



Photo: 2024 Prize Bridge Merit Award, Medium Span Rt. 34B over Salmon Creek Bridge Photo Credit: NYSDOT

## What's New With NSBA

Jeff Carlson, PE

NSBA Senior Director of Bridge Initiatives



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Stronger.  
Steel.**



Photo: 2020 Prize Bridge Merit Winner, Major Span – Portageville Bridge Replacement (New York) – Photo Credit: John Kucko

## Upcoming Events



# Registration and Travel Stipends for Owner's

## NASCC: THE STEEL CONFERENCE

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

Join us for NASCC: The Steel Conference in Louisville, KY at the  
**Kentucky International Convention Center April 2-4, 2025.**

Registration for NASCC: The Steel Conference 2025 opens Wednesday, January 8th!

# Notable Events at WSBS

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- Constructability Design Requirements for Steel I-Girder Bridges Workshop
- Steel Industry Roundtable
- Kentucky Steel Bridge Session
- Fabricator Panel Session
- Movable Bridges
- Tied Arches
- Welding
- Corrosion Protection
- Railroad Bridges



# Webinars

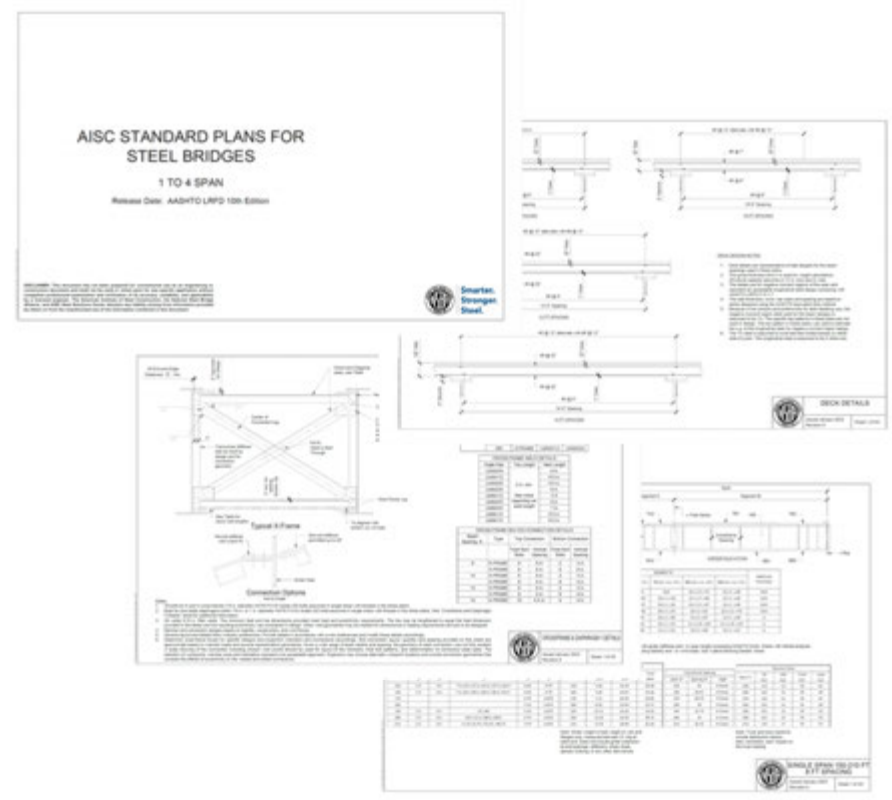
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- Next webinar: November 14, 2024
  - Frank Russo – Standard Plans for Modern Steel Highway Bridges
    - More on this later.....
  - Free registration for bridge owners
  - <https://learning.aisc.org/>

# Standard Designs for Straight I-Girder Bridges

## AISC's Need for Speed Initiative project – In progress


- **Motivation:**
  - Steel provides great flexibility in design.
  - Engineers are routinely confronted with repetitive design decisions regarding material thickness and sizes for the routine steel I-girder bridges.
- **Objective:**
  - Develop designs for 1, 2, 3, and 4 span arrangements.
  - Optimize and standardize web, flange, stiffener, and field splice plate sizes from typical mill plate widths and thicknesses.
  - Provide cost-efficient diaphragm and cross-frame standards.



# Educational Resources

- AISC Learning Portal - <https://learning.aisc.org/>

## AISC Learning Portal





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Welcome to the AISC Learning Portal -- the premier source of information on steel design and construction topics offered in a variety of convenient formats. Whether you are looking to build your steel expertise or seeking professional development hours for licensure renewal, you'll find it here.


👉 \*\*2024 NASCC: The Steel Conference recordings are now available under [Conference Recordings and Papers](#). We suggest using the optional filters -- select a conference under Conference Recordings and Papers; select Year: 2024.\*\*


### PROGRAMS FOR CONTINUING PROFESSIONAL EDUCATION


LIVE WEBINARS

NIGHT SCHOOL


ON-DEMAND COURSES


UPCOMING CONFERENCES


STEEL ACADEMY

SEMINARS

### CONFERENCE RECORDINGS AND OTHER RESOURCES

CONFERENCE RECORDINGS AND PAPERS

ENGINEERING JOURNAL

DESIGN GUIDES

#### OPTIONAL FILTERS

Keyword

Conference Recordings and Papers

Year

Credit Type

Credit Amount

Audience





Photo: 2024 Prize Bridge Merit Award, Medium Span Rt. 34B over Salmon Creek Bridge Photo Credit: NYSDOT

## New Resources



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# Fundamentals of Steel Bridge Engineering

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## Problem and Objective

- Many universities
  - do not have faculty with the expertise in highway steel bridge design.
  - do not provide a graduate level class in this area of bridge engineering.
- Develop teaching materials for a collegiate level class dedicated to highway steel bridge design.

## Current Status

- Presentations completed
  - Available for free at AISC Education website as a Teaching Aid
- Video recordings for each lecture:
  - Targeting Q1 2025 for public release.

# Fundamentals of Steel Bridge Engineering

## Lecture Summary


Lecture	Title
1	Introduction to Bridges and Bridge Steels
2	Bridge Planning and Layout
3	Loads
4	Methods of Analysis
5	Shear in Girders
6	Flexure – Fundamental Calculations
7	Flexure – Constructability, Service Limits States and Fatigue and Fracture Limits States

Lecture	Title
8	Flexure - Strength Limit State: Noncomposite Sections and Composite Sections in Negative bending
9	Flexure - Strength Limit State: Composite Sections in Positive Bending and Shear Connectors
10	Flexure – Bracing for Flexure
11	Splices and Connections - General Concepts, Welded Connections, Bolted Connections, and Girder Field Splices
12	Tension and Compression Members
13	Bearings and Joints
14	Bridge Decks

# Fundamentals of Steel Bridge Engineering

## Lecture Format

**Discrete vs. Continuous Bracing**



The diagram illustrates a steel bridge cross-section with three types of bracing indicated by orange arrows: 'Discretely braced tension flange' pointing to the top flange, 'Discretely braced compression flange' pointing to the bottom flange, and 'Continuously braced flange' pointing to the web. A small circular logo is visible in the bottom left corner of the diagram area.

**Continuously braced flange**

A continuously braced flange is defined as a flange encased in concrete or anchored by shear connectors for which flange lateral bending effects need not be considered. The lateral resistance of the composite concrete deck is generally sufficient to compensate for the neglect of any initial lateral bending stresses in the flange, as well as any additional lateral bending stresses that may be induced in the flange after the deck hardens. A continuously braced flange in compression is also assumed not to be subject to local or lateral-torsional buckling. For a continuously braced compression flange, one side of the flange is effectively prevented from local buckling, or else both sides of the flange must buckle in the direction away from the concrete deck, resulting in highly restrained boundary conditions at the web-flange juncture.

For composite sections in positive bending at the strength limit state, the top (compression flange) is continuously braced by the composite concrete deck, and the bottom flange remains a discretely braced tension flange.

As discussed previously, in regions of negative flexure, when stud shear connectors are provided, the section may be considered composite with the longitudinal reinforcement at the strength limit state after the concrete deck hardens. Although the concrete in tension is ignored in the strength limit state design calculations, the top (tension) flange is still considered to be continuously braced by the concrete deck. The bottom flange in regions of negative flexure remains a discretely braced compression flange.

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Presentation  
Slide

Speaker's  
Notes



# Fundamentals of Steel Bridge Engineering

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## What is next?

- Recordings
  - Finalize with quizzes for assessments
- Development of an in-person short course
  - 2-to-3-day course
  - Parts 1 and 2

### Fundamentals of Steel Bridge Engineering

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#### Lesson 6 – Flexure Part 1 Fundamental Calculations



# AREMA/NSBA Collaboration

## Guidelines for the Design of Steel RR Bridges for Constructability and Fabrication

- **Table of Contents:**

- Chapter 1 – Special Considerations for Railroad Bridges
- Chapter 2 – General Design & Detailing
- Chapter 3 – Girders
- Chapter 4 – Boxes
- Chapter 5 – Trusses
- Chapter 6 – Floor Systems, Decks, and Walkways
- Chapter 7 – Bolts
- Chapter 8 – Corrosion Protection
- Chapter 9 – Construction



Guidelines for the  
Design of Steel  
Railroad Bridges  
for Constructability  
and Fabrication

**AREMA**  
AMERICAN RAILWAY ENGINEERING AND  
MAINTENANCE ASSOCIATION



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# AREMA/NSBA Collaboration

## Guidelines for the Design of Steel RR Bridges for Constructability and Fabrication

- Published at NSBA and AREMA websites
- [aisc.org/rrbridges](http://aisc.org/rrbridges)



Guidelines for the  
Design of Steel  
Railroad Bridges  
for Constructability  
and Fabrication

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Photo: 2020 Prize Bridge Merit Winner, Major Span – Portageville Bridge Replacement (New York) – Photo Credit: John Kucko

## Ongoing & Proposed Initiatives

# LRFD Simon

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## Future Update

- Interim release (9th Edition Bridge Design Specification) - Q2 2024
  - Bug fixes (~25 in total).
  - New installer.
- Major Release - Q4 2024 / Q1 2025
  - Implement 10th Edition Bridge Design Specification.
  - Major overhaul of user interface.
  - File format change.
  - Miscellaneous enhancements.
  - Evaluate integration with AASHTOWare BrDR.
  - Removal of tub girder design option.



# Steel Grade Separation Bridges

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- **Motivation:**

- Interstate system bridges that will be replaced in the coming years.
- How can the steel industry make designing and constructing these easier?

- **Design and Detailing of Routine Grade Separation Bridges**

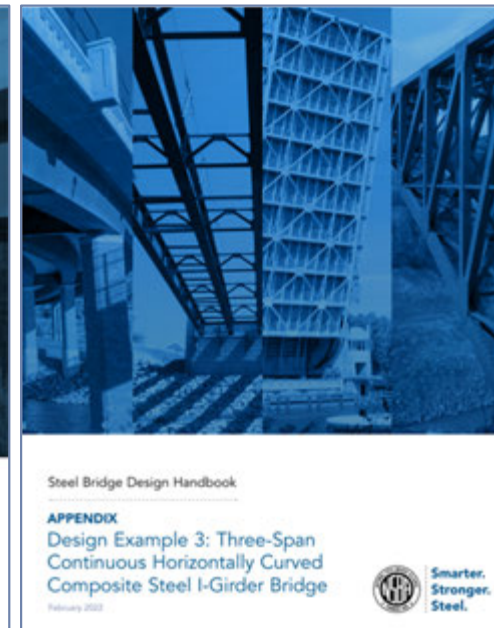
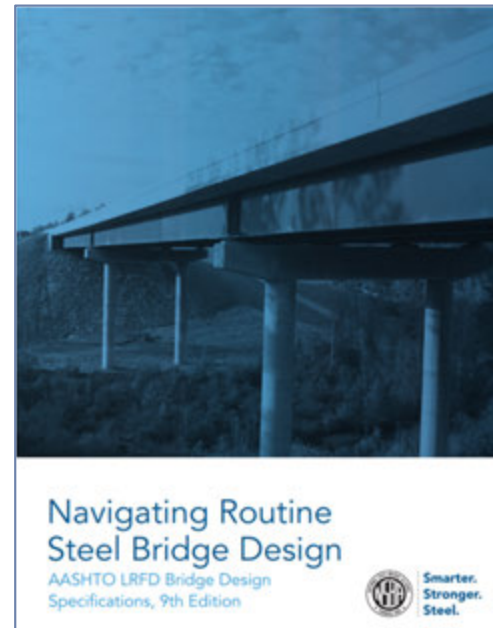




# Updating of Existing Publications

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- Navigating Routine Steel Girder Bridge Design
- Steel Bridge Design Handbook
- Both:
  - Update for the AASHTO LRFD BDS 10<sup>th</sup> Edition
  - Update for current research and other revised guidelines and specifications.



# Cross-frame Design Guidelines - Update

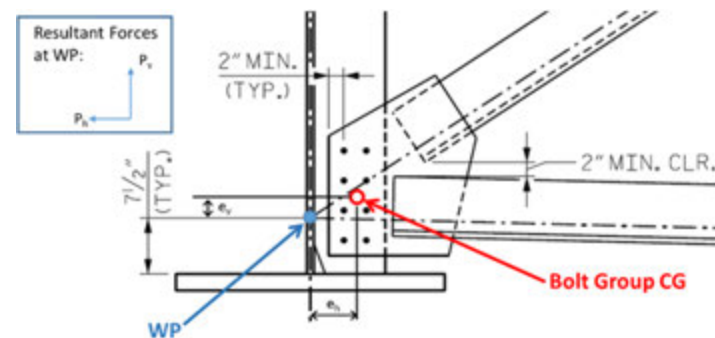
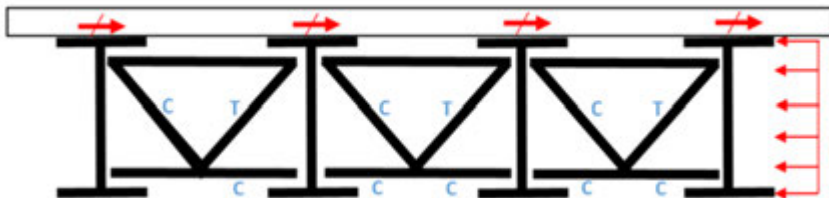
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- **AASHTO/NSBA Steel Bridge Collaboration – TG 11**
- Develop a Collaboration document to provide engineers with guidance on various issues related to the design of cross-frames in steel girder bridges
- The intent is to educate engineers about:
  - The development of framing plans.
  - The selection of cross-frame configuration and member type.
  - The typical design forces for cross-frame members.
  - The typical requirements for the design various member types.
  - The typical requirements for the design of cross-frame connections.



# Cross-frame Design Guidelines - Update

- In Progress.....
  - Expected to have final edits completed in the next two weeks
  - Collaboration ballot process
    - Make necessary edits
  - AASHTO CBS Steel and Metals Technical Committee
    - Make necessary edits
  - Approval / Publication in 2026??

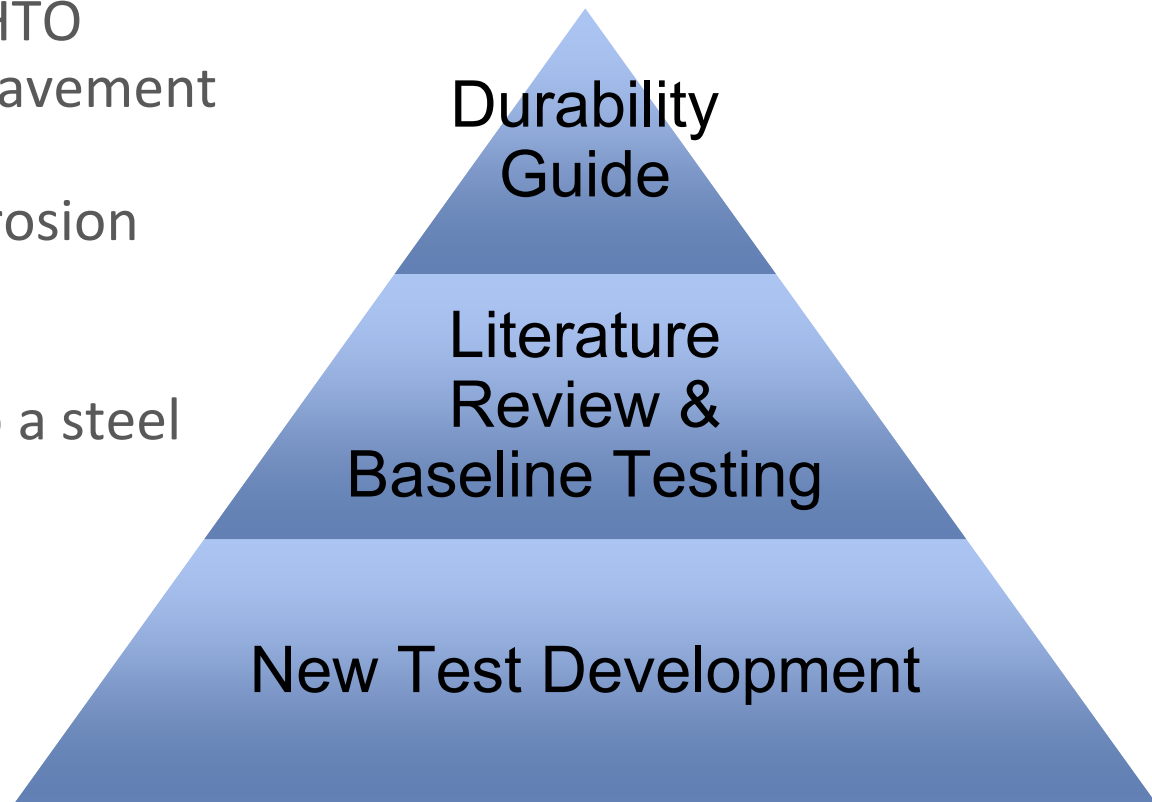


# New Corrosion Protection Testing Procedure

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*AASHTO Product Evaluation/AASHTO Committee on Materials and Pavement - 4c*

- NSBA is working with the AASHTO Committee on Materials and Pavement (4c) to develop a new testing procedure for steel bridge corrosion protection systems.
- The ultimate goal is to develop a steel bridge durability guide!



# Performance – Single Coat IOZ

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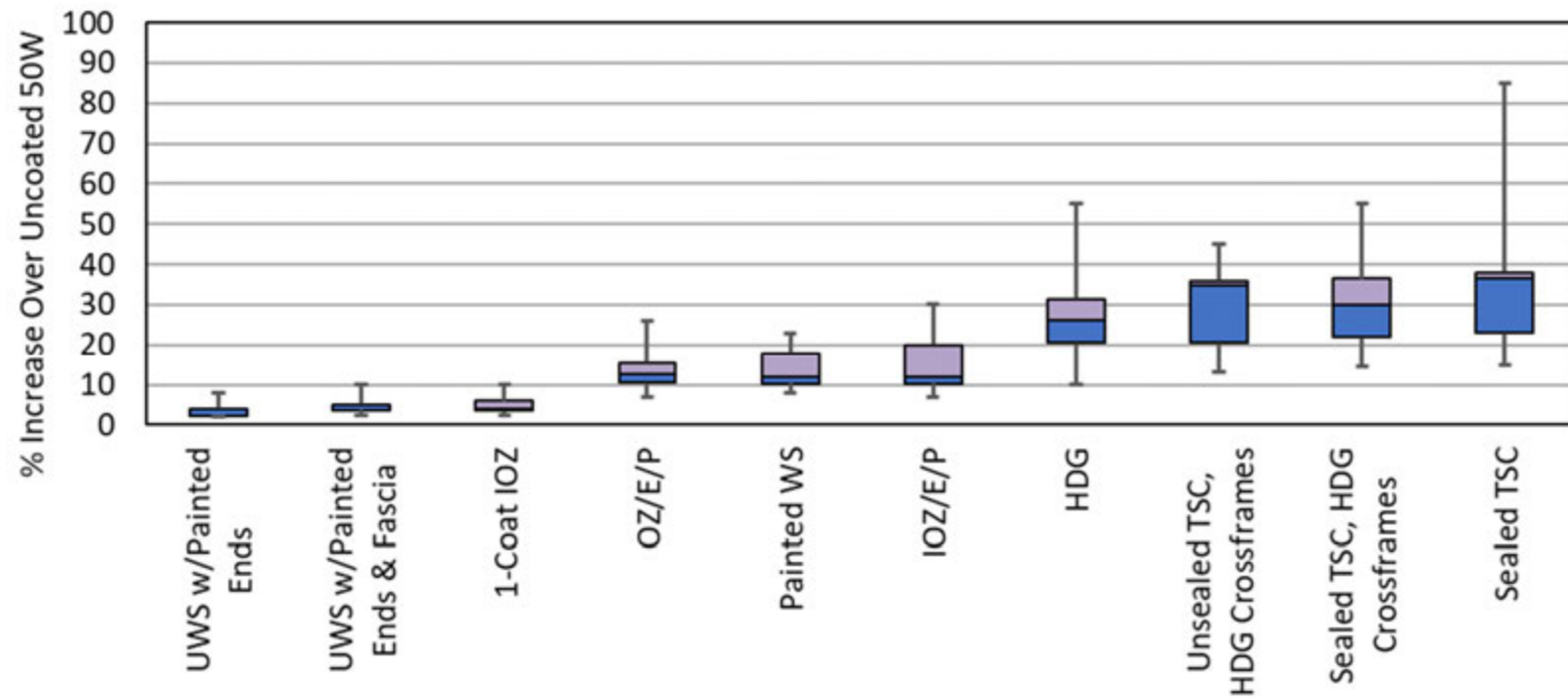
**TxDOT Salt Fog Testing @ 4,000 Hours**





# 2020 Cost of Coatings Survey

Relative % cost increase\* over ASTM A709 Grade 50W (unpainted)

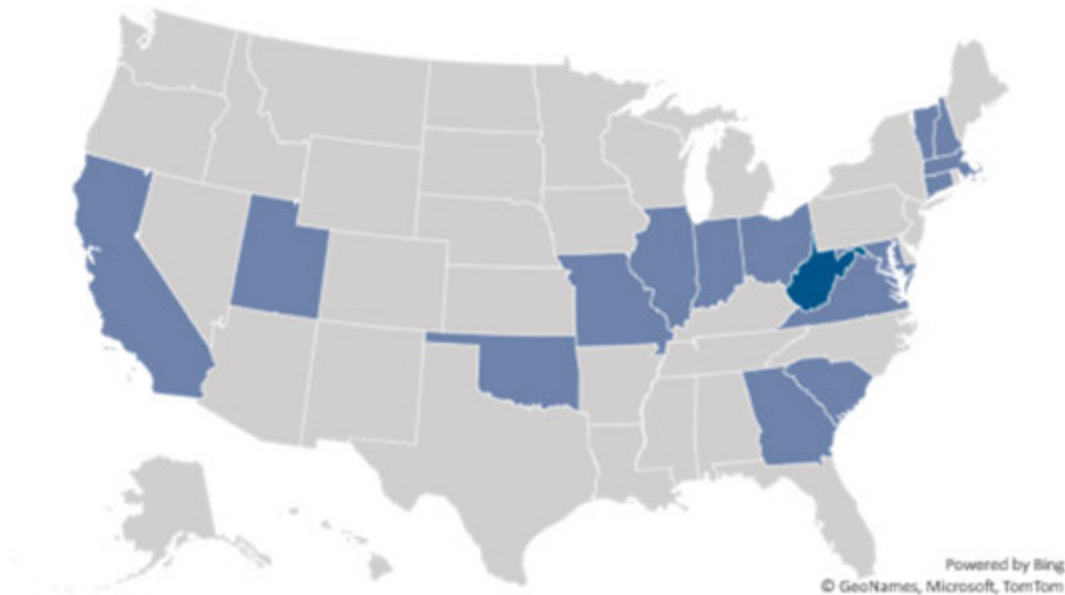


\* - defined as FOB cost delivered to jobsite.

# Coatings Testing Survey

### ***Paint testing and approval specifications / AASHTO COMP***

- Feedback about current durability tests used to evaluate steel bridge coatings



# SSRC 2025 Lynn S. Beedle Award

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- **Structural Stability Research Council Award**
- **Dr. Todd Helwig**
- Attend his presentation at the 2025 Annual Stability Conference, titled “A 30-Year Career Led by Buckling and Bracing Problems.”
  - At NASCC in Louisville.





# Thank You

Jeff Carlson, PE  
720.440.3011  
[carlson@aisc.org](mailto:carlson@aisc.org)  
[www.aisc.org/nsba/](http://www.aisc.org/nsba/)



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Photo: 2020 Prize Bridge National Winner, Medium Span - Grand Avenue (Colorado) Photo Credit: RS&H

# Bridges To Prosperity (B2P) 2024



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# Bridges to Prosperity – Rwanda

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VIDEO



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