Tickets are distributed upon the close of SCIS. Registration is required for these complimentary student sessions.

Student Steel Bridge Competition on Display

Wednesday 12:15 – 2:00 p.m. | **Hall 1**

Did you know that annually, students at over 200 universities across the nation get hands-on, practical experience by participating in AISC's Student Steel Bridge Competition? Join us Wednesday in the exhibit hall on our mock competition floor and see real competition bridges produced via thousands of hours of design, fabrication and practice assembly. Meet some of this year's participants and get a firsthand look at a program that's been engaging students since 1987!



All signs point to our quality track! Be sure to attend **Q1: AISC Certification Forum** where you'll find out what's on the horizon for 2019. Q1 starts on **Wednesday at 8:00 a.m. in Room 225** and is followed by eleven more lively quality sessions!

CERTIFICATION PROGRAMS

quality

AISC Certification Forum

Q1 Wednesday 8:00 – 9:00 a.m. | **room 225**

Speakers: Mark Trimble and Todd Alwood, AISC; Larry Martof, QMC

Moderator: Max Puchtel, QMC

Find out about new developments in AISC Certification such as free audit resources, documentation audits being conducted during full-renewal audits, the planned 2020 Quality Construction Symposium, and much more. Attendees will have the opportunity to get answers to their certification and audit-related questions.

Fabricators, Erectors 1.0 AU

What Do AISC Certification Complaints and Appeals Policies Mean to Specifiers and Participants?

Q2 Wednesday 9:15 – 10:15 a.m. | **room 225**

Speaker: Roger Ferch, Ferch Assoc.

Moderator: Mark Trimble, AISC

Often certified participants and the steel industry are unaware these resources exist, but what are they and how are they used? This session will answer these questions and cover several sample cases (while keeping the players confidential).

Fabricators, Erectors 1.0 AU

Let's Set that Goal!

Q3 Wednesday 1:30 – 3:00 p.m. | **room 225**

Speaker: Lee Patza, EQS Services

Moderator: Taylor Cook, QMC

Goals can be a tricky subject for participants, but this session breaks down what makes a good goal and what it includes, like a baseline and associated metrics. Come ready to master your goals (and enjoy an afternoon candy break)!

Fabricators, Erectors 1.5 AU

Teamwork: No One in this Room is Smarter than All of Us

Q4 Wednesday 3:15 – 4:45 p.m. | **room 225**

Speaker: Chris Crosby, Cianbro

Moderator: Art Bustos, AISC

"The cost of active disengagement in the U.S. is estimated to be more than $500 billion annually." We've heard and read about the importance of teamwork and team engagement in the workplace many times over. How do we build an engaged, effective team? This session will teach managers how to build a team that's just that!

Fabricators, Erectors 1.5 AU

Areas of Concern and Corrective Action Requests: Streamlining the Process and Talking About the Root Cause

Q5 Wednesday 5:00 – 6:00 p.m. | **room 225**

Speakers: Linda Hale and David Webb, QMC

Moderator: Dennis Haught, QMC

With fabricators converting to the new standard and erectors starting on June 1, 2019, Areas of Concern and Corrective Action Requests are popular topics for certified participants. This session will cover ways to respond and streamline those processes, and investigate how to satisfy your root cause analysis requirements.

Fabricators, Erectors 1.0 AU

What Does "Management Review" Really Mean?

Q6 Thursday 8:00 – 9:00 a.m. | **room 225**

Speaker: Anna Petroski, Atema, Inc.

Moderator: Todd Alwood, AISC

This session takes an interactive look at one approach to conducting a meaningful management review for erectors and fabricators. It will also review the minimum requirements for conducting a management review as required by the AISC *Certification Program Requirements and Standard*. So, be sure to attend and move your management review to the next level!

Fabricators, Erectors 1.0 AU

I Have a Quality Manual and Procedures – Now What?

Q7 Thursday 9:15 – 10:15 a.m. | **room 225**

Speaker: Lee Pielaet, Pioneer Steel Services

Moderator: Larry Martof, QMC

We're answering your questions from the ground up! Do I have to follow my procedures? How do I get management/staff buy-in? What do I do with my reports/records, etc.? This session helps you chart your next steps once you have your manual and your procedures are on paper.

Fabricators, Erectors 1.0 AU

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(check with your state licensing board for eligibility for professional credits)

quality

The New Certification Standard: Update for Erectors

Q8 Thursday noon – 1:00 p.m. | **room 225**

Speakers: David Webb and Dennis Haught, QMC

Moderator: Max Puchtel, AISC

This session explores the new *Certification Standard for Steel Fabrication and Erection, and Manufacturing of Metal Components* (AISC 207-16), which takes effect for erectors on June 1, 2019. This *Standard* brings together provisions from the four individual predecessor standards relating to the four industry segments: steel building fabrication, steel bridge fabrication, steel erection, and metal component manufacturing with the goal of providing consistency and transparency across all industry programs. This session will also discuss the implementation process for erectors.

Erectors 1.0 AU

Steel Erectors Panel Discussion on Quality Control

Q9 Thursday 2:00 – 3:30 p.m. | **room 225**

Speakers: Sam Tipton, Chicago Steel Construction, LLC; Philip Torchio, Williams Erection Co., Inc.; Andrew Lye, Schuff Steel

Moderator: Mark Yerke, S&R Enterprises LLC

Do you think quality control is the job of the special inspector? What about Chapter N or your Quality Control Inspector (QCI)? This lively panel discussion will share the insights of three brilliant erectors with years of experience in the business–it will be worth attending for the stories alone!

Erectors 1.5 AU

Let's Get Down to the Nuts and Bolts (and Welding Electrodes): All About Jobsite Storage

Q10 Thursday 4:00 – 5:30 p.m. | **room 225**

Speaker: Dennis Haught, QMC

Moderator: Loren Thomas, AISC

This may not sound like the most exciting topic, but every year erectors receive Corrective Action Requests for improperly storing structural bolts and welding electrodes. This session will offer solutions to help streamline your daily methods and oversight of field storage.

Erectors 1.5 AU

The Paint Certification Primer

Q11 Friday 8:00 – 9:00 a.m. | **room 225**

Speakers: Zane Keniston, Structural Steel Parts, Inc.

Moderator: Larry Martof, QMC

This session will answer two major paint certification questions: What does the certified fabricator need to include within their procedures for paint requirements? And what do you need to consider if you're thinking about applying for the Sophisticated Paint Endorsement (SPE)? You'll also have the chance to quiz the speaker and moderator about any paint questions you may have!

Fabricators 1.0 AU

The Real Secret of Calibration

Q12 Friday 9:15 – 10:15 a.m. | **room 225**

Speaker: Larry Martof, QMC

Moderator: Todd Alwood, AISC

Lately, AISC & QMC have heard talk about all sorts of calibration issues, and this session is here to clear up some of those misconceptions. Attendees will get examples and learn tricks to help streamline the process at their shop or erection site. Come ready with your questions; we'll have the answers!

Fabricators, Erectors 1.0 AU

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WORLD STEEL BRIDGE SYMPOSIUM

sessions

Improving the Quality of Steel Bridge Fabrication Through Communication

B1 Wednesday 8:00 – 9:00 a.m. | **room 130**

Speakers: Brad Dillman, PE, High Steel Structures; Chris Crosby, PE, Cianbro Fabrication

Moderator: Chris Crosby, Cianbro

As project delivery methods evolve and schedules continue to accelerate, clear communication of design intent and requirements in contract documents becomes crucial for successful projects. This session offers insights into common design issues and how bridge fabricators and designers can work together to improve the quality of steel bridges.

Engineers 1.0 PDHs/AU

Pedestrian Bridges – Unique Design and Analysis

B2 Wednesday 8:00 – 9:00 a.m. | **room 131**

Speakers: William Goulet, SE, and Marian Barth, PE, STV Incorporated; Dipal Vimawala, PE, and Jixign He, AECOM

Moderator: Geoff Swett, SE, PE, WDOT

Bridges that carry people-only sometimes take a back burner to vehicular bridges. We have to case studies to prove that preconceived notion wrong. The Fanny Appleton Bridge is a slender vierendeel arch that was part of the Longfellow Bridge Design-Build project and involved significant vibration analysis. The 41st Street Pedestrian Bridge located just south of downtown Chicago spans over historical Lake Shore Drive and six active railroad tracks and features an elegant S-curve—no small feat for any bridge, especially over Lake Shore Drive.

Engineers, Detailers 1.0 PDHs/AU

Research and Construction of Press-Brake-Formed Steel Tub Girder Bridges

B3 Wednesday 9:15 – 10:15 a.m. | **room 130**

Speakers: Karl Barth, PhD, West Virginia University; Guy Nelson, SE, PE, TEG Engineering

Moderator: Finn Hubbard, PE, Fickett Structural Solutions

This session presents recent research and case studies construction of press-brake-formed steel tub girders along with lessons learned in the process.

Engineers, Fabricators 1.0 PDHs/AU

New and Exciting Changes to Welding for Bridges

B4 Wednesday 9:15 – 10:15 a.m. | **room 131**

Speakers: Ronnie Medlock, PE, High Steel Structures; Nina Choy, PE, California DOT

Moderator: Soliman Khudeira, SE, PE, PhD, Chicago DOT

A new bridge welding reference will be published in 2019 and this session is a great opportunity to learn about it. This session will also review recent updates to AWS D1.5.

Engineers, Fabricators, Detailers 1.0 PDHs/AU

Redundancy of Steel Bridges – Part 1

B5 Wednesday 1:30 – 3:00 p.m. | **room 130**

Speakers: Francisco Bonachera Martin, Purdue University; Dave Kiekbusch, Wisconsin DOT; Robert Connor, PhD, Purdue University

Moderator: Matthew Hebdon, Virginia Tech

Two new guide specifications on bridge redundancy have recently been adopted by AASHTO: *Internal Redundancy of Mechanically-fastened Built-up Steel Members* and *Analysis and Identification of Fracture Critical Members and System Redundant Members*. In this first part of a two-part series, speakers will discuss the implementation of the guide specifications to leverage redundancy in the analysis of steel bridges.

Engineers 1.5 PDHs/AU

1.0 PDH = 0.1 CEU; Attendance credits = AU
(check with your state licensing board for eligibility for professional credits)

The Steel Advantage in Accelerated Bridge Construction

B6 Wednesday 3:15 – 4:45 p.m. | **room 130**

Speakers: Christian Ray, PE, PEng, PMP, Jacobs; Mike Laviolette, PE, PEng, and Roger Eaton, HDR, Inc.; Jason Zang, Pennsylvania DOT

Moderator: Eric Myers, Nucor

Owners are experiencing increasing constituent pressure to reduce construction time for infrastructure projects, increasing demand for Accelerated Bridge Construction (ABC). This session will look at case studies where steel was integral to project success.

Engineers, Fabricators, Erectors, Detailers, 1.5 PDHs/AU

It's All in the Details

B7 Wednesday 1:30 – 3:00 p.m. | **room 131**

Speakers: Todd Helwig, PhD, University of Texas at Austin; Gary Prinz, PhD, University of Arkansas; Gary Wisch, PE, DeLong's, Inc.

Moderator: John Hastings, NSBA

Efficient and effective details can be the difference between a successful project and a not-so-successful one. This session will cover cross-frame details, innovative changes to shear studs, and cost-effective steel details.

Engineers, Fabricators, Erectors, Detailers 1.5 PDHs/AU

Steel Bridge Rehabilitation, Retrofit, and Reuse – Part 1

B8 Wednesday 3:15 – 4:45 p.m. | **room 131**

Speakers: Brandon Chavel, PE, PhD, Jacob Wroten, PE, and Gregory Kuntz, PE, HDR, Inc.; Mark Ennis, PE, and Alison Love, STV, Inc.; Stacy McMillan, PE, Missouri Department of Transportation (MoDOT)

Moderator: Ryan Sherman, PhD, University of Nevada, Las Vegas

Faced with challenges of aging inventory, increased loads and limited budgets, steel bridge owners are increasingly adapting their structures to meet current and future demands. This session will present case studies demonstrating the rehabilitation, retrofit,and reuse of steel bridges.

Engineers, Fabricators, Erectors 1.5 PDHs/AU

The Rehabilitation of the Pulaski Skyway Bridge

B9 Wednesday 5:00 – 6:00 p.m. | **room 130**

Speakers: Ruben Gajer, ARORA and Associates

Moderator: Michel Bruneau, PEng, PhD, F.CAE, F.ASCE, University at Buffalo

Located in northeastern New Jersey, the 3.5-mile-long Pulaski Skyway Bridge has been recently rehabilitated. This presentation will include project background, development of project criteria, overview of seismic analysis, and a summary of the steel rehabilitation.

Engineers, Fabricators, Erectors, Detailers 1.0 PDHs/AU

Design and Maintenance of Steel Bridges for Corrosion Control

B10 Wednesday 5:00 – 6:00 p.m. | **room 131**

Speakers: Peter Ault, PE, Elzly Technology; Jason Provines, PE, Virginia Department of Transportation

Moderator: Chris Higgins, PE, PhD, Oregon State University

Corrosion can negatively impact the aesthetics, serviceability, and long-term structural integrity of any bridge. Recent innovations in corrosion resistant steels and corrosion control offer new opportunities for corrosion mitigation in steel bridges. This session provides attendees with background information on corrosion of steel bridges, available alternatives and important factors to consider for corrosion control.

Engineers, Fabricators, Detailers 1.0 PDHs/AU

Steel Bridge Design and Practice in Europe and Japan

B11 Thursday 8:00 – 9:00 a.m. | **room 130**

Speakers: Henk Kolstein, PhD, Delft University of Technology; Chitoshi Miki, PhD, Tokyo City University

Moderator: Dayi Wang, PE, PhD, FHWA

Steel bridge design and practice in Europe and Japan will be compared to the practice in the U.S. Topics will include fracture critical design and redundancy, orthotropic deck design, fabrication, detailing and tolerances and quality control with automation.

Engineers, Fabricators, Erectors, Detailers, 1.0 PDHs/AU

Fatigue: Unique Loading & Crack Detection Technology

B12 Thursday 8:00 – 9:00 a.m. | **room 131**

Speakers: William Collins, PE, PhD, University of Kansas; Natalie McCombs, SE, PE, HNTB

Moderator: John Jones, PE, Kansas DOT

Fatigue is an important consideration for steel bridge design. This session explores a unique loading case that resulted in cracking in uncommon locations. It also explores difficulties with digital image correlation as it relates to inspection.

Engineers, Fabricators, Detailers 1.0 PDHs/AU

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Steel Bridge Design Resources: Introduction and Application

B13 Thursday 9:15 – 10:15 a.m. | **room 130**

Speakers: Brandon Chavel, PE, PhD, and Domenic Coletti, PE, HDR, Inc.

Moderator: Ryan Sherman, PhD, University of Nevada, Las Vegas

The first half of this session will provide steel bridge designers with an overview of the most useful design resources available, while the second half will walk attendees through an example of how to use these valuable tools.

Engineers 1.0 PDHs/AU

Challenging and Unique Projects – Part 1

B14 Thursday 9:15 – 10:15 a.m. | **room 131**

Speakers: Soliman Khudeira, SE, PE, PhD, Chicago DOT; Thomas Densford, PE, STANTEC

Moderator: Sammy Elsayed, PE, Skanska USA Civil

Steel lends itself well to unique projects, illustrated by these two case studies: a bridge having a parabolically shaped steel tied-arch and a curved bridge having wedge-shaped girder envelope cross-section.

Engineers 1.0 PDHs/AU

A Second Look at Corrosion: Uncoated Weathering Steel Update & High-Performance Coatings in Florida

B15 Thursday noon – 1:00 p.m. | **room 130**

Speakers: Jennifer McConnell, PE, PhD, University of Delaware; Paul Vinik, PE, Greenman-Pedersen Inc.

Moderator: Soliman Khudeira, SE, PE, PhD, Chicago Department of Transportation

This session takes a fresh look at advances in uncoated weathering steel, specifically how different environments affect performance, and examines the effects of the environment on the service life of structural steel coatings.

Engineers, Fabricators 1.0 PDHs/AU

Challenging and Unique Projects – Part 2

B16 Thursday noon – 1:00 p.m. | **room 131**

Speakers: Irsilia Colletti, PE, HNTB; Herbert Protin, PE, HDR, Inc.

Moderator: Tony Hunley, SE, PE, PhD, Stantec

Steel lends itself well to unique projects. This session discusses a hydraulic transfer bridge in New York and a challenging curved bridge with unique ownership constraints in Chicago.

Engineers, Fabricators, Erectors, Detailers 1.0 PDHs/AU

Redundancy of Steel Bridges – Part 2

B17 Thursday 2:00 – 3:30 p.m. | **room 130**

Speakers: Tony Shkurti, PE, PhD, HNTB; Brian Kozy, PE, PhD, FHWA; Jason Lloyd, SE, PE, PhD, NSBA; Francesco Russo, PE, PhD, Michael Baker, Jr.; Matthew Hebdon, PhD, Virginia Tech

Moderator: Julie Whitehead, Burns & McDonnell

Two new guide specifications on bridge redundancy have recently been adopted by AASHTO: *Internal Redundancy of Mechanically-fastened Built-up Steel Members* and *Analysis and Identification of Fracture Critical Members and System Redundant Members*. In this second part of a two-part series, speakers will discuss the implementation of the guide specifications to leverage redundancy in the analysis of steel bridges.

Engineers 1.5 PDHs/AU

Long Span Bridges

B18 Thursday 2:00 – 3:30 p.m. | **room 131**

Speakers: Jeff Smith, PE, and Samantha Kevern, PE, HNTB; Robert Magliola, SE, PE, Parsons; Dennis Heckman, PE, Missouri Department of Transportation

Moderator: Dayi Wang, PE, PhD, FHWA

Steel's superior strength-to-weight ratio makes it a first choice for long span bridges, helping keep overall projects costs lower. This session will present three case studies: Champ Clark Bridge over the Mississippi River Design-Build Project; Trunk Highway 53 over Rochleau Mine; Anchor Box Design for an Asymmetrical Cable Stayed Bridge.

Engineers, Fabricators, Erectors, Detailers 1.5 PDHs/AU

Steel Bridge Rehabilitation, Retrofit, and Reuse – Part 2

B19 Thursday 4:00 – 5:30 p.m. | **room 130**

Speakers: Francesco Russo, PE, PhD, Michael Baker International; Caroline Bennett, PhD, University of Kansas; Tyler Thomas, Flame-on, Inc.

Moderator: John Jones, PE, Kansas DOT

Refurbishing aging steel bridges is a cost effective solution for owners who want to extend bridge life. Steel is a resilient solution for bridges because of its ability to be repaired when damaged. This session will present case studies for heat straightening and repairing fatigue-induced damage.

Engineers, Fabricators, Detailers 1.5 PDHs/AU

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(check with your state licensing board for eligibility for professional credits)

Challenges Encountered During Construction and Demolition

B20 Thursday 4:00 – 5:30 p.m. | **room 131**

Speakers: Fady Kari, PE, Siefert Associates; Lucas Morgan, PE, Siefert Associates; Paul Biju-Duval, PhD, LUSAS; Telmo Andres Sanchez, PhD, Adstren Cia. Ltda.

Moderator: John Hastings, NSBA

Three case studies will review lessons learned during the construction/demolition phase of projects. The first addresses the stability of long span built-up riveted girders during demolition; the second focuses on haunched girder bridges; and the last addresses launching of steel girder bridges.

Engineers, Erectors 1.5 PDHs/AU

New AASHTO ABC Guide Specification & Unique Projects

B21 Friday 8:00 – 9:00 a.m. | **room 130**

Speakers: Mike Culmo, PE, CME Engineering; Jake Williams, PE

Moderator: Eric Myers, Nucor

AASHTO has recently approved a new guide specification on Accelerated Bridge Construction (ABC). This session will present provisions for ABC that affect steel bridges, review the advantages of steel for ABC technologies, and look at a unique project that leveraged steel's ABC capabilities.

Engineers, Fabricators, Erectors, Detailers 1.0 PDHs/AU

Technologies to Assist with Bridge Design, Fabrication, and Construction

B22 Friday 8:00 – 9:00 a.m. | **room 131**

Speakers: Grant Schmitz, PE, HDR; Hoda Azari, PhD, USDOT-FHWA

Moderator: Justin Ocel, PhD, PE, FHWA

Attendees of this session will learn of two advanced technologies that are new to steel bridge industry: an implementation of building information modeling to a complex interchange of curved steel bridges and an overview of the use of the Total Focus Method/Full Matrix Capture ultrasonic inspection method in steel bridge fabrication.

Engineers, Fabricators, Erectors, Detailers 1.0 PDHs/AU

2018 Prize Bridges

B23 Friday 9:15 – 10:15 a.m. | **room 130**

Speakers: Bob Goodrich, PE, OBEC Consulting Engineers; Jason Provines, PE, Virginia DOT

Moderator: Geoff Swett, SE, PE, WSDOT

This sessions highlights two 2018 NSBA Prize Bridge Award Winners. The Peter Courtney Minto Island Bicycle and Pedestrian Bridge connects downtown Salem to Minto-Brown Island Park. The Rt. 340 Bridge is constructed with ASTM A709 Grade 50CR (A1010).

Engineers, Fabricators, Erectors, Detailers 1.0 PDHs/AU

Steel Bridge Rehabilitation, Retrofit, and Reuse – Part 3

B24 Friday 9:15 – 10:15 a.m. | **room 131**

Speakers: Gregory Taravella, PE, and James Costigan, Modjeski and Masters; Joshua Pudleiner, PE, STSC, and Barry Colford, PE, CEng, FICE, AECOM

Moderator: Tony Hunley, SE, PE, PhD, Stantec

Preserving existing long-span and unique steel bridges is common given the large number and long life-spans of these types of structures. Two case studies are presented: the first involves the floor system and bottom chord of a bascule bridge and the second covers maintaining various systems of long span bridges.

Engineers, Fabricators, Erectors, Detailers 1.0 PDHs/AU

Rating and Evaluation of Existing Steel Bridges

B25 Friday 10:45 – 11:45 a.m. | **room 130**

Speakers: Amanda Bao, PE, PhD, Rochester Institute of Technology; Christopher Higgins, PE, PhD, Oregon State University

Moderator: Chris Higgins, Oregon State University

While most older bridges were designed with allowable stress design, modern evaluation is now performed using the AASHTO *Manual for Bridge Evaluation* (*MBE*) which uses load and resistance factor methods. Existing bridges may exhibit deterioration that can affect their strength, but methods to include condition states in quantitative evaluation tasks are lacking. This session provides new tools for evaluating steel bridge members and connections. It includes *MBE*-compatible calibration of resistance models for steel pin and hanger connections and details methods to account for corrosion damage in evaluating steel girders.

Engineers 1.0 PDHs/AU

Advances in the Design Code & AASHTO Design Code Compared to International Codes

B26 Friday 10:45 – 11:45 a.m. | **room 131**

Speakers: Michel Bruneau, PEng, PhD, F.CAE, F.ASCE, University at Buffalo; Hadi Kenarangi, PhD, Modjeski and Masters; Terry Cakebread, LUSAS

Moderator: Chris Crosby, Cianbro

Circular reinforced-concrete-filled steel tubes are growing in popularity and are the topic of the first presentation of this session, summarizing findings from project NCHRP-12-93 on when the contribution of steel casing to the structural resistance can be taken into account in shaft foundations of bridges. In a second presentation, focusing on truss bridges, the AASHTO design code will be compared to the Canadian bridge design code, the Eurocode, and other international codes to examine which provisions seem most adrift and what assumptions underlie the differences.

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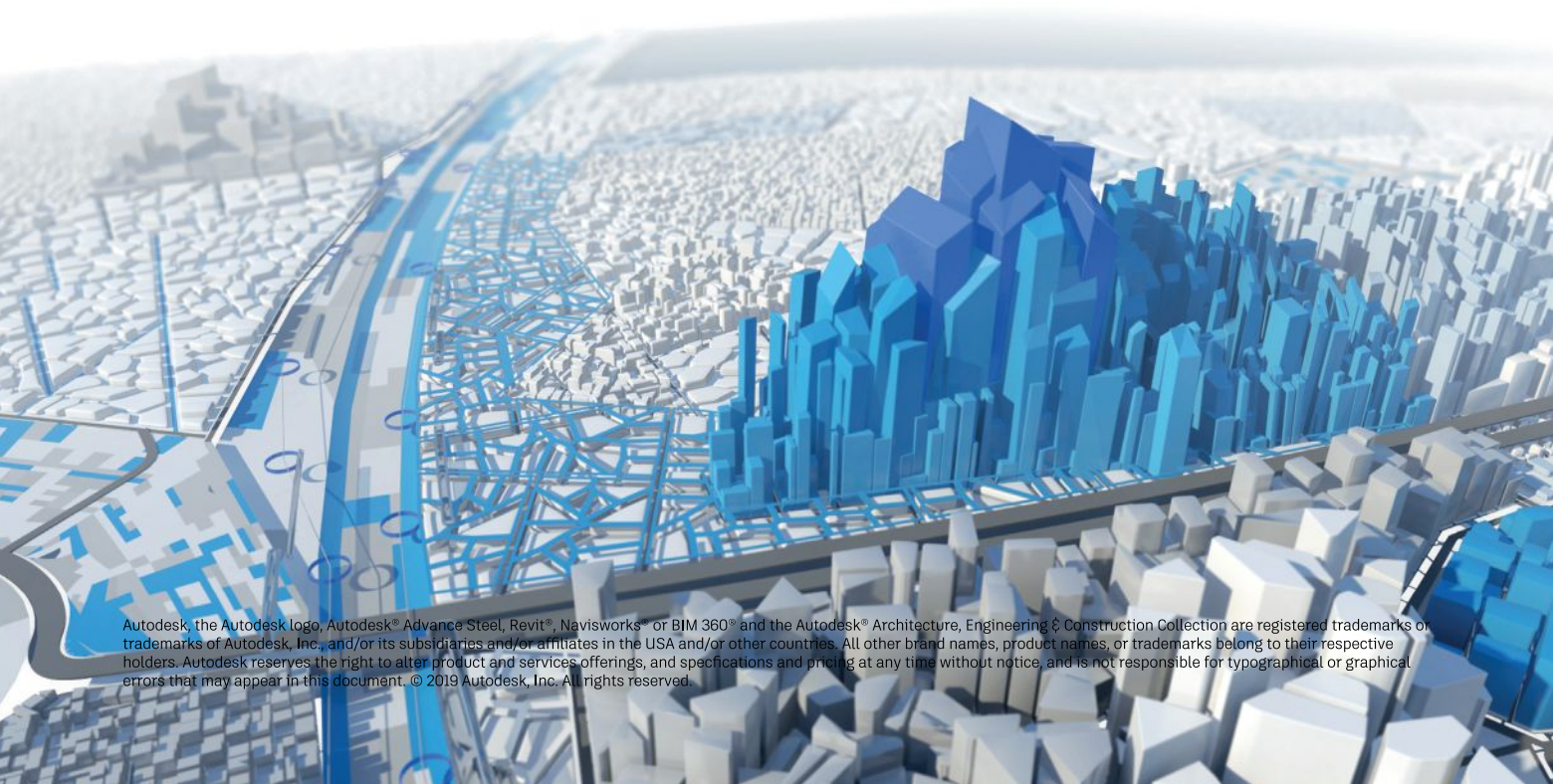

2019 SSRC annual meeting

Welcome Tuesday 1:00 – 1:10 p.m. | Daniel Linzell, University of Nebraska-Lincoln

Stability of Structural Members

SS1 Tuesday 1:10 – 2:30 p.m.
room 274

Moderator: Erica Fischer, Oregon State University

The Strength of Rotary-Straightened Steel Columns
Xiaomeng Ge and Joseph A Yura, The University of Texas at Austin, Austin, TX

Local Buckling of I-Shape Members Bent about Their Weak Axis
Anjan K. Bhowmick, Concordia University, Montreal, Quebec, Canada; Gilbert Y. Grondin, AECOM Canada Ltd, Edmonton, Canada

Flexural-Torsional Deformations of Imperfect Thin-Walled Columns with Continuous Bracing
Raymond H. Plaut, Virginia Tech, Blacksburg, VA; Cristopher D. Moen, NBM Technologies, Inc., Baltimore, MD

Topology Optimization of Top Lateral Bracing for Steel Tub Girder Systems Using Genetic Algorithm
Liwei Han, CHI Consulting Engineers, Summit, NJ; Yang Wang, the University of Texas at Austin, Austin, TX

Experimental and Numerical Studies on the M-V-N Interaction of Longitudinally Stiffened I-Girders
André Biscaya and José O. Pedro, University of Lisbon, Lisbon, Portugal; Ulrike Kuhlmann, Universität Stuttgart, Institut für Konstruktion und Entwurf, Stuttgart, Germany

Engineers 1.0 PDHs/AU

Yoon Duk Kim Memorial Session

SS2 Tuesday 3:00 – 4:20 p.m.
room 274

Moderator: Larry A. Fahnestock, University of Illinois at Urbana-Champaign

Global Lateral – Torsional Buckling of Steel I-Girder Bridges
T. Andres Sanchez, Andres F. Robalino, and Santiago P. Zaruma, ADSTREN, Quito, Ecuador

Streamlined Design of Nonprismatic I-Section Members
Ryan Slein and Donald W. White, Georgia Institute of Technology, Atlanta, GA

Application of Inelastic Buckling Analysis for Design Assessment of Frames Using Nonprismatic I-section Members
Oguzhan Togay, Ryan Slein, and Donald W. White, Georgia Institute of Technology, Atlanta, GA

Stability of a Tapered Power Pole under Extreme Loading
Cliff D. Bishop, Exponent Inc., Atlanta, GA; Morgan Griffith, Brian M. McDonald, and Joel M. Wolf, Exponent Inc., Menlo Park, CA

Engineers 1.0 PDHs/AU

Overview of Task Group Objectives

Tuesday 4:20 – 4:30 p.m. | **room 274** | Erica Fischer, Oregon State University

International Liaison Committee Meeting Tuesday 4:30 – 4:45 p.m. | **room 274**

Task Group Meetings

SS3/4 Tuesday 4:45 – 6:50 p.m.

TG02 4:45 – 5:10 p.m. | **room 265** | Members: Stability of Steel Members
Chair: Craig E. Quadrato, Wiss, Janney, Elstner Associates, Inc., Austin, TX

TG03 5:10 – 5:35 p.m. | **room 266** | Systems: Stability of Steel Systems, Especially Frames
Chair: Benjamin W. Schafer, Johns Hopkins University, Baltimore, MD

TG04 5:35 – 6:00 p.m. | **room 265** | Stability of Metal Bridges and Bridge Components
Chair: T. Andrés Sánchez, ADSTREN, Quito, Ecuador

TG05 6:00 – 6:25 p.m. | **room 266** | Thin-Walled Structures
Chair: Kara Peterman, University of Massachusetts Amherst, Amherst, MA

TG06 6:25 – 6:50 p.m. | **room 265** | Extreme Loads: Stability under Extreme Loads
Chair: Mina Seif, National Institute of Standards and Technology, Gaithersburg, MD

SSRC Annual Business Meeting

SS5 Tuesday 7:00 – 7:30 p.m.
room 274

- SSRC Business Meeting
- Presentation of the 2019 Yoon Duk Kim Young Researcher Award
- Presentation of the 2019 Vinnakota Award
- Presentation of the 2018 MAJR Medal
- Presentation of the 2019 Beedle Award

SSRC Social Hour and 75th Anniversary Celebration

SS6 Tuesday 7:30 – 8:30 p.m. | **room 274**

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SSRC ANNUAL STABILITY CONFERENCE

sessions

Advances in Stability Analysis

S1 Wednesday 8:00 – 9:00 a.m.
room 241

Moderator: Benjamin W. Schafer, Johns Hopkins University

Welcome to the 2019 SSRC Annual Stability Conference
Larry Fahnestock, University of Illinois at Urbana-Champaign

Accurate Direct Strength Method (DSM) Prediction of Column Flexural-Torsional Failure Loads
Pedro B. Dinis, Dinar Camotim and André D. Martins, University of Lisbon, Lisbon, Portugal; Alexandre Landesmann, COPPE – Federal University of Rio de Janeiro, Rio de Janeiro, Brazil

Application of Geometrically Exact Beam Finite Elements in the Advanced Analysis of Steel and Steel-Concrete Beam-Columns
Rodrigo M. Gonçalves, Guilherme M. C. O. Carvalho, José T. O. P. de Silveira, and Manuel J. L. de Sousa, Nova University of Lisbon, Lisbon, Portugal

Validation Study of a New Inelastic Material Model for Steel W-Shapes
Barry T. Rosson, Florida Atlantic University, Boca Raton, FL;
Ronald D. Ziemian, Bucknell University, Lewisburg, PA

Design by Advanced Elastic Analysis – An Investigation of Beam-Columns Resisting Minor-Axis Bending
Yunfei (Phoebe) Wang, Cornell University, Ithaca, NY; Ronald D. Ziemian, Bucknell University, Lewisburg, PA

Engineers 1.0 PDHs/AU

Stability of Beams and Girders

S2 Wednesday 9:15 – 10:15 a.m.
room 241

Moderator: Anjan K. Bhowmick, Concordia University

Torsional Bracing Requirements on the Stability of Steel I-Girders
Yangqing Liu, Tongji University, Shanghai, China; Todd A. Helwig, University of Texas at Austin, Austin, TX

Large-scale Lateral-torsional Buckling Tests of Welded Girders
Xiao Lin Ji, Robert G. Driver, and Ali Imanpour, University of Alberta, Edmonton, Canada

On the Interaction Between Local and Lateral-Torsional Buckling of I-Shaped Slender Section Beams
Carlos Couto and Paulo V. Real, RISCO University of Aveiro, Aveiro, Portugal

Distortional Buckling Behavior and Design Consideration of Castellated Beams Considering Residual Stresses
Xuhong Zhou, Ziqi He, Peng Chen, and Jingchao Li, Chongqing University, Chongqing, China; Zhanjie Li, SUNY Polytechnic Institute, Utica, NY

Engineers 1.0 PDHs/AU

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Stability under Seismic Loading

S3 Wednesday 1:30 – 3:00 p.m.
room 241

Moderator: Matthew R. Eatherton, Virginia Tech

Seismic Stability of Special Concentrically Braced Frames in a Moderate Seismic Region
Kelley D. M. Grabner, KPFF, Seattle, WA; Larry A. Fahnestock, University of Illinois at Urbana-Champaign, Urbana, IL

Seismic Performance of Corrugated Double-Skin Composite Shear Walls with Different Aspect Ratios
Qiuhong Zhao and Yikang Li, Tianjin University, Tianjin, China; Ying Tian, University of Nevada, Las Vegas, NV

Seismic Performance and Impact of Geometric Nonlinearity on 3D Steel Braced Frame Building Models
Hamid Foroughi and Benjamin W. Schafer, Johns Hopkins University, Baltimore, MD; Gengrui Wei and Matthew R. Eatherton, Virginia Tech, Blacksburg, VA

Design of Fixed-Base Hollow Structural Section Subjected to Large Seismic Drift
Hye-eun Kong and Matthew R. Eatherton, Virginia Tech, Blacksburg, VA; Benjamin W. Schafer, Johns Hopkins University, Baltimore, MD

Uncertainties in Collapse Analysis of Framed Structures Due to Seismic Excitation
Kevin K.F. Wong, National Institute of Standards and Technology, Gaithersburg, MD

Stability Evaluation of Cold Formed Steel Pallet Racks under Seismic Condition – A Numerical and Shake Table Study
Arul Jayachandran Sanjeevi, Indian Institute of Technology, Chennai, India

Engineers 1.5 PDHs/AU

Presentation Session for Beedle and McGuire Awards

S4 Wednesday 3:15 – 4:45 p.m.
room 241

Moderator: Todd A. Helwig, University of Texas at Austin

Beedle Award Presentation: A Stability Journey – Diaphragms, Cold-Formed Steel and the SSRC

W. Samuel Easterling, Virginia Tech, Blacksburg, VA

W. Samuel Easterling is the Montague-Betts Professor of Structural Steel Design and Department Head in the Via Department of Civil and Environmental Engineering at Virginia Tech. Easterling received his BSCE and MSCE from West Virginia University and his PhD in Structural Engineering from Iowa State University. He is a registered professional engineer in Virginia. Easterling has taught courses in structural steel design and cold-formed steel design. He has directed research and consulted on projects dealing with a variety of steel-concrete composite and cold-formed steel structures, including composite and non-composite diaphragms. He has been active professionally within AISC, AISI, ASCE and SSRC. His leadership roles have included serving as Chair of the SSRC from 2006–2009.

This award has been established in honor of the late Lynn S. Beedle, an international authority on stability and the development of code criteria for steel and composite structures.

MAJR Medal Presentation: Ten Years of Stability of Structural-Steel Research: The Hot, the Cold, and the Ugly

Mina Seif, National Institute of Standards and Technology (NIST), Gaithersburg, MD

Dr. Mina Seif is a licensed Professional Engineer working as research structural engineer in the National Fire Research Laboratory (NFRL) at the National Institute of Standards and Technology (NIST). Seif's primary research interests relate to the assessment of structural performance under extreme loads, particularly under fire-induced heating. Prior to joining NIST, Seif received a MSc followed by a PhD in Structural Engineering from the Johns Hopkins University, where his research focused on the cross-sectional stability of high strength structural steel. Seif has also earned a MSc degree in Structural Engineering from Cairo University where his thesis focused on seismic assessment of reinforced concrete buildings. In addition to his research work, Seif has held multiple adjunct professor positions as well as design/consulting positions over the years.

This award has been established in honor of the late William "Bill" McGuire to recognize promising young researchers in structural stability.

Engineers 1.5 PDHs/AU

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Stability at Elevated Temperatures

S5 Wednesday 5:00 – 6:00 p.m.
room 241

Moderator: Mina Seif, National Institute of Standards and Technology (NIST)

Influence of Simple Connection Restraint on the Lateral-Torsional Buckling Behavior of Restrained Beams under Fire Conditions
Erica C. Fischer, Oregon State University, Corvallis, OR

Time-Dependent Buckling of Steel Plates Exposed to Fire
Mohammed A. Morovat, Michael D. Engelhardt and Todd A. Helwig, University of Texas at Austin, Austin, TX

Comparison of Steady-State and Transient Thermo-Mechanical Responses of Unprotected Aluminum Columns at Elevated Temperatures
Jean C. Batista Abreu and Tyler D. Spinello, Elizabethtown College, Elizabethtown, PA; Nicholas A. Soares and Ronald D. Ziemian, Bucknell University, Lewisburg, PA

Evaluating Critical Temperatures of Axially Loaded I-Shaped Steel Members Using ANSI/AISC-360 Appendix 4
Ana Sauca, Chao Zhang, Mina Seif and Lisa Choe, National Institute of Standards and Technology (NIST), Gaithersburg, MD

Engineers 1.0 PDHs/AU

Stability Considerations for Localized Conditions

S6 Thursday 8:00 – 9:00 a.m.
room 241

Moderator: Kara D. Peterman, University of Massachusetts Amherst

Web Compression Buckling Strength of Wide Flange Members: On the Influence of Bearing Length
Kadir C. Sener and Amit H. Varma, Purdue University, West Lafayette, IN

The Impact of Bearing Conditions on the Stability Behavior of Cold-Formed Steel Stud Assemblies
Abbas Joorabchian and Kara D. Peterman, University of Massachusetts Amherst, Amherst, MA; Zhanjie Li, The SUNY Polytechnic Institute, Utica, NY

Compression Capacity of Short Cold-Formed Steel Built-Up Columns with Double-Lacing Configuration and Low Sectional Compactness
M. Adil Dar, Dipti Ranjan Sahoo, and Arvind K. Jain, Indian Institute of Technology Delhi, New Delhi, India

Influence of the Length of Patch Load on the Ultimate Load of Longitudinally Stiffened Plate Girders
Sasa Kovacevic, Washington State University, Pullman, WA; Nenad Markovic, University of Belgrade, Belgrade, Serbia

Engineers 1.0 PDHs/AU

Stability of Plates and Shells

S7 Thursday, 9:15 – 10:15 a.m.
room 241

Moderator: Simos Gerasimidis, University of Massachusetts Amherst

Influence of Boundary Conditions on the Shear Post-Buckling Behavior of Thin Web Plates
Spencer E. Quiel and Kevin Augustyn, Lehigh University, Bethlehem, PA; Maria E. Moreyra Garlock and Peter Wang, Princeton University, Princeton, NJ

Imperfection Insensitive Thin Steel Tubular Shells under Bending
Kshitij Kumar Yadav and Simos Gerasimidis, University of Massachusetts Amherst, Amherst, MA

Analytical and Numerical Buckling Analysis of Rectangular Functionally-Graded Plates under Uniaxial Compression
Elias Ali and Yared Shifferaw, Drexel University, Philadelphia, PA

Engineers 1.0 PDHs/AU

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Stability of Connections and Assemblages

S8 Thursday, noon – 1:00 p.m.
room 241

Moderator: Cliff D. Bishop, Exponent, Inc.

Stability of Apex Connections in Cold-Formed Steel Portal Frames
Hannah B. Blum, University of Wisconsin-Madison, Madison, WI; Zhanjie Li, SUNY Polytechnic Institute, Utica, NY

Topology Optimization of Steel Shear Fuses to Resist Buckling
Javier A. Avecillas and Matthew R. Eatherton, Virginia Tech, Blacksburg, VA

Modal Buckling Analysis of Trapezoidal Sheeting
Sandor Adany and Qadier Tayseer Aldalaien, Budapest University of Technology and Economics, Budapest, Hungary

Engineers 1.0 PDHs/AU

Topics in Lateral-Torsional Buckling

S9 Thursday 2:00 – 3:30 p.m.
room 241

Moderator: Ronald D. Ziemian, Bucknell University

Moment Gradient Factor for Lateral-Torsional Buckling of T-Shaped Beams
Michael Manarin, Robert Driver and Yong Li, University of Alberta, Edmonton, Canada

Moment Gradient Factors for Singly-Symmetric I-Sections
Matt Reichenbach, Todd A. Helwig and Michael D. Engelhardt, University of Texas at Austin, Austin, TX; Yangqing Liu, Tongji University, Shanghai, China

Experimental Study on the Lateral-torsional Buckling Strength of Trapezoidally Corrugated Web Girders
Bence Jáger, Balázs Kövesdi, and László Dunai, Budapest University of Technology and Economics, Budapest, Hungary

A Modified Approach Towards Estimating The Lateral Torsional Buckling Effective Length
Joel Ben John and Lakshmi Subramanian, Indian Institute of Technology Madras, Chennai, India

Lateral Stability and Design of Gerber Systems
Amir Elmaraghy, Kévin Silva, Valentin Manaud, and Nicolas Boissonnade, Laval University, Québec City, Canada

Engineers 1.5 PDHs/AU

Topics in Local Stability

S10 Thursday 4:00 – 5:30 p.m.
room 241

Moderator: Perry Green, Bechtel Corporation

Issues of Scale on Experimental Buckling Results for Circular Steel Tubes in Bending
Angelina Jay, Exponent Inc., New York, NY; Andrew T. Myers, Northeastern University, Boston, MA; Benjamin W. Schafer, Johns Hopkins University, Baltimore, MD

Experiments and Computations on Steel Bridge Corroded Beam Ends
George Tzortzinis, Brendan Knickle, Simos Gerasimidis, and Sergio Breña, University of Massachusetts Amherst, Amherst, MA; Alexander Bardow, Massachusetts Department of Transportation, Boston, MA

Experimental and Numerical Investigation of Local Stability of Flexural Cold Formed High Strength Steel Hollow Section Profiles
Ieva Misiunaite, Ronaldas Jakubovskis, Aleksandr Sokolov, Arvydas Rimkus, and Viktor Gribniak, Vilnius Gediminas Technical University, Vilnius, Lithuania

Structural Stability Condition Assessment of Corroded Steel Trusses in Operating Industrial Facilities
Hunter Brown, Martin/Martin Consulting Engineers, Lakewood, CO; Damon G. Reigles, Structural Technologies, Columbia, MD; Perry Green, Bechtel Corporation, Reston, VA

Local Buckling of RHS Members with Small-to-Large Corner Radii Subject to Combinations of Axial Force and Biaxial Bending
Luís Vieira and Dinar Camotim, University of Lisbon, Lisbon, Portugal; Rodrigo M. Gonçalves, Nova University of Lisbon, Lisbon, Portugal

The Role of Local Buckling in the Determination of H.S.S. Rotational Capacity
Elsy Saloumi and Marielle Hayeck, University of Applied Sciences of Western Switzerland–Fribourg, Fribourg, Switzerland; Joanna Nseir, Saint-Joseph University, Beirut, Lebanon; Nicolas Boissonnade, Laval University, Québec City, Canada

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Stability of Columns

S11 Friday 8:00 – 9:00 a.m.
room 241

Moderator: Dinar Camotim, University of Lisbon

Post-Buckling Behavior of Thin-Walled Regular Polygonal Tubular Columns Undergoing Local-Distortional Interaction
André D. Martins and Dinar Camotim, University of Lisbon, Lisbon, Portugal; Rodrigo M. Gonçalves, Nova University of Lisbon, Lisbon, Portugal

Stiffness Matrix for Buckling Analysis of Web Tapered Steel Members
Emad S. Salem, Al-Azhar University, Cairo, Egypt

Spherically-Hinged Cold-Formed Steel Equal-Leg Angle Columns: Experimental Investigation and DSM Design
Kathleen G. Santana and Alexandre Landesmann, COPPE, Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brazil; Dinar Camotim and Pedro B. Dinis, University of Lisbon, Lisbon, Portugal

Engineers 1.0 PDHs/AU

Stability of Structural Systems

S12 Friday 9:15 – 10:15 a.m.
room 241

Moderator: Daniel Linzell, University of Nebraska-Lincoln

Stability Analysis of Unbraced Steel Storage Racks: Discussions and Alternatives
Maria A. Branquinho and Maximiliano Malite, University of São Paulo, São Carlos, São Paulo, Brazil; Luiz C. M. Vieira Jr., University of Campinas, São Paulo, Brazil

Simulation of Steel Sheathed Cold-Formed Steel Framed Shear Walls and Wall Lines
Zhidong Zhang and Benjamin W. Schafer, Johns Hopkins University, Baltimore, MD

Capturing Cold-formed Steel Shear Wall Behavior Through Nonlinear Fastener-based Modeling
Fani Derveni, Simos Gerasimidis, and Kara D. Peterman, University of Massachusetts Amherst, Amherst, MA

Stability of Aboveground Open-Top Storage Tanks Subjected to Wind Loading: Static and Dynamic Analyses
Yen-Chen Chiang, William B. Rich and Sukru Guzey, Purdue University, West Lafayette, IN

Engineers 1.0 PDHs/AU

Special Topics in Structural Stability

S13 Friday 10:45 – 11:45 a.m.
room 241

Moderator: Nicolas Boissonnade, Laval University

On the Buckling Behavior of Thin-Walled Steel Tubes Subjected to Combinations of Axial Compression and External Lateral Pressure
Cilmar Basaglia, University of Campinas, Campinas, Brazil; Dinar Camotim and Nuno Silvestre, University of Lisbon, Lisbon, Portugal

Investigation on the Effect of Warping on the Behavior of Cold Formed Steel Beam-Columns
Sevugan Rajkannu and Arul Jayachandran, Indian Institute of Technology Madras, Chennai, India

Strengthening Beam Sections of Industrial Buildings against Lateral Torsional Buckling
Sepehr Movaghati, Poe Engineering Inc., Memphis, TN

Stability of Stainless Steel Sections under Simple Loading
Anne-Sophie Gagné, Lucile Gérard, and Nicolas Boissonnade, Laval University, Québec City, Canada

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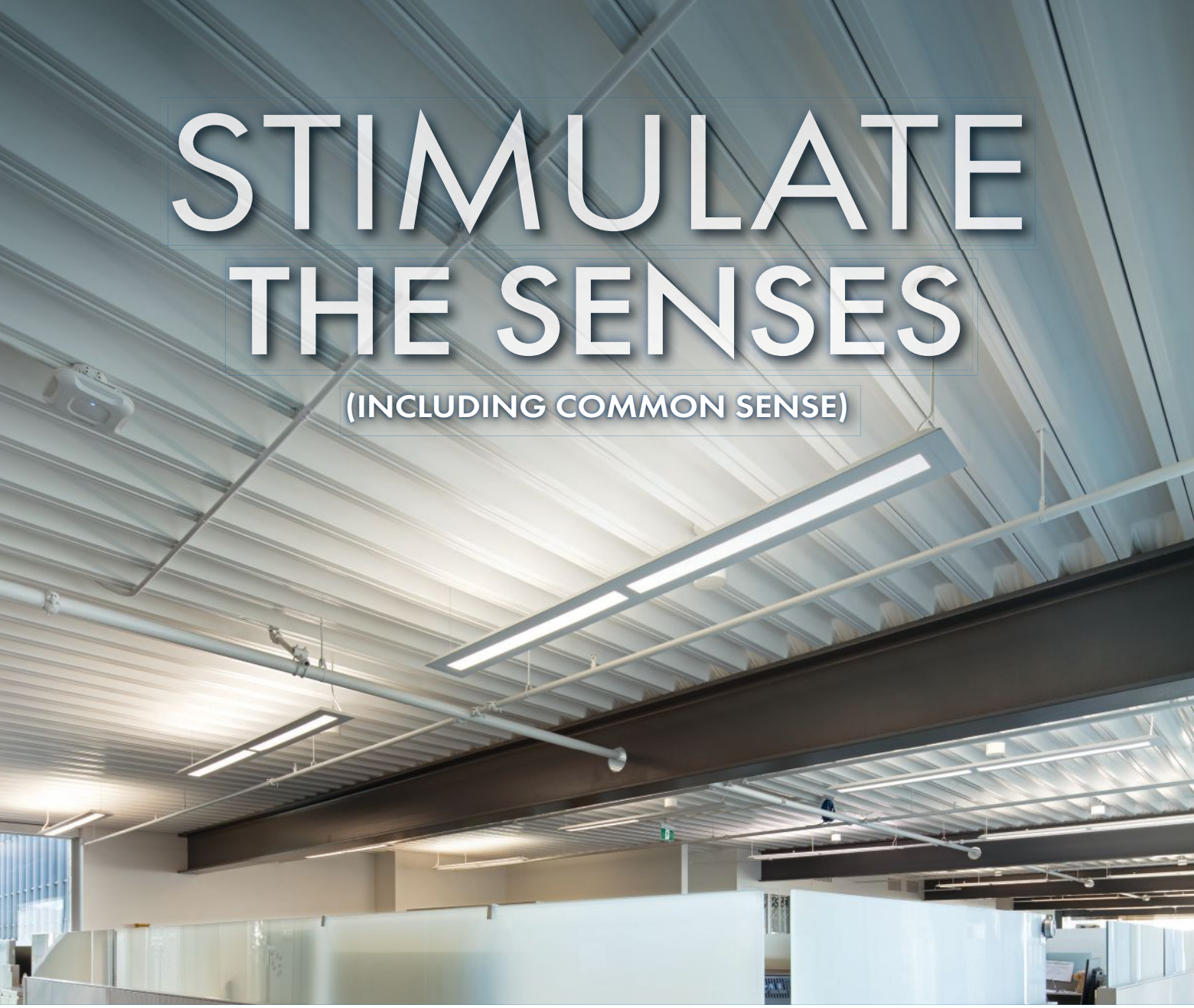

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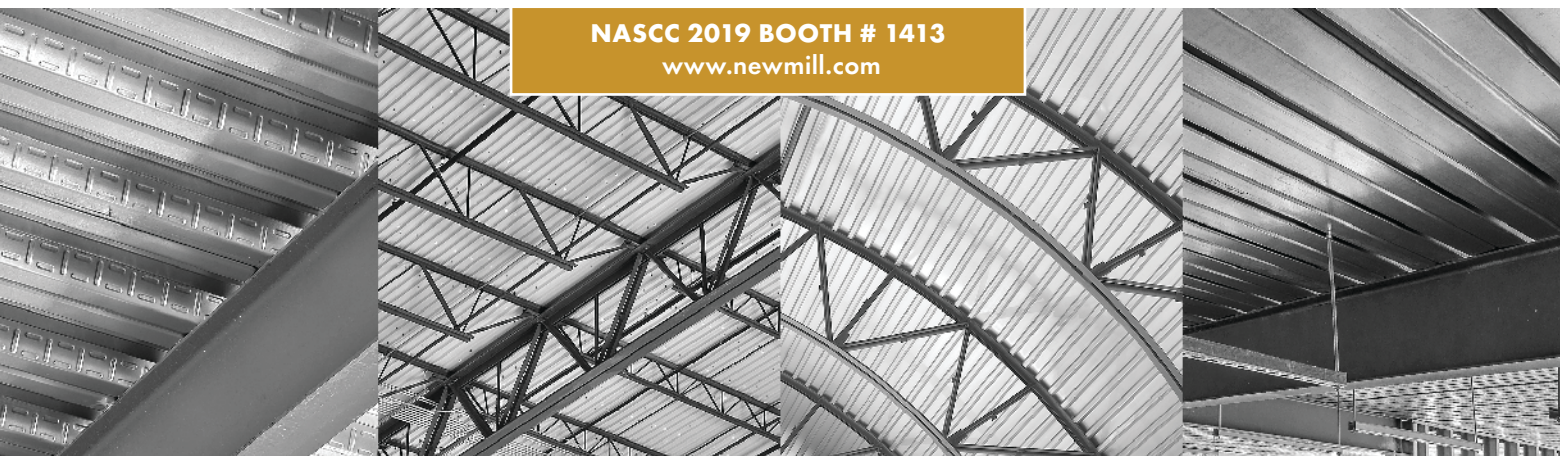

exhibitor workshops

For complete session descriptions please see our mobile app. Exhibitor Workshops do not provide PDH/CEU credit.

Our Renewed Customer Focus

EW1 Wednesday 9:15 – 10:15 a.m. | **room 261**
Presented by: NUCOR Grating

The Fasten-ating Technology Behind Mechanical Deck Fasteners from Design to Inspection

EW2 Wednesday 9:15 – 10:15 a.m. | **room 265**
Presented by: Hilti North America

Approaches to Connection Design: Break the Limits of Hand-Calculations with CBFEM-based Tools

EW3 Wednesday 1:30 – 3:00 p.m. | **room 261**
Presented by: IDEA StatiCa

Reliability from Design to Inspection: Save Yourself the Struggle with Safe Set

EW4 Wednesday 1:30 – 3:00 p.m. | **room 265**
Presented by: Hilti North America

The Tekla PowerFab Workflow: Increased Control, Accuracy and Visibility Throughout Your Fabrication Process

EW5 Wednesday 3:15 – 4:45 p.m. | **room 261**
Presented by: Trimble Solutions USA, Inc.

Staying on Top of Seismic Standards

EW6 Wednesday 3:15 – 4:45 p.m. | **room 265**
Presented by: AVEVA Inc.

The GIZA Process: A Collaborative Connection Design Method

EW7 Thursday 7:00 – 7:45 a.m. | **room 261**
Presented by: GIZA LLC

Steel Connection Design: Why Should Steel Detailers Care?

CANCELLED

EW8 Thursday 7:00 – 7:45 a.m. | **room 265**
Presented by: SDS/2

RISA-3D | Fresh New Look, Same Powerful RISA

EW9 Thursday 8:00 – 9:00 a.m. | **room 261**
Presented by: RISA

Streamlining Fabricator/Erector Workflows

EW10 Thursday 9:15 –10:15 a.m. | **room 261**
Presented by: SDS/2

Tekla Structural Designer: True BIM for Structural Engineers

EW11 Thursday 9:15 – 10:15 a.m. | **room 265**
Presented by: Trimble Solutions USA, Inc.

BIM and BRIM for Misc. Metals

EW12 Thursday 2:00 – 3:30 p.m. | **room 261**
Presented by: Steel Tek Unlimited

Designing and Specifying Structural Connections using Fluorogold Slide Plates

EW13 Thursday 2:00 – 3:30 p.m. | **room 265**
Presented by: GRM Custom Products

Effective Connection Design Software Tools for Your Project

EW14 Thursday 4:00 – 5:30 p.m. | **room 261**
Presented by: GIZA LLC

AISC Advanced Steel Design in RFEM

EW15 Thursday 4:00 – 5:30 p.m. | **room 265**
Presented by: Dlubal Software, Inc.

Seamless Structural Analysis Utilizing RFEM and Revit/Tekla

EW16 Friday 7:00 – 7:45 a.m. | **room 261**
Presented by: Dlubal Software, Inc.

From Design and Analysis to Detailing and Fabrication with Autodesk Revit, Robot and Advance Steel

EW17 Friday 9:15 – 10:15 a.m. | **room 261**
Presented by: Autodesk Inc.

Resilient Seismic Design of Steel Special Moment Frame Buildings using the Simpson Yield-Link Connection

EW18 Friday 9:15 – 10:15 a.m. | **room 265**
Presented by: Simpson Strong-Tie/Haselton Baker Risk Group

Implications of Recent Advances to the FEMA P-58 Methodology for Resilient BRBF Design

EW19 Friday 10:45 – 11:45 am. | **room 261**
Presented by CoreBrace/Haselton Baker Risk Group

RAM Structural System: How Productive Do You Want to Be?

EW20 Thursday noon - 1:00 p.m. | **room 265**
Presented by: Bentley Systems, Inc.

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events in the hall

Exhibitor Product Showcases

Exhibit Hall 1 | stage 1

For complete product showcase descriptions please see our mobile app.

Introducing Tekla PowerFab: The Complete Fabrication Solution

PS1 Thursday 10:00 – 10:20 a.m.

Presented by: Trimble Solutions USA Inc.

XT Plugins – Modeling Automation in Tekla

PS2 Thursday 11:00 – 11:20 a.m.

Presented by: Steel Tek Unlimited

GIZA 19.0 – The Latest in Connection Design Software

PS3 Thursday 11:30 – 11:50 a.m.

Presented by: GIZA LLC

The Complete Workflow for Structural BIM

PS4 Thursday noon – 12:20 p.m.

Presented by: Autodesk Inc.

Structural Analysis and Design in RFEM

PS5 Thursday 1:00 – 1:20 p.m.

Presented by: Dlubal Software Inc.

Fluorogold & GRM Side Plates

PS6 Thursday 10:30 – 10:50 a.m.

Presented by: GRM Custom Products

Would You Pass an AISC Audit?

PS7 Thursday 2:00 – 2:20 p.m.

Presented by: AVEVA FabTrol

Cracking the Code: What Does Your Customer Really Want?

PS8 Thursday 2:30 – 2:50 p.m.

Presented by: AVEVA Bocad

New RISA-3D Tools to Elevate Your Workflow

PS9 Thursday 3:00 – 3:20 p.m.

Presented by: RISA

IDEA StatiCa: The First Software that Code-checks Steel Connections of all Topologies and Loading, in Minutes

PS10 Friday 9:30 – 9:50 a.m.

Presented by: IDEA StatiCa

The Complete Workflow for Structural BIM

PS11 Friday 10:00 – 10:20 a.m.

Presented by: Autodesk Inc.

Fortosi: Software for Automating and Planning Truck Loading of Steel

PS12 Friday 10:30 – 10:50 a.m.

Presented by: Fortosi

Student Steel Bridge Competition on Display

Wednesday 12:15 – 2:00 p.m.

Exhibit Hall 1

Did you know that annually, students at over 200 universities across the nation get hands-on, practical experience by participating in AISC's Student Steel Bridge Competition? Join us Wednesday in the exhibit hall on our mock competition floor and see real competition bridges produced via thousands of hours of design, fabrication and practice assembly. Meet some of this year's participants and get a firsthand look at a program that's been engaging students since 1987!

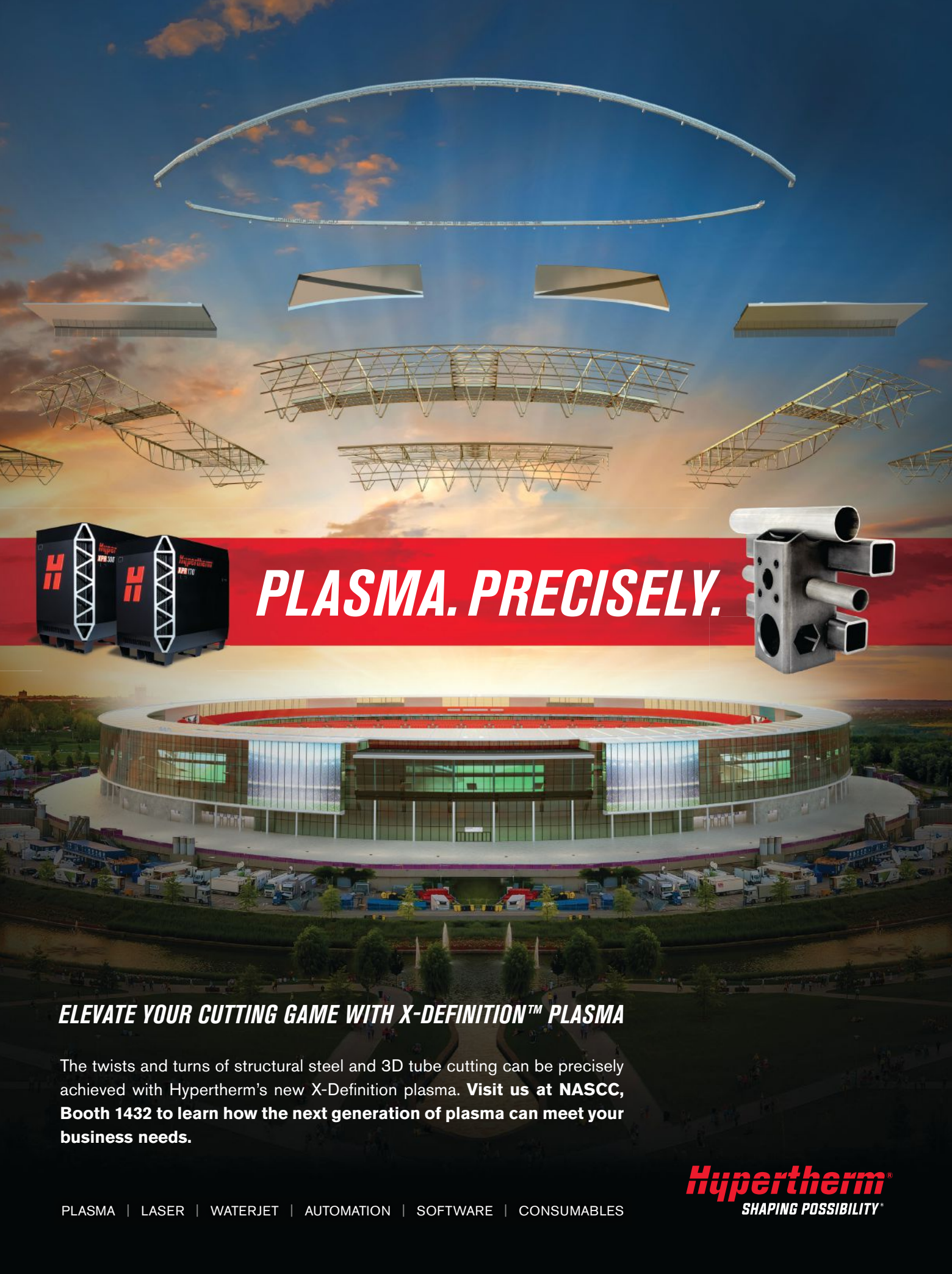
Women Who Weld Workshops

Thursday 9:15 – 11:45 a.m.
Friday 9:00 a.m. – 1:00 p.m.

Exhibit Hall 1

Registration is required for these workshops.

AISC, in partnership with Lincoln Electric, is presenting two Women Who Weld Workshops live on the exhibit hall floor. These half-day introductory workshops are for women interested in learning the basics of MIG welding. **Thursday morning** participants are female conference attendees and **Friday morning** participants are women from the local St. Louis area. Women Who Weld is a 501(c)(3) nonprofit organization that teaches women how to weld and find employment in the welding industry. Interested in registering for this event? Visit **aisc.org/nascc/equity** for registration links.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networking events

Welcome Reception

Wednesday 5:30 – 7:00 p.m. | **Exhibit Hall**

Cost: Included in all full registration options. Single ticket option also available.

Don't miss this valuable networking opportunity in the exhibit hall! The Steel Conference Welcome Reception is a great way to kick off the conference and get a special preview of what exhibitors will offer at the show. Stroll through the aisles and experience the industry's latest trends in structural software, coatings, connection products and more! Live demonstrations from equipment manufacturers will be ongoing. Mingle with your peers while you enjoy drinks, hors-d'oeuvres and the excitement of the exhibit hall.

Conference Dinner – Anheuser-Busch Brewery

Thursday, 7:00 – 10:00 p.m.
Anheuser-Busch Brewery

Cost: $60 pre-reg/$85 onsite.
Conference Dinner Tickets are included with Full Registration. Exhibitors and other registration types may purchase tickets online or at the registration desk.

This year's event takes place at the home to the King of Beers—the Anheuser-Busch Brewery. Situated in a complex with over 70 red brick structures on 100 acres, the brewery buildings are known for their unique architecture and several are National Historic Landmarks. The brewery is located next to the Anheuser-Busch North America Headquarters and is the oldest of the company's breweries. Guests will enjoy tours of the brewery and have a photo opportunity with one of the world-famous Clydesdales. Anheuser-Busch Flight Masters will be on hand during the event to talk about the unique pairings and give insight into how these beers are brewed. Cheers!

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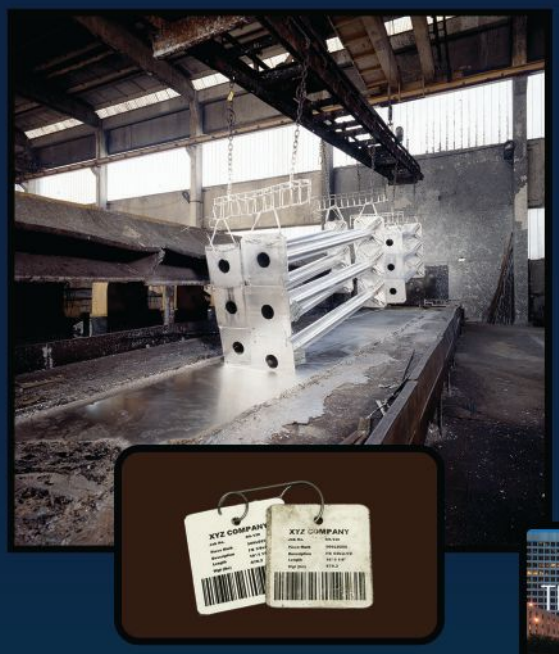

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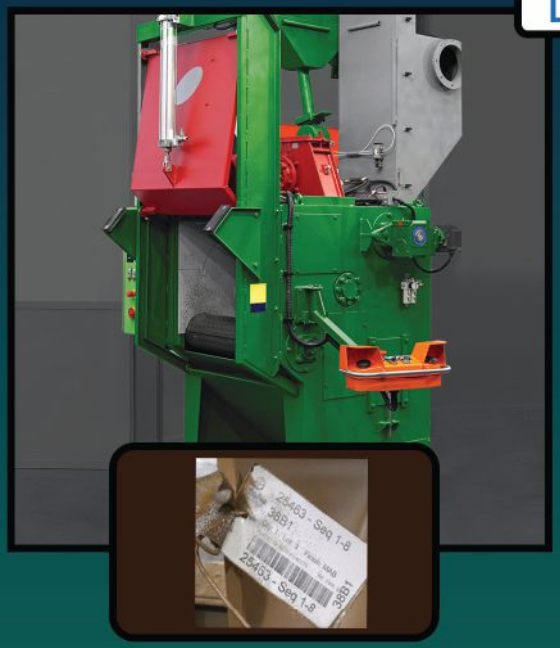

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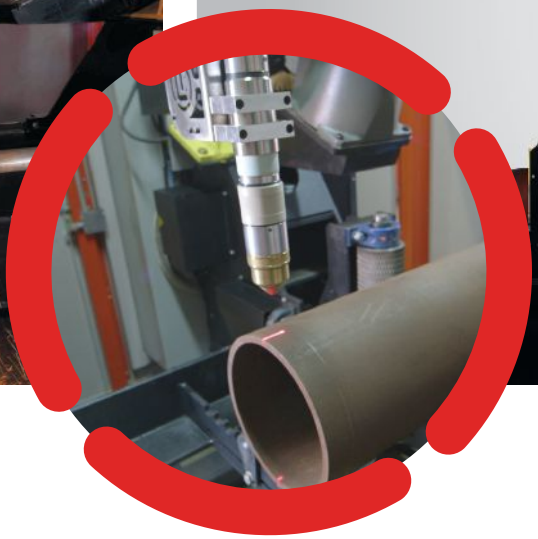

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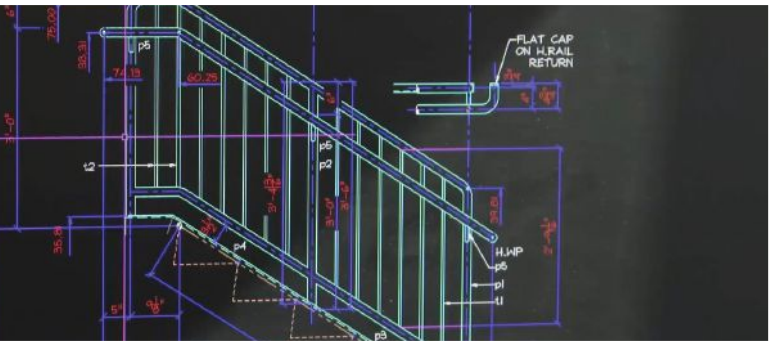

➢ Cut Fabrication Time by More Than 50%

Time between jobs is drastically reduced — the marking ink takes only minutes to remove using a biodegradable, unscented solution.

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The Lightning Rail works with DXF files to quickly and accurately print an entire handrail layout in minutes, allowing the fabricator to place their railing parts within the outlines.

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Greenbrook Engineering specializes in Steel Detailing, 3D Modeling, Connection Design and B.I.M. coordination services for the steel industry. With offices in New Jersey and a production center in Bangalore, India, we serve the Structural Designers, Steel Fabricators and Architects. We have in-house engineering capabilities to design connections in several states across the country.

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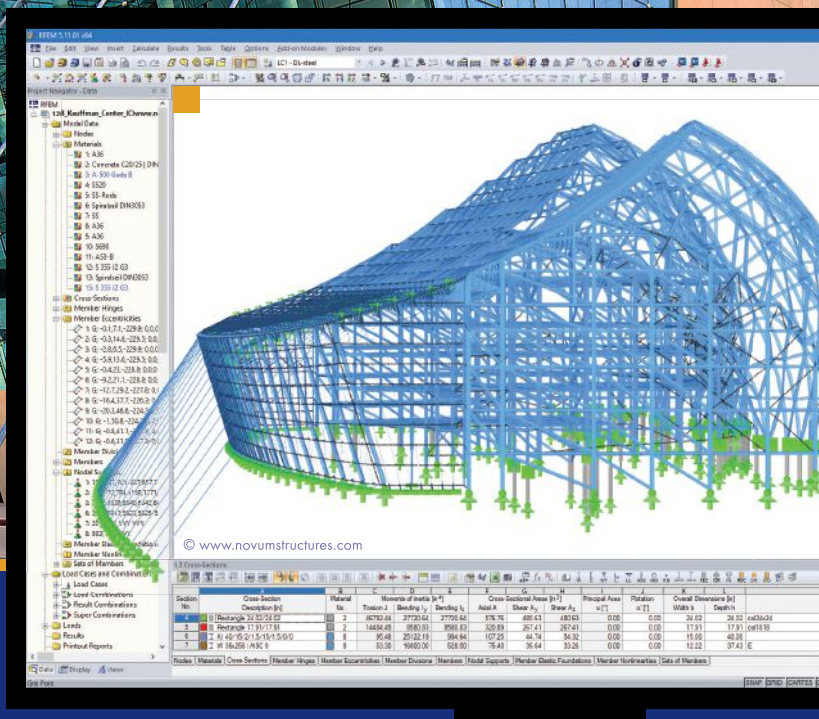

RFEM 5

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- CLT
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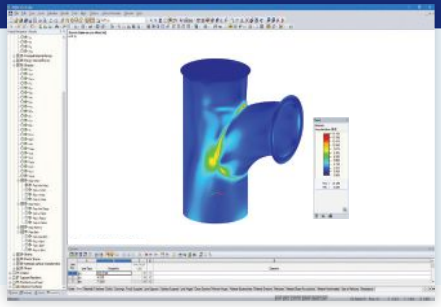

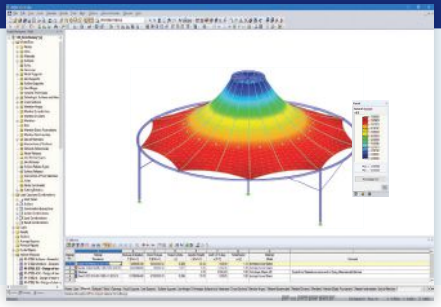

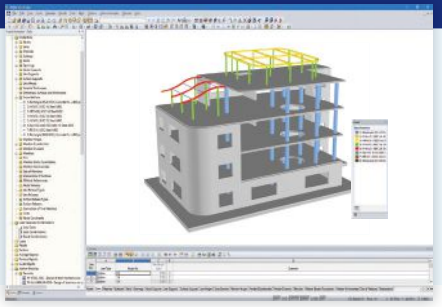

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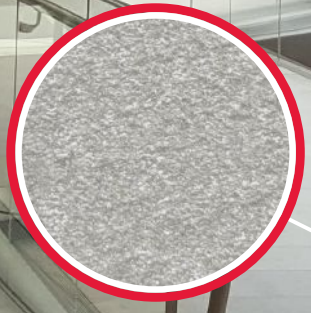

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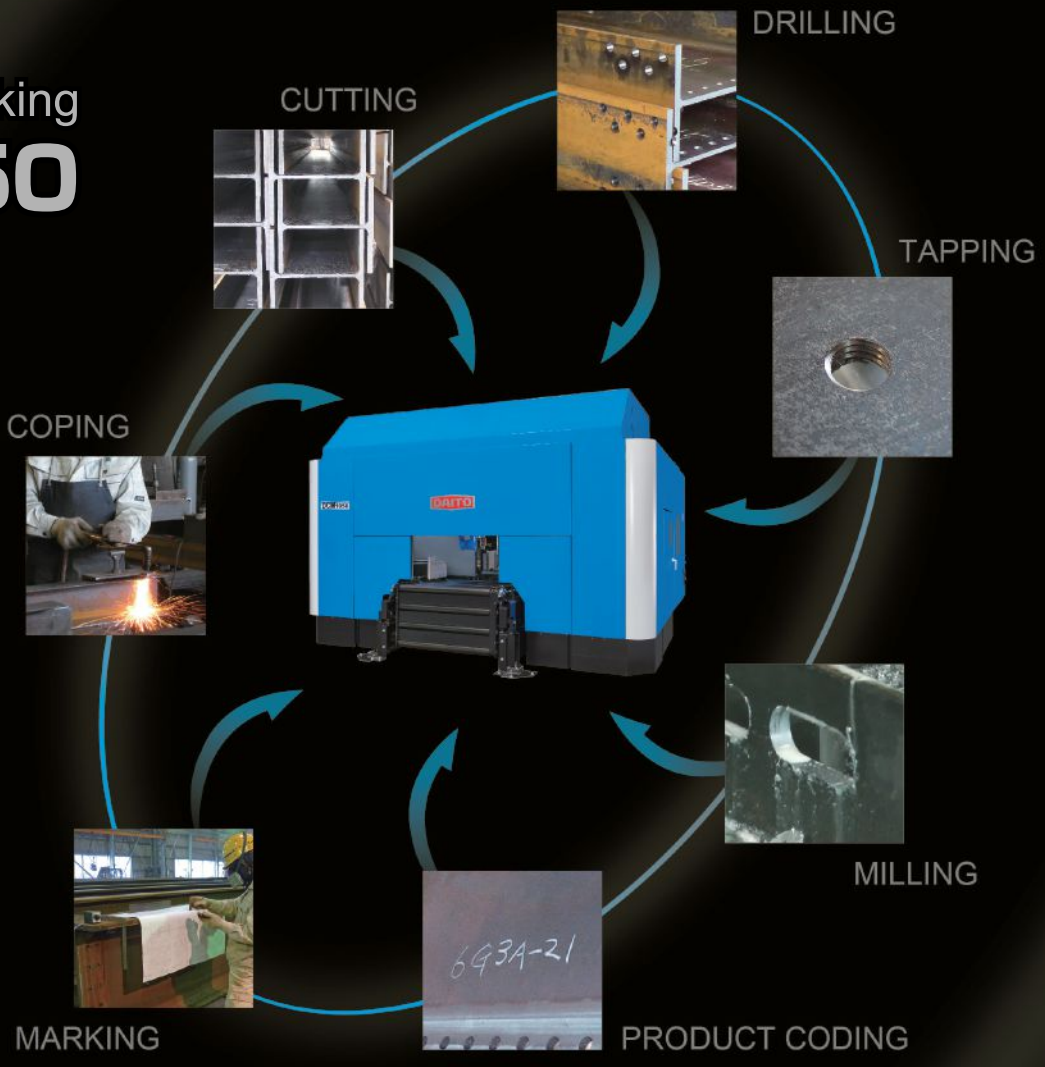

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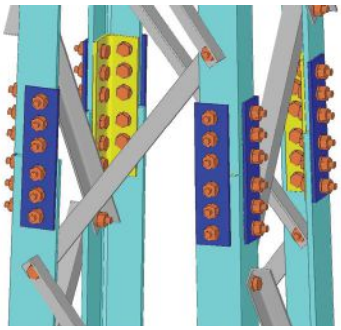

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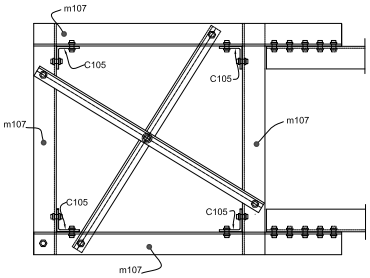

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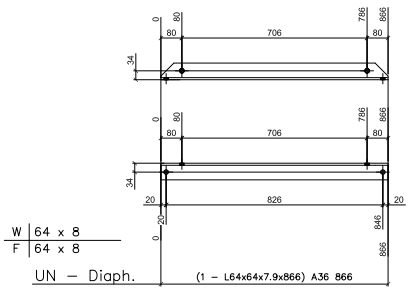

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ZModular, a division of Zekelman Industries, is a one-stop shop for modular construction products and services. Our goal is to reduce the cost of design, fabrication and building assembly through a standardized, scalable, connection system for structural modules. We don't have floor plans at ZModular so your imagination can run wild. It is the only way to build.

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session planner

Use this table to personalize your conference experience and keep track of your PDH credits. **This is NOT a PDH certificate.** See page 36 for instructions on how to receive an official NASCC: The Steel Conference PDH Certificate.

WEDNESDAY 4/3	SESSION	SESSION TITLE	ROOM	PDHs*	PDH CODE**
8:00 – 9:00 a.m.				1.0	
9:15 – 10:15 a.m.				1.0	
10:30 a.m. – 12:15 p.m.	K1	KEYNOTE: The Power of Contrarian Thinking	America's Ballroom	1.0	
noon – 2:00 p.m.	—	Boxed Lunch (must have W icon on badge) **Exhibit Hall Opens**	Exhibit Hall	—	—
1:30 – 3:00 p.m.				1.5	
3:15 – 4:45 p.m.				1.5	
5:00 – 6:00 p.m.				1.0	

THURSDAY 4/4	SESSION	SESSION TITLE	ROOM	PDHs*	PDH CODE**
8:00 – 9:00 a.m.				1.0	
9:30 a.m.	—	**Exhibit Hall Opens**	Exhibit Hall	—	—
9:15 – 10:15 a.m.				1.0	
10:30 – 11:45 p.m.	K2	KEYNOTE: The Joy of Steel...So Many Possibilities	America's Ballroom	1.0	
noon – 2:00 p.m.	—	Boxed Lunch (must have Th icon on badge)	Exhibit Hall	—	—
noon – 1:00 p.m.				1.0	
2:00 – 3:30 p.m.				1.5	
3:15 – 4:15 p.m.	—	Coffee Break	Exhibit Hall	—	—
4:00 – 5:30 p.m.				1.5	

FRIDAY 4/5	SESSION	SESSION TITLE	ROOM	PDHs*	PDH CODE**
8:00 – 9:00 a.m.				1.0	
9:00 a.m.	—	**Exhibit Hall Opens**	Exhibit Hall	—	—
9:15 – 10:15 a.m.				1.0	
10:15 – 10:45 a.m.	—	Snack	Exhibit Hall	—	—
10:45 – 11:45 a.m.				1.0	
noon – 1:30 p.m.	K3	KEYNOTE: T.R. Higgins Lecture: Structural Stability – Letting the Fundamentals Guide your Judgment	America's Ballroom	1.0	

*1.0 PDHs = 0.10 CEUs
**PDH codes are session specific and given by speakers during individual sessions.

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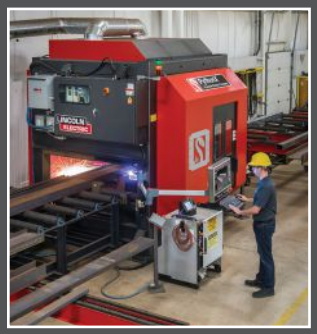

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