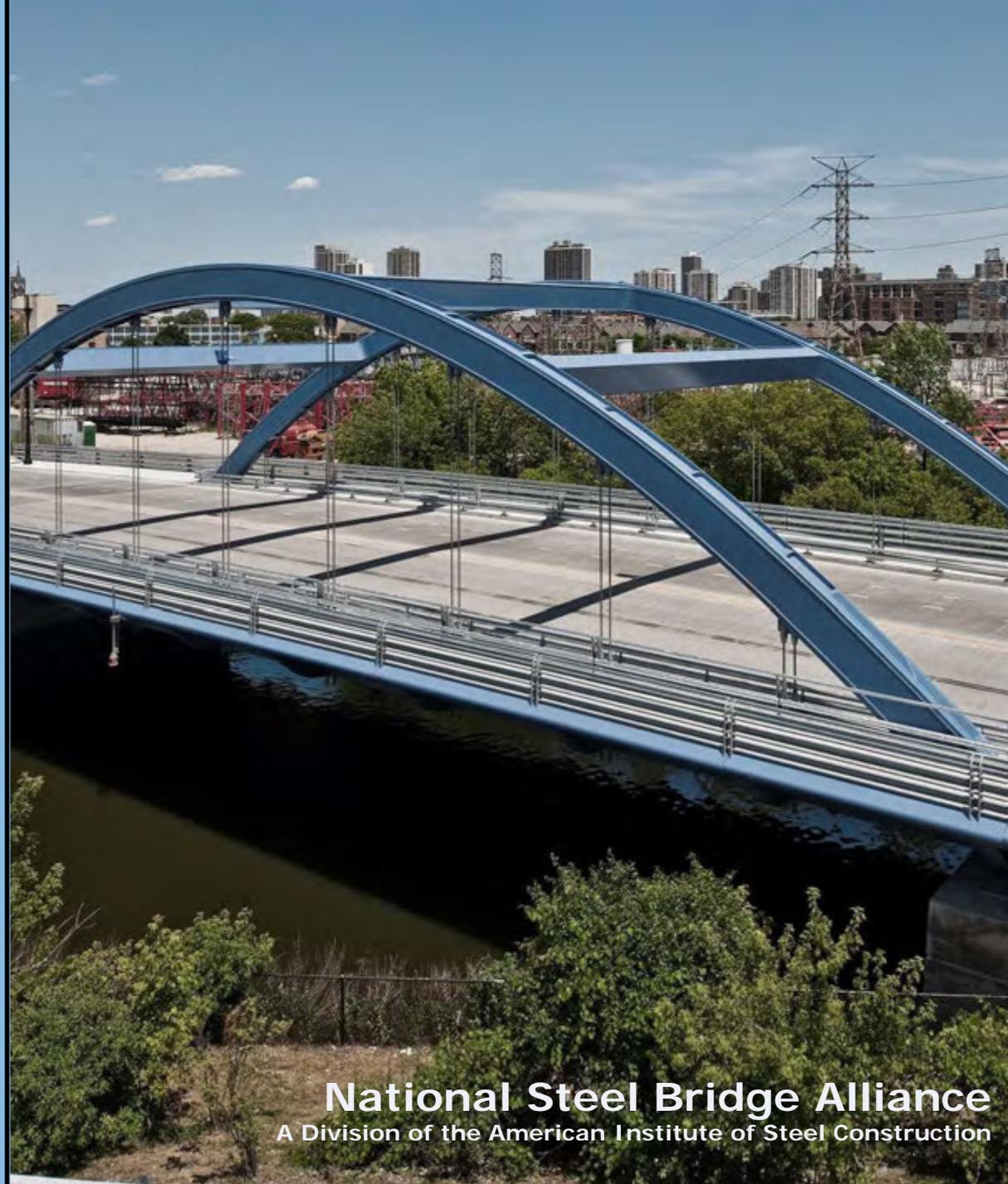


Steel Industry Update

Jeff Carlson

Director of Market
Development



National Steel Bridge Alliance
A Division of the American Institute of Steel Construction

Celebrating 10 Years of **SteelDay!**
September 28, 2018



Thursday, September 27th

Baileson Brewery
2322 Bissonnet St., Houston

Happy Hour sponsored by AISC/NSBA
6 – 9 PM



Register for event here:

<https://www.aisc.org/why-steel/steelday/steelday-events/nsba-aisc-happy-hour/>



Staff Updates

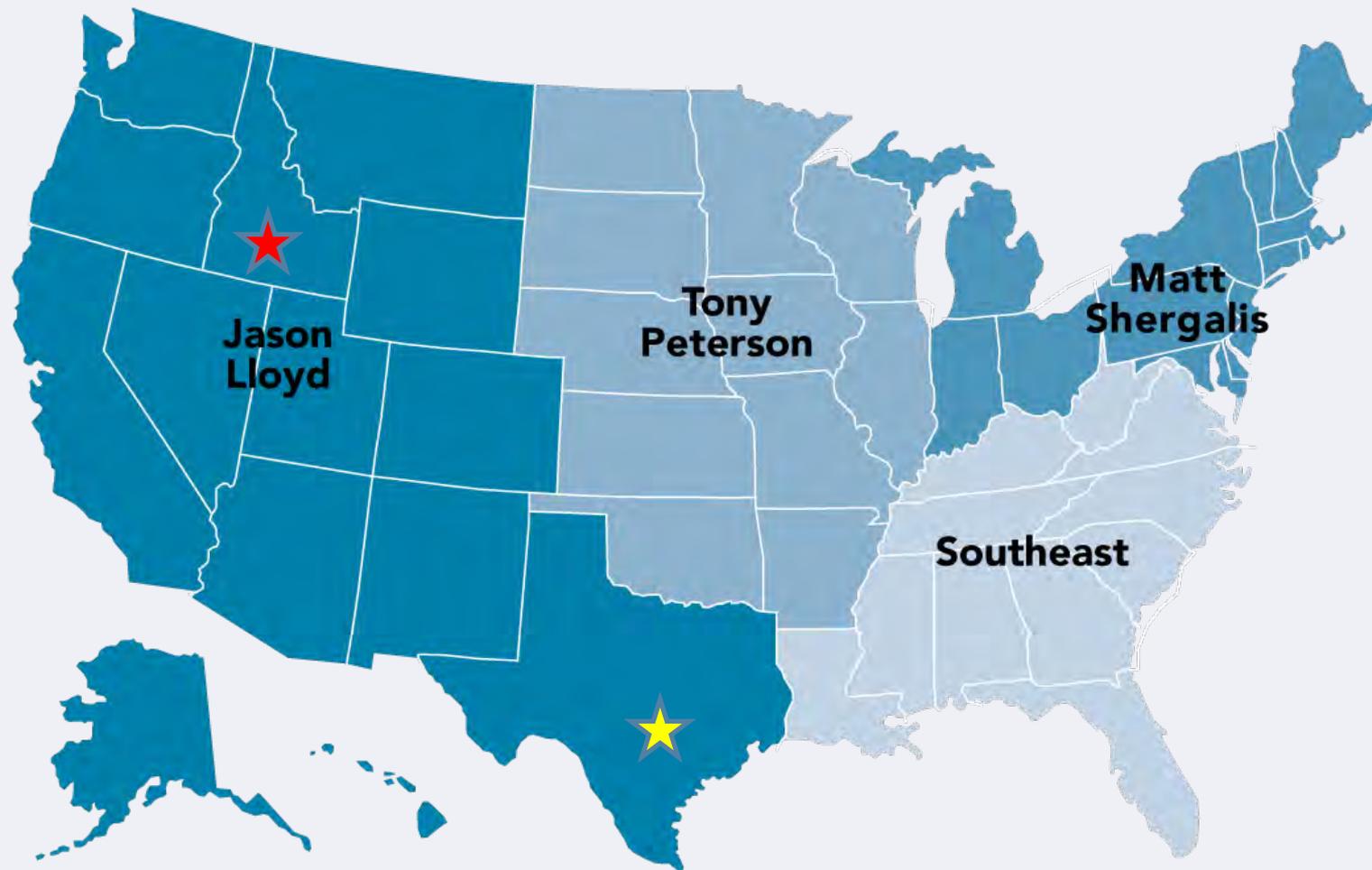




Staffing Updates

- New Roles
 - Chris Garrell: Chief Bridge Engineer
 - Jeff Carlson: Director of Market Development
- Retirement
 - Calvin Schrage retired September 15
- Staff Additions
 - Tony Peterson joins NSBA in central region
 - Jason Lloyd joins NSBA in west region

Regions



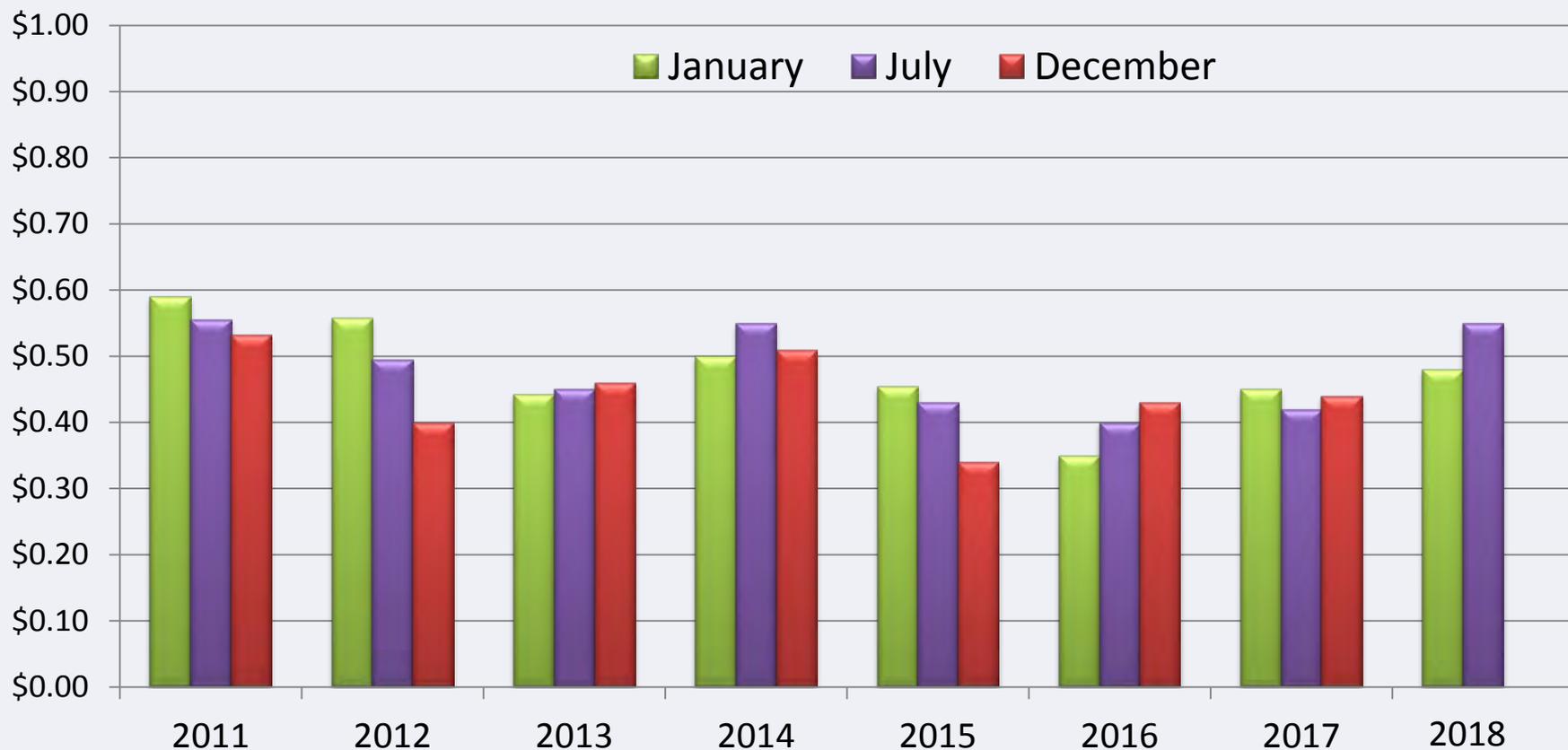
A black and white photograph of a large steel truss bridge under construction. The bridge's complex lattice of steel beams and girders is the central focus. A semi-transparent blue horizontal band is overlaid across the middle of the image, containing the text 'Pricing Estimates' in white. Below the bridge, a construction site is visible with various pieces of equipment, including a concrete pump truck and several vertical rebar columns. In the background, there are industrial buildings, one of which has 'CASINO' and 'DANCE' signs, and a large grain elevator structure. The sky is clear and bright.

Pricing Estimates



Plate Material Prices

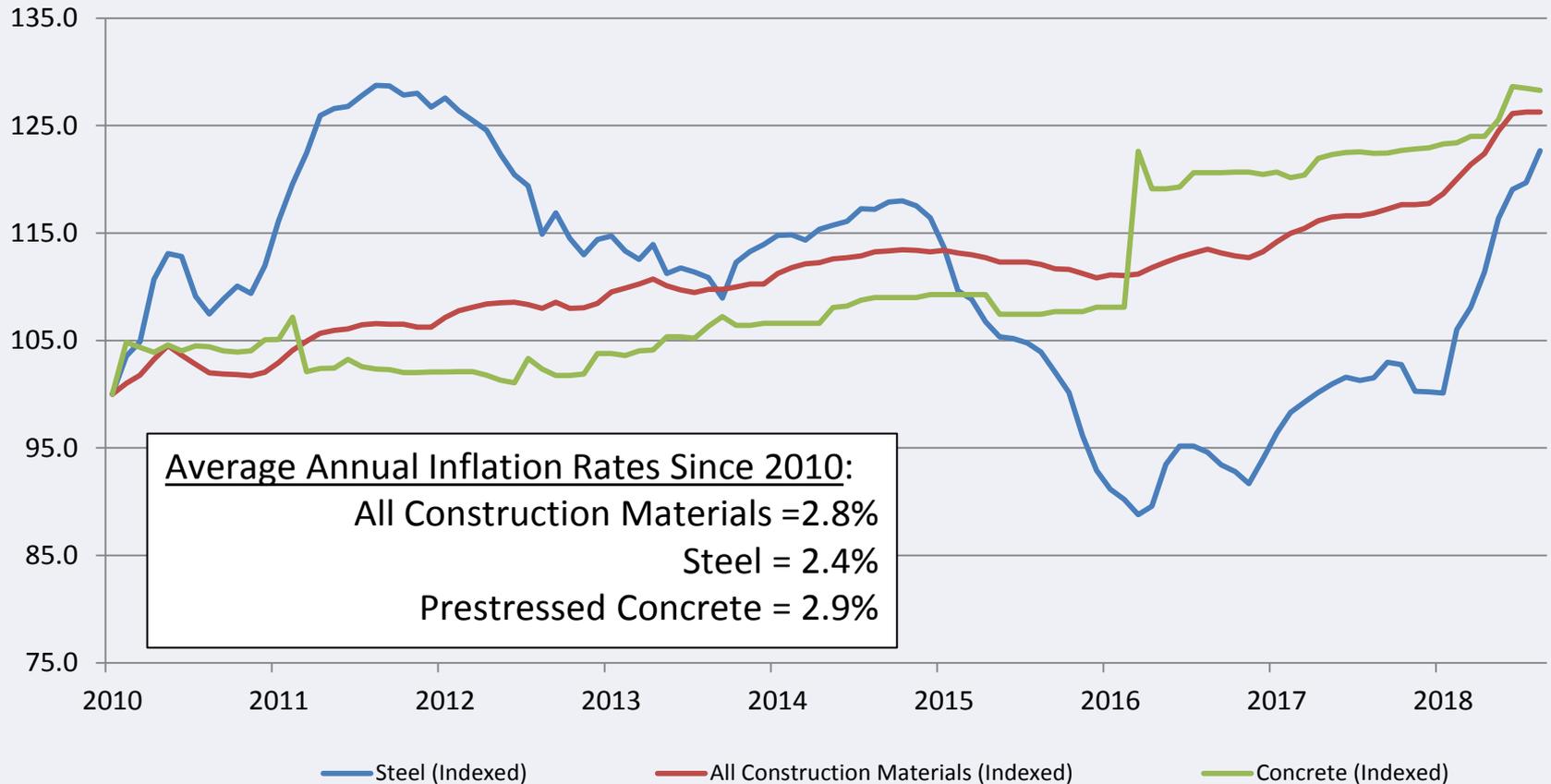
Historic Raw Material Costs - A709 Grade 50W 2 inches and less (\$/lb)



Steel In The News



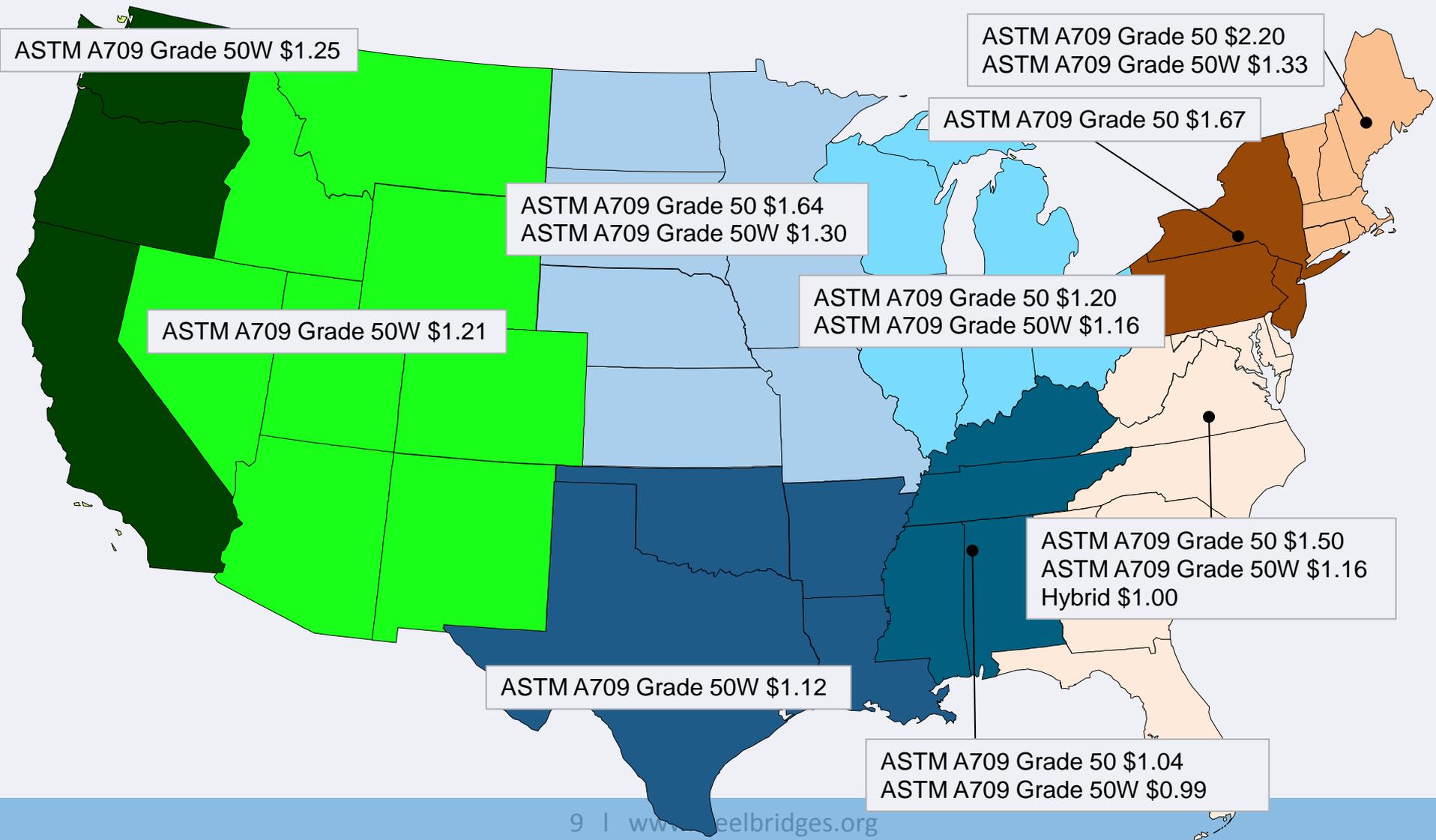
Relative Construction Producer Price Index



Source: US Bureau of Labor Statistics (St Louis Federal Reserve)

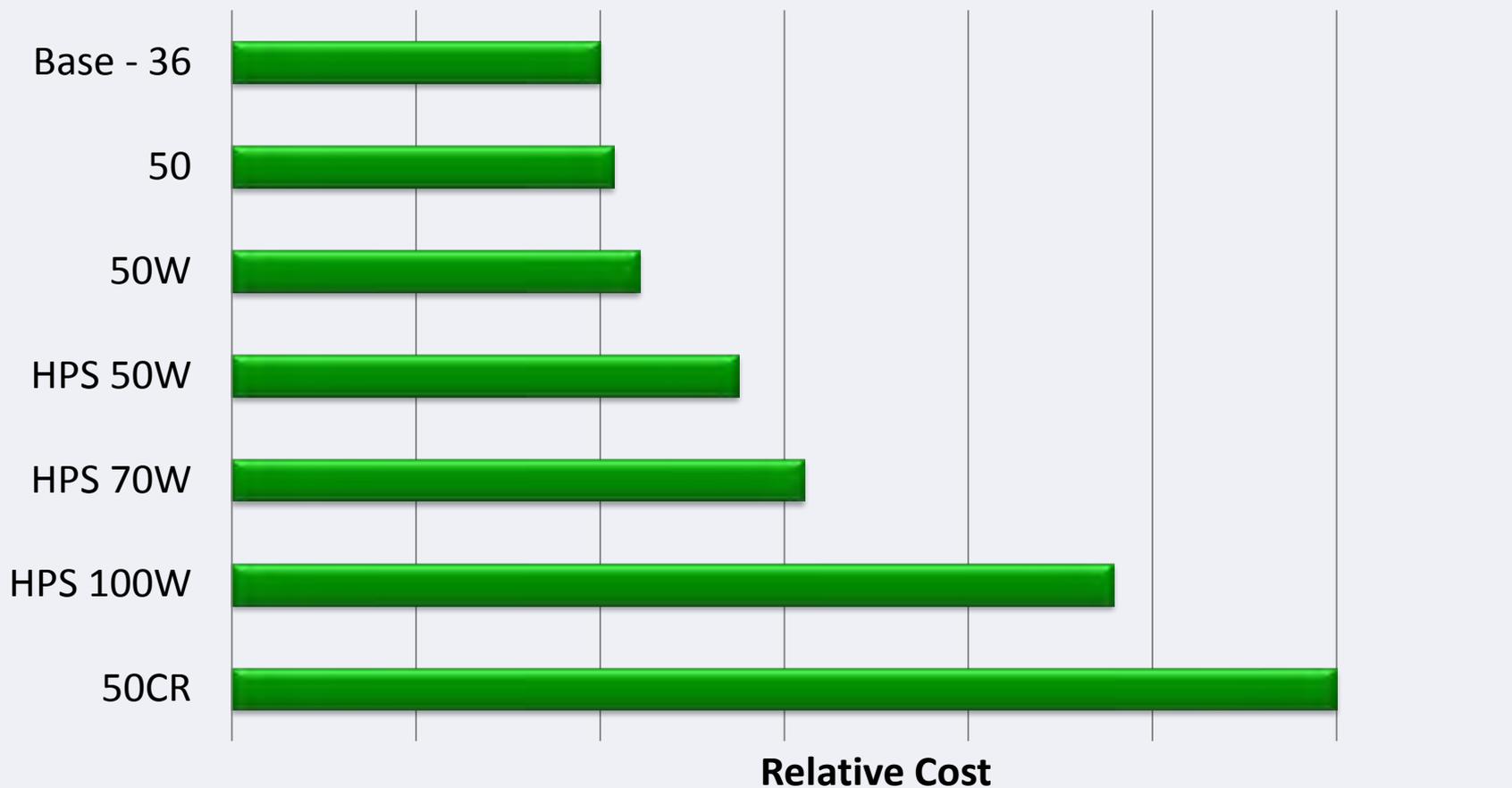


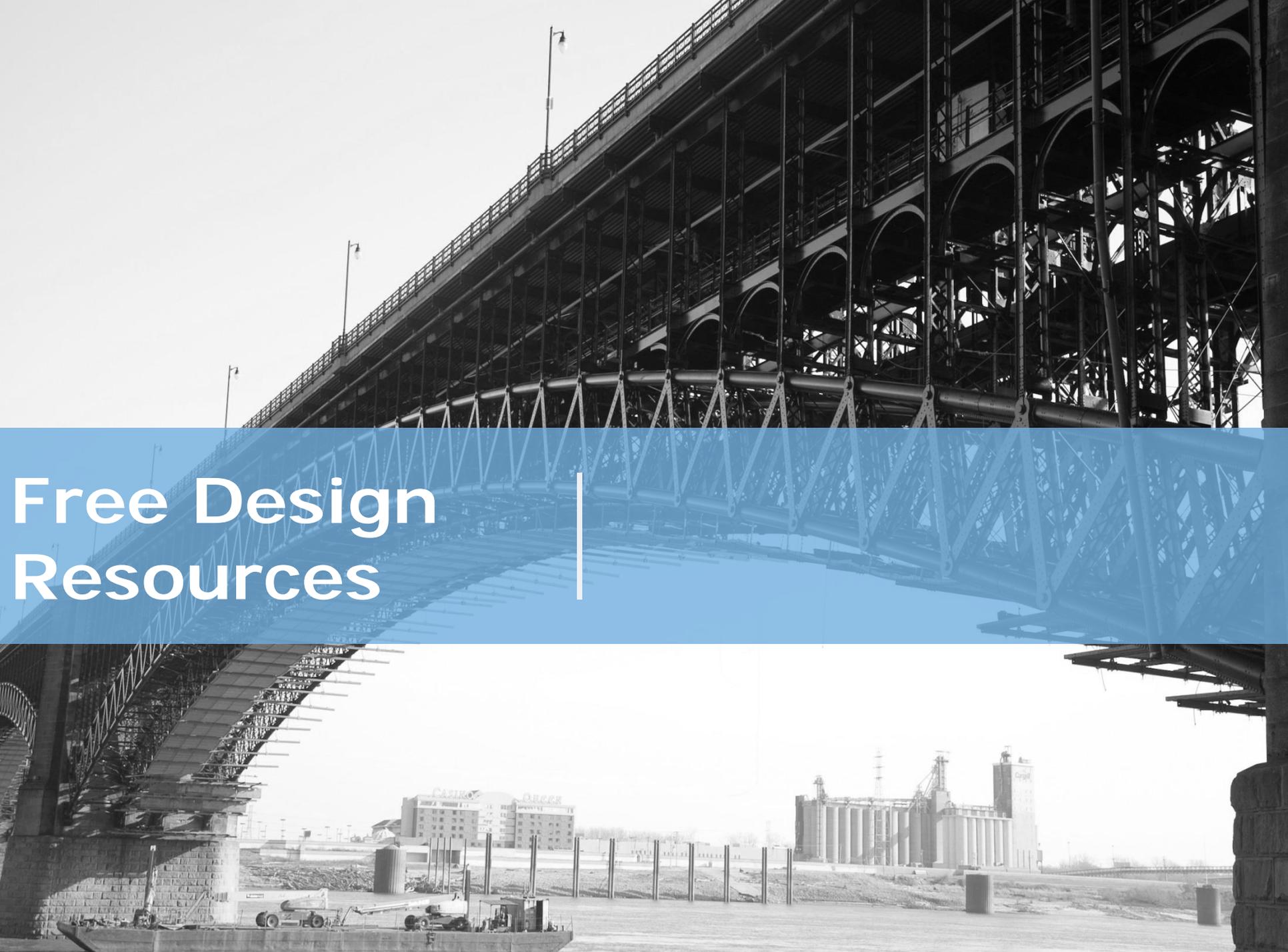
Historic Bridge Costs (\$/lb)





Material Relative Cost





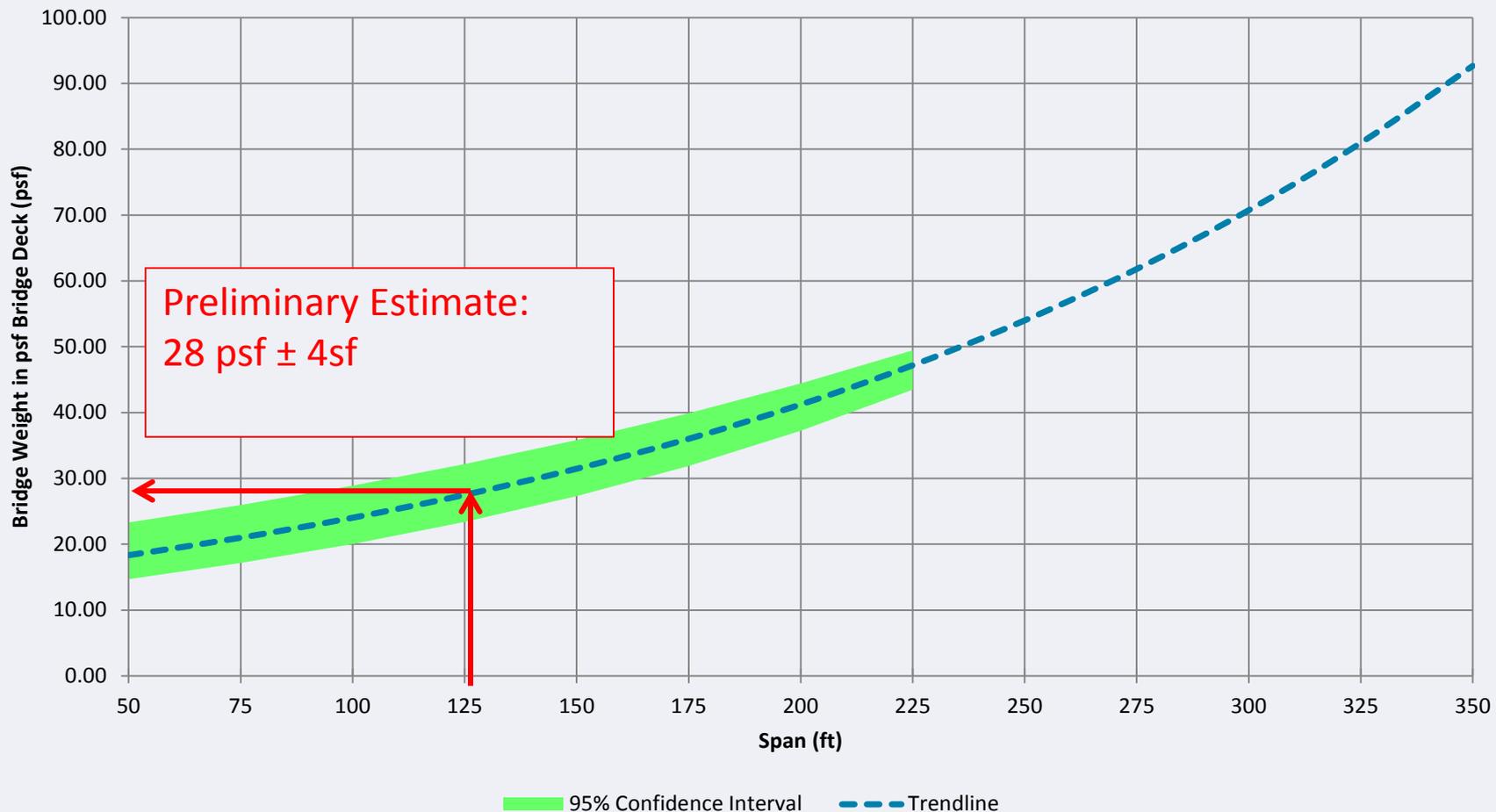
Free Design Resources





Steel Superstructure Weight vs. Span

Two Span - 9' to 11' Girder Spacing





LRFD Simon – AASHTO 8th Edition



- LRFD Simon – Latest Enhancements
 - 8th Edition AASHTO Specification Support.
 - Input File Validation.
 - “Best Design” input file creation.
 - Updated User Documentation.
 - An Assortment of Bug Fixes.





LRFD Simon – AASHTO 8th Edition

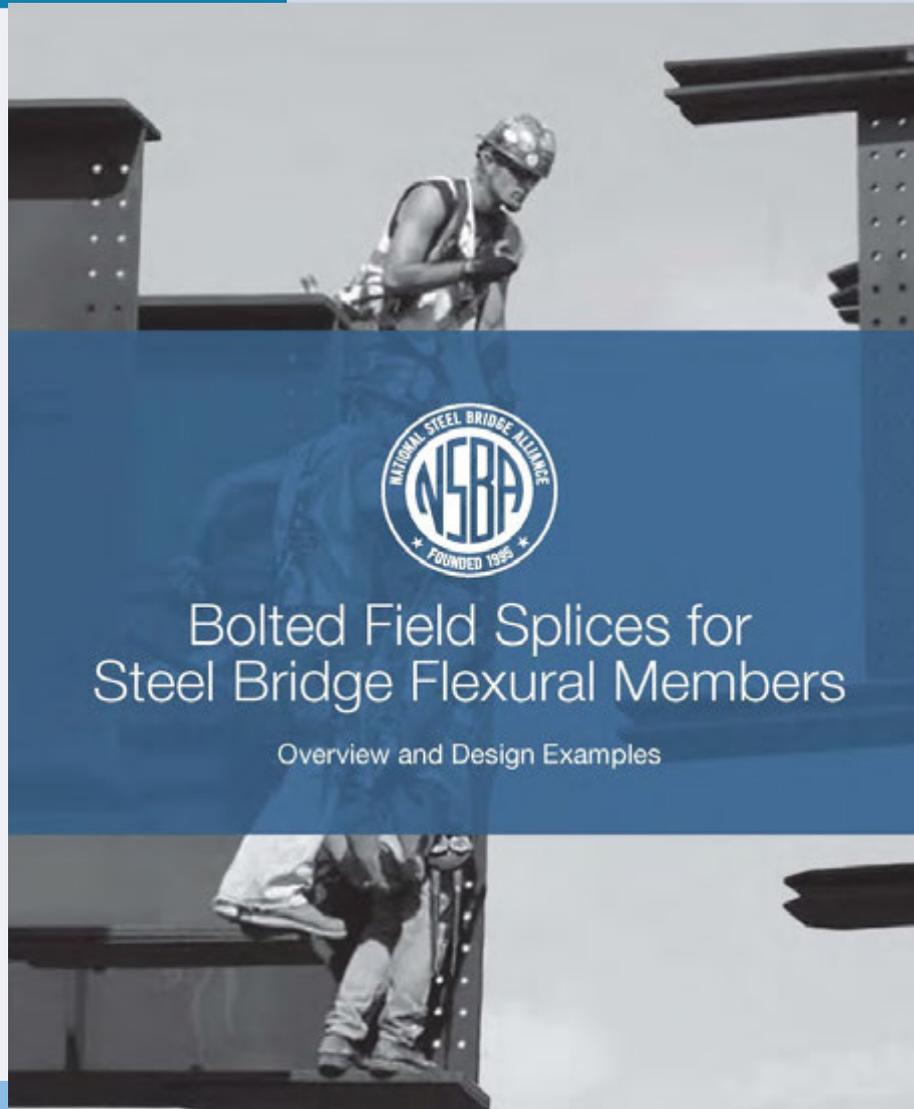


New Version Available Now!



www.aisc.org/nsba/design-resources

Splice Design Aid



Bolted Field Splices for Steel Bridge Flexural Members

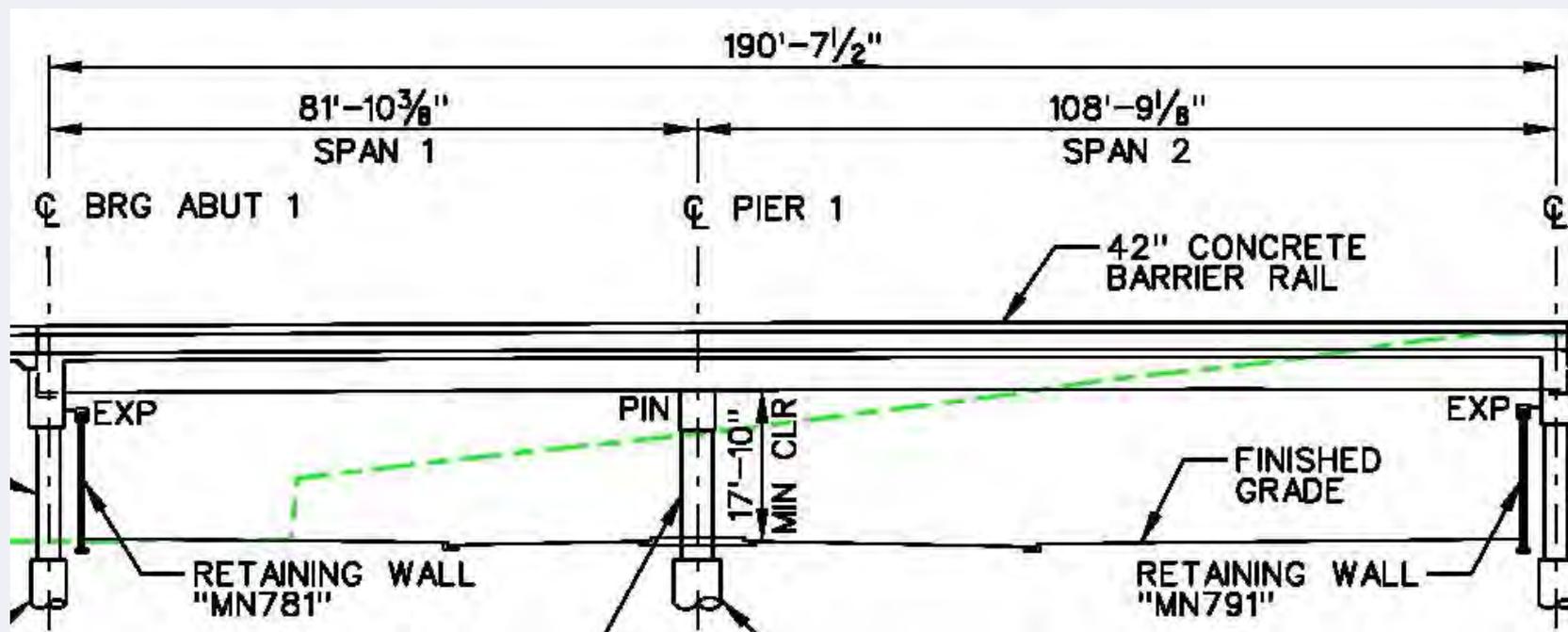
Overview and Design Examples

Go To:

<https://www.aisc.org/nsba/design-resources>

Conceptual Studies

- For example, you might have a bridge with this layout



Conceptual Studies

- You would receive a detailed report including:
 - Comparison tables

PDS 2004/25
Two spans (82.76 - 112.76')

Description	Estimated Unit Weight Scheme				
	A1	A2	B1	B2	
Number of girder lines	5	5	4	4	
Approximate number of studs/gdr	384	339	396	498	
Number of t. stiffeners/gdr	0	0	8	0	
Deck Area (ft ²)	8079	8079	8079	8079	
Weight of one girder line (Grade 50w)	19.31	17.26	6.24	20.65	
HPS 70W <= 2 in			12.56		
HPS 70W > 2 in.					
Weight of field splices	0.19	0.18	0.19	0.21	
Summation for one girder line (tons)	19.50	17.44	18.99	20.86	
Weight of all girder lines (tons)	97.50	87.20	75.96	83.44	
Interior Cross frames (tons)	2.19	2.29	2.13	2.18	
Cross frames at supports (tons)	1.76	1.80	1.70	1.73	
Total Weight (tons)	101.5	91.3	79.8	87.4	
Unit Weight (psf deck area)	25.1	22.6	19.8	21.6	
Normalized Unit Weight	1.271	1.144	1.000	1.095	

- A1:** Five girder lines, constant depth
- A2:** Five girder lines, variable depth (Span 1 only)
- B1:** Four girder lines, constant depth
- B2:** Four girder lines, variable depth (Span 1 only)



Material Guidance



Structural Shape Availability





Structural Shape Availability



- Wide Flange Availability Maximums

Producer	Maximum Depth (in)	Length (ft)
Nucor-Yamato Steel	44	120*
Gerdau Ameristeel	36	
Steel Dynamics	36	

* Maximum length for some beam sizes may be shorter.

- Allow a plate girder alternative & show on bid documents.

Mill Plate Availability





Mill Plate Availability – Grade 50

- Plate Availability Maximums

Producer	Maximum Thickness (in)	Maximum Width (in)
Arcelor-Mittal	4	162
Nucor Steel	4	136
SSAB	3	120

- ≤ 3 " thick plate will result in the best pricing



Mill Plate Availability – HPS70W



- Plate Availability Maximums

Producer	Maximum Thickness (in)	Maximum Width (in)	Maximum Length (in)
Arcelor-Mittal (Q&T)	4	195	600
Arcelor-Mittal (TMCP)	1 3/8	120	1500
Nucor Steel (Q&T)	3	124	580
SSAB (TMCP)	2	103	1140

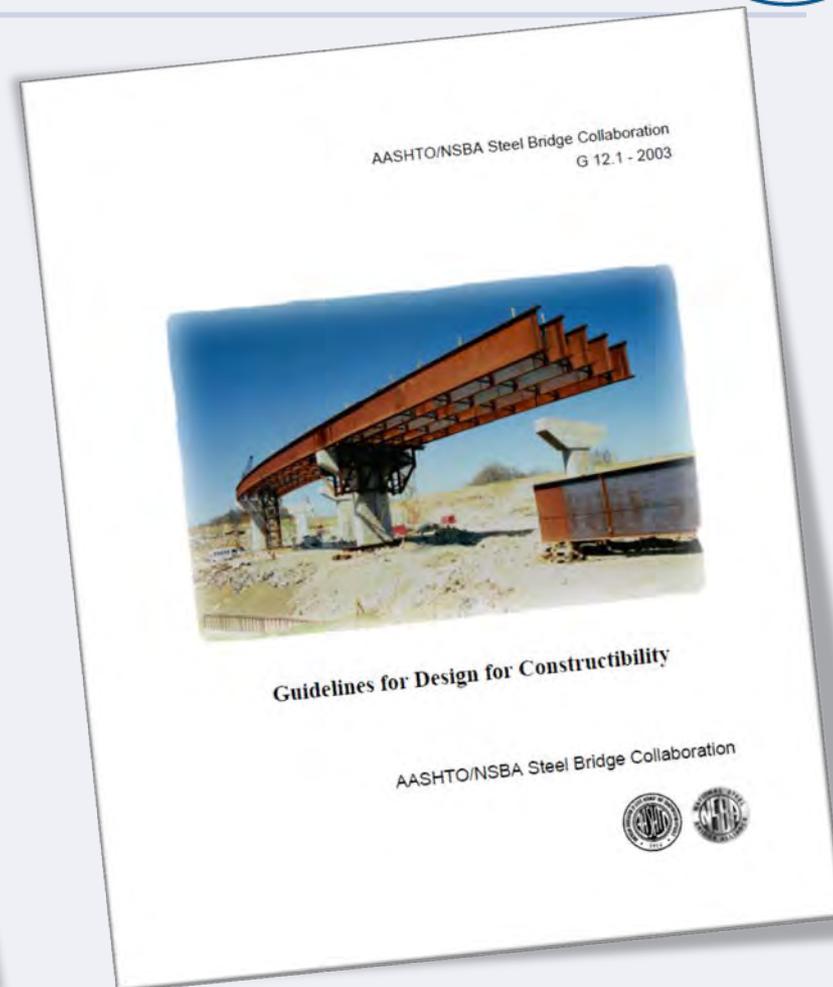
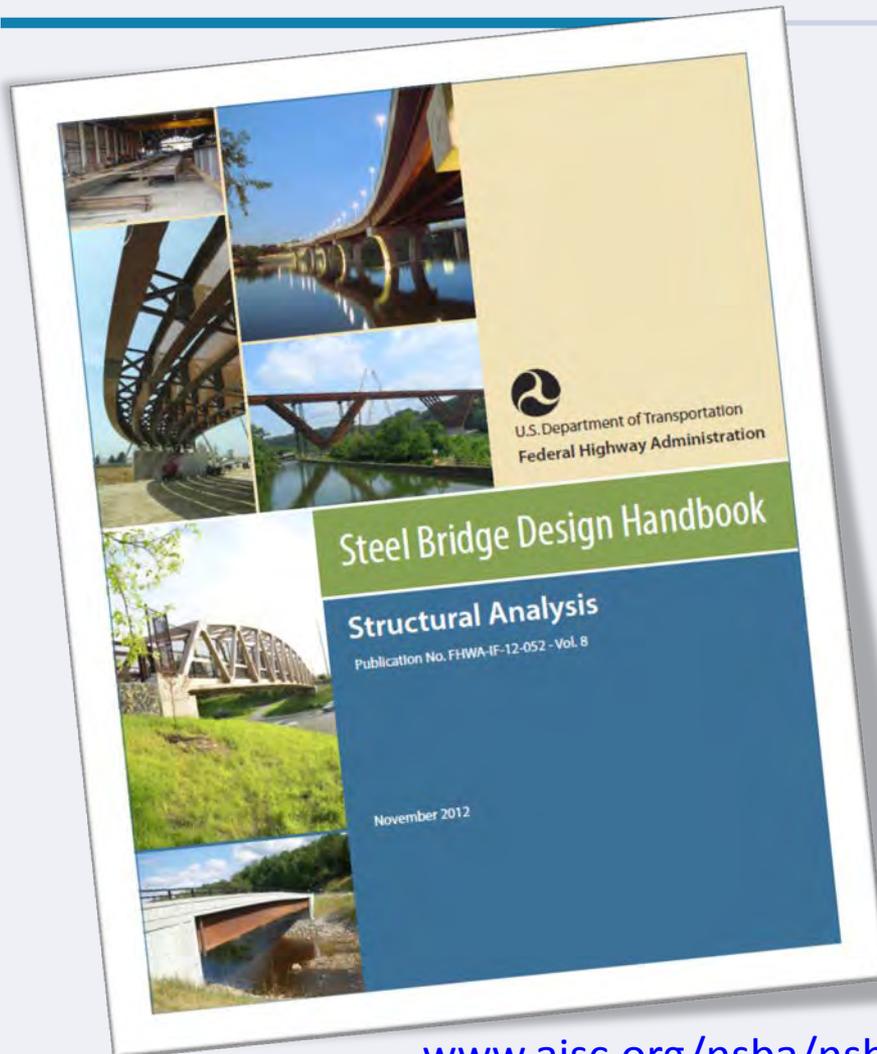
* Q&T: Quench and Tempered.

** TMCP: Thermomechanical Controlled Process.



White Papers & Publications |

Design References



www.aisc.org/nsba/nsba-publications

Technical Resources




Skewed and Curved Steel I-Girder Bridge Fit

NSBA Technical Committee: Bill Davis, Fred
 Eberhart, Charles Gotsch, Karl Frank, Mike Gustin, Bill McDermott, Ronnie Medlock and Don Wicker

Download a free summary report by clicking on the appropriate download link on the right side of the page.

What is Fit and Why is it Important?

The "fit" or "fit condition" of an I-girder bridge refers to the deflected girder geometry associated with a specific load condition, and the final condition. Therefore the associated relationships, or fitting, of the members also changes. When the fit condition to which the cross-frames or diaphragms are detailed to conform to the girders. Consideration of the fit condition is important because the appropriate fit decision can provide a significant benefit to the constructability and the overall performance of the bridge system.

In all bridge systems (trusses, arches, etc.) the steel components change shape between the fabricated condition, the erected condition, and the final condition. Therefore the associated relationships, or fitting, of the members also changes. When the fit changes are small, the fit choice may be inconsequential, but when the changes are large, the proper fit choice is essential for achieving a successful project.

Article 6.7.2 of the AASHTO LRFD Bridge Design Specifications (8th Edition, 2017) specifies that the contractor documents should state the fit condition for which the cross-frames or diaphragms are to be detailed for the following I-girder bridges:

- Straight bridges where one or more support lines are skewed more than 20 degrees from normal;
- Horizontally curved bridges where one or more support lines are skewed more than 20 degrees from normal and with an L/R in all spans less than or equal to 0.05; and
- Horizontally curved bridges with or without skewed supports and with a maximum L/R greater than 0.05;

where L is the span length bearing to bearing along the centerline of the bridge and R is the radius of the centerline of the bridge cross-section.

bridge crossings
ARE YOU SURE THAT'S FRACTURE CRITICAL?

BY ROBERT J. CONNER, PH.D., KARL FRANK, P.E., PH.D.,
 BILL MCELRENEY AND JOHN YANUSKY, P.E.

Understanding which steel bridge elements are fracture critical members will provide the required protection while saving on in-service inspection.

ONE OF THE MOST NOTEWORTHY bridge failures in the United States occurred in 1967, when the Pease Pleasant Bridge over the Ohio River (also known as the Silver Bridge) collapsed, resulting in 46 deaths.

The collapse was due to brittle fracture of one of the eyebars.

The subsequent investigation revealed that the fracture was due to fatigue propagation of a tiny crack in the eyebar. Because the fracture propagation of the eyebar was extremely slow, a relatively small crack led to a brittle fracture of the eyebar, which in turn led to the collapse of the bridge.

This collapse was the catalyst for many changes in material specifications, design, fabrication and shop inspection of steel bridges. These requirements are codified in the AASHTO Bridge Design Specifications and the AASHTO AASHTO D.5 Bridge Fracture Critical (AASHTO) and are applied to tension members whose fracture could lead to bridge collapse. (Another bridge incident—the failure of a pin-and-roller assembly, which triggered the collapse of one span of the Mianus River Bridge in 1983—served as the impetus for enhanced field inspection requirements for these same members.)

The Three-Legged Stool

Today, a total fracture critical plan (FCP) is often illustrated as a three-legged stool, where each leg is made up of a part of the plan, as illustrated in Figure 1. (Since the introduction of the FCP, the authors are not aware of any failures in fracture critical members fabricated to the FCP. Hence, the FCP concept appears to be serving its intended purpose.)

It is essential to understand that the FCP was specifically developed in response to failures (i.e., brittle fractures) in non-redundant tension members that occurred in the 1970s. Such members, which may be either entirely (e.g., a truss member) or partially (e.g., a flexural member) in tension, became known as fracture critical members (FCMs). An FCM is defined by the Code of Federal Regulations (49CFR1650) – Bridges, Structures and Hydraulics as "a steel member in tension, or with a residual stress, whose failure would probably cause a portion of or the entire bridge to collapse."

Prior to the FCP, the design of tension members was based

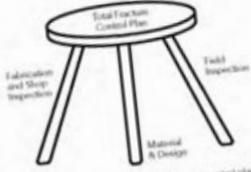


Figure 1 – The three “legs” of a total fracture critical plan for bridges.






Robert Conner (robert.conner@purdue.edu) is an associate professor of civil engineering and director of the S-DBITE Center at Purdue University.
 Karl Frank (karl.frank@theohold.com) is chief engineer with The Ohio Hold Inc., Bill McDermott (billmcd@nsba.org) is managing director of NSBA, John Yanusky (john.yanusky@theohold.com) is CEO of Bridges and Structures Operations, Inc.

100001 STEEL CONSTRUCTION

www.aisc.org/nsba/nsba-publications

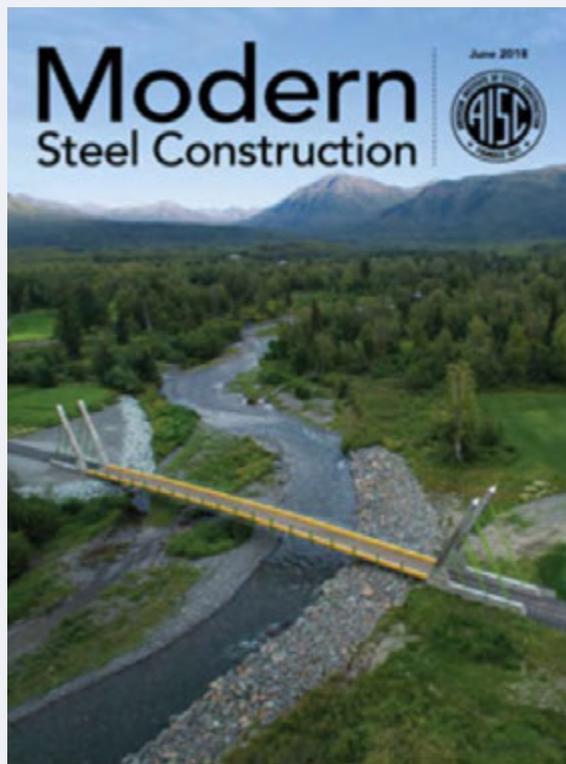


Alerts & Upcoming Events



MSC Articles

- Have an idea for a great bridge article?
 - Submit it to www.aisc.org/bridgeideas



Prize Bridge Awards

- 2020 Awards – Submissions open next summer
- Bridges must be open to traffic between May 1, 2017 and September 30, 2019.



2019 World Steel Bridge Symposium



- St. Louis – April 3 – 5, 2019
- DOT registration & travel reimbursement is available



AASHTO/NSBA Collaboration



- Fall 2018 Meeting
 - October 8 – 10.
 - Austin, TX.

AASHTO/NSBA Collaboration Meeting
Fall 2018 Meeting
October 8 - 10, 2018 - Austin, TX

The Fall AASHTO/NSBA Steel Bridge Collaboration meeting has been scheduled for Monday, October 8 from 1:00 PM - 5:00 PM, Tuesday, October 9 from 8:00 AM - 5:00 PM and Wednesday, October 10 from 8:00 AM - 4:00 PM at the Sheraton Austin Hotel at the Capitol.

Meeting Schedule

The following Task Groups are scheduled for this up-coming meeting. Note that in addition to their respective individual meetings, there will be a combined TG2, TG4, TG10 meeting on Wednesday. All times are approximate and subject to change.

Monday, October 8 (1:00 pm - 5:00 pm)

Time	Meeting
1:00pm - 5:00pm	TG 2 / TG 5 Fabrication Specification
1:00pm - 5:00pm	TG12 Design for Economy & Constructability

Tuesday, October 9 (8:00 am - 5:00 pm)

Time	Meeting
8:00am - 12:00am	TG 8 Coatings
8:00am - 10:00am	TG 11 Steel Bridge Handbook
10:00am - 12:00pm	TG 15 Data Modeling for Interoperability
12:00pm - 1:00pm	Lunch (Provided)
1:00pm - 3:00pm	TG 1 Detailing
3:00pm - 5:00pm	TG 10 Erection
1:00pm - 5:00pm	TG 16 Orthotropic Deck Panels
6:30pm - 9:00pm	Dinner (Registration Requested)

About the Collaboration
The mission of the Collaboration is to achieve quality and value in steel bridges by standardization of design, fabrication, and erection and by the sharing of resources. Through the Collaboration, steel bridge professionals work together in a spirit of cooperation and mutual respect to develop details, specifications and practices and to exchange knowledge, technology and expertise.

More Information
Visit: www.steelbridges.org/CollaborationStandards

Sheet 1 of 2

Sheet 2 of 2

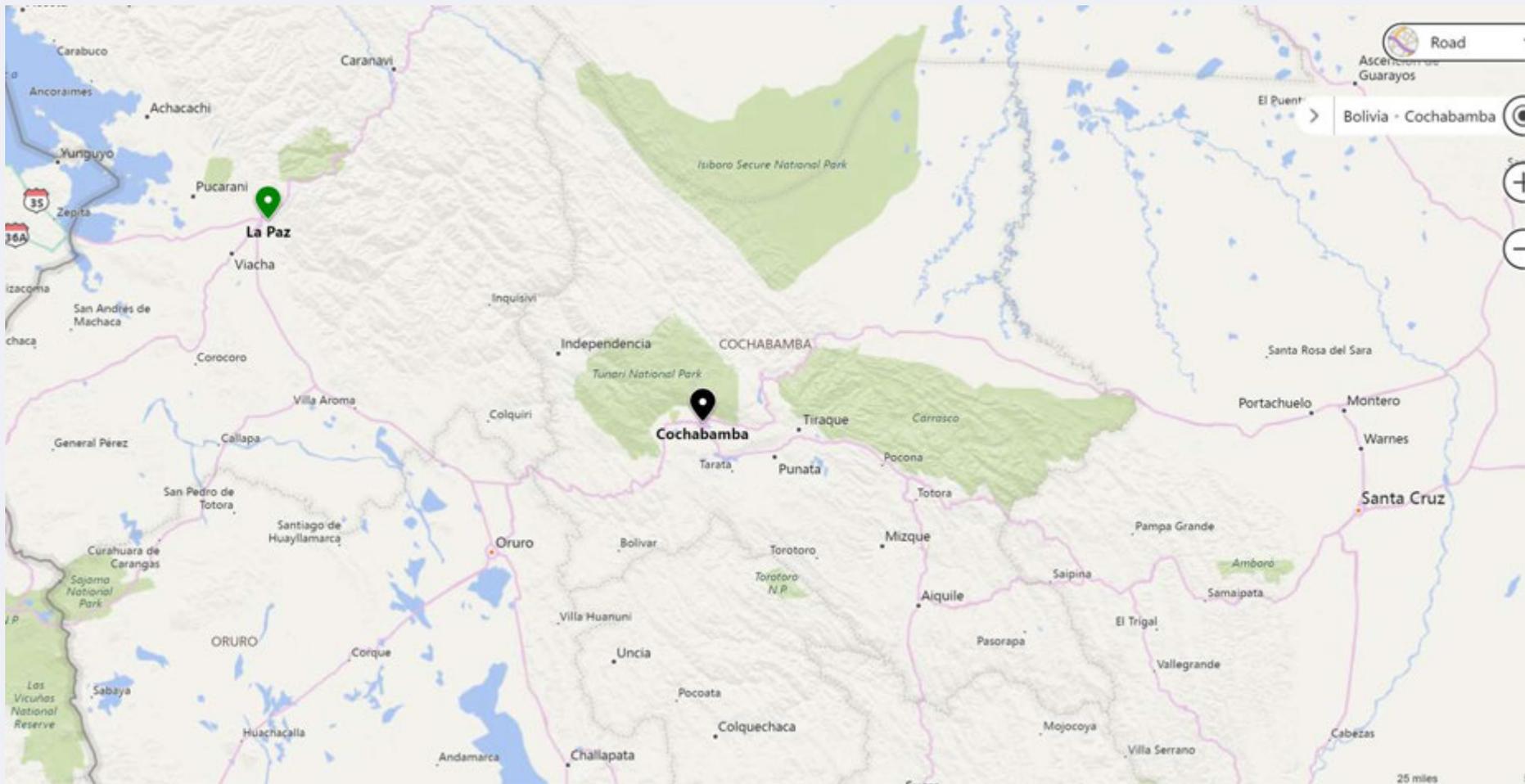
More Information:

nsbacollaboration@steelbridges.org

Bridges to Prosperity - Bolivia



Bridges to Prosperity - Bolivia



Celebrating 10 Years of SteelDay!

September 28, 2018



Thursday, September 27th

Baileson Brewery
2322 Bissonnet St., Houston

Happy Hour sponsored by AISC/NSBA
6 – 9 PM



Register for event here:

<https://www.aisc.org/why-steel/steelday/steelday-events/nsba-aisc-happy-hour/>



Thank you
