



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



Smarter.
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

- 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



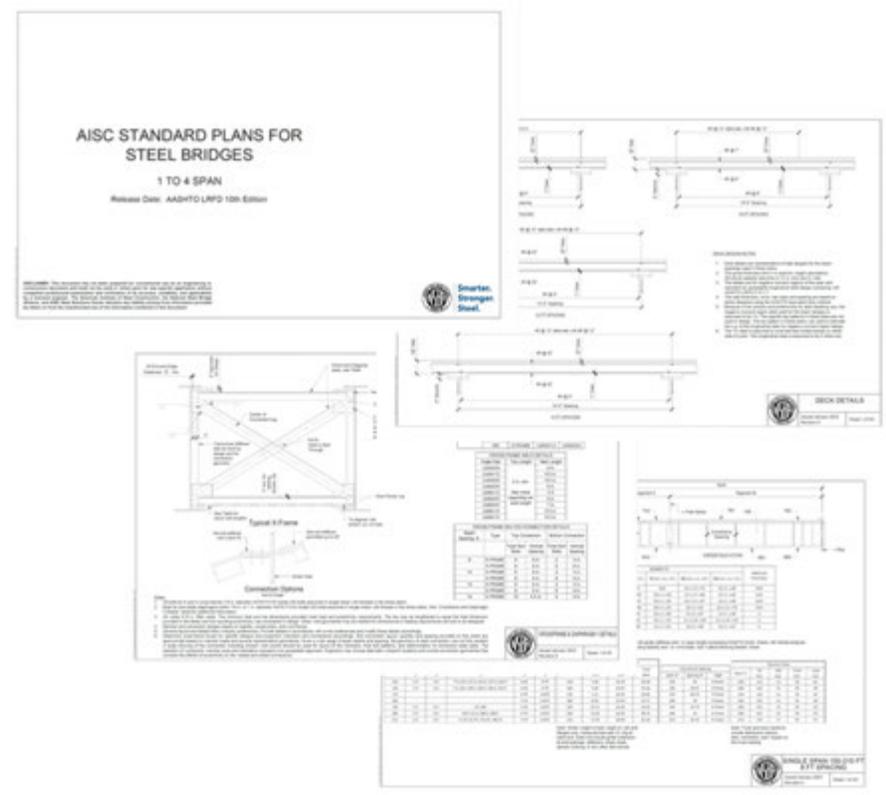
Webinars

- 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/>

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
Select...

Year
Select...

Credit Type
Select...

Credit Amount
Select...

Audience
Select...



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

New Resources



Smarter.
Stronger.
Steel.

Fundamentals of Steel Bridge Engineering

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 shows a cross-section of a steel bridge girder. The top flange is labeled 'Discretely braced tension flange' and the bottom flange is labeled 'Discretely braced compression flange'. A red line indicates the 'Continuously braced flange' which is the top flange in this section.

Continuously braced flange

22

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.

22

Presentation Slide

Speaker's Notes

Fundamentals of Steel Bridge Engineering

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

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



AREMA/NSBA Collaboration

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

- Published at NSBA and AREMA websites
- aisc.org/rrbridges



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

AREMA
AMERICAN RAILWAY ENGINEERING AND
MAINTENANCE ASSOCIATION





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

Ongoing & Proposed Initiatives

LRFD Simon

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

- **Motivation:**

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

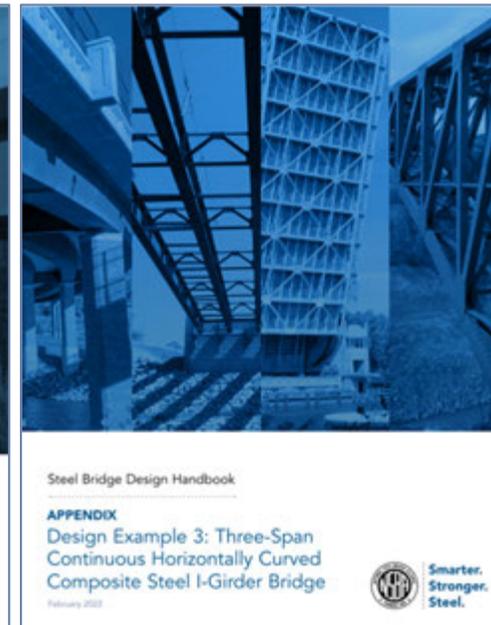
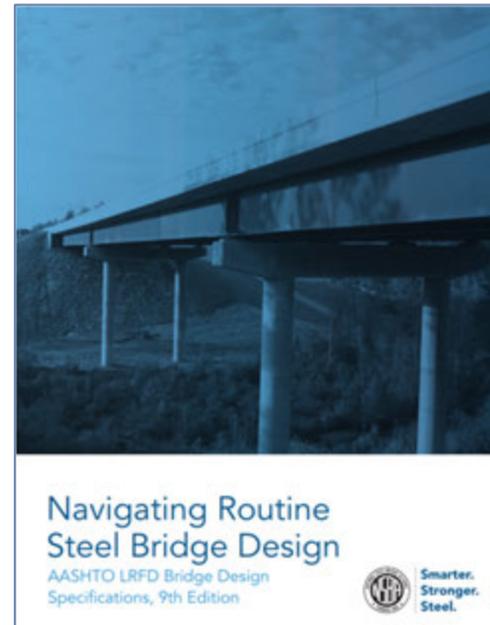
- **Design and Detailing of Routine Grade Separation Bridges**



Updating of Existing Publications

- Navigating Routine Steel Girder Bridge Design
- Steel Bridge Design Handbook

- Both:
 - Update for the AASHTO LRFD BDS 10th Edition
 - Update for current research and other revised guidelines and specifications.



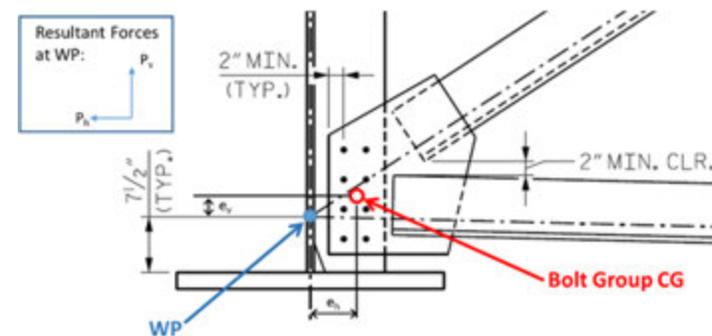
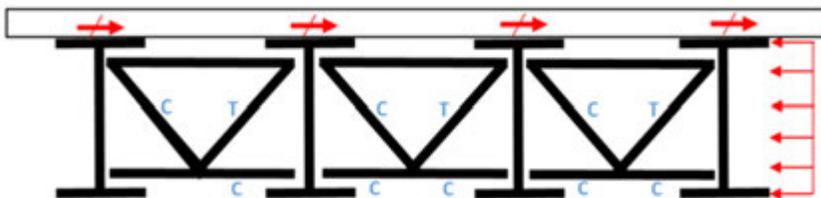
Cross-frame Design Guidelines - Update

- **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

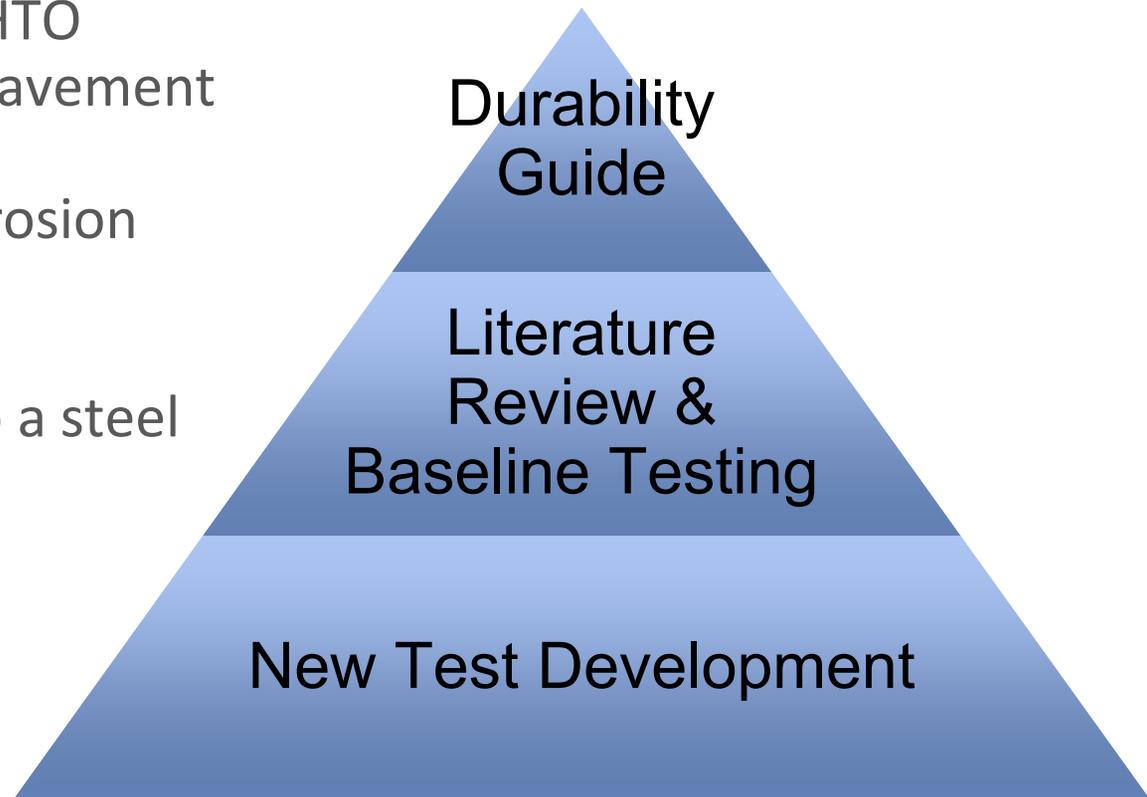
- In Progress.....
 - Expected to have final edits completed in the next two weeks
 - Collaboration ballot process
 - Make necessary edits
 - AASHTO CBS Steel and Metals Technical Committee
 - Make necessary edits
 - Approval / Publication in 2026??



New Corrosion Protection Testing Procedure

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!



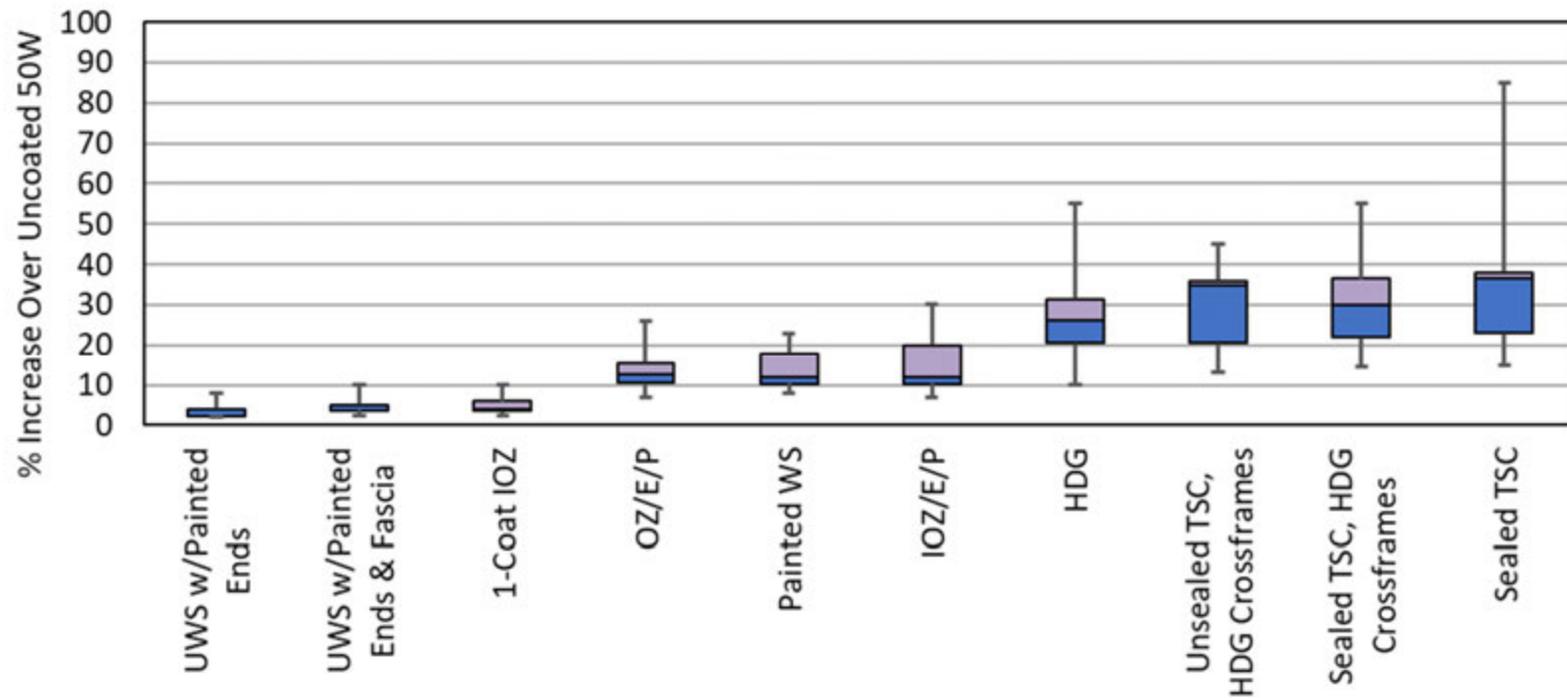
Performance – Single Coat IOZ

TxDOT Salt Fog Testing @ 4,000 Hours



2020 Cost of Coatings Survey

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

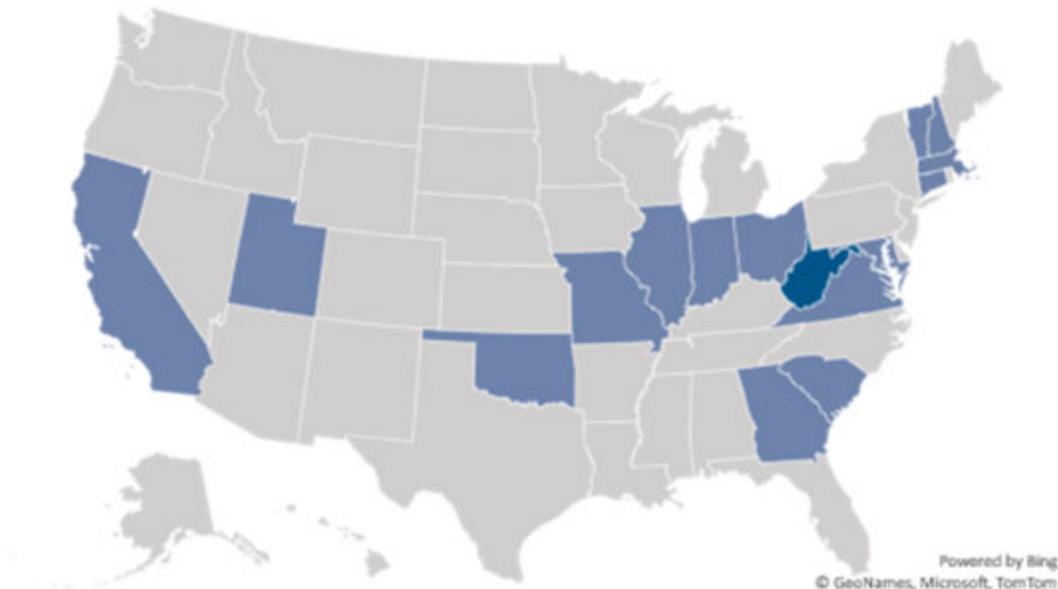


* - defined as FOB cost delivered to jobsite.

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

- **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
www.aisc.org/nsba/



Smarter.
Stronger.
Steel.



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

Bridges To Prosperity (B2P) 2024



Smarter.
Stronger.
Steel.

Bridges to Prosperity – Rwanda



VIDEO

Nyagashanga Suspension Bridge
South of the city of Muhanga, Rwanda



Smarter.
Stronger.
Steel.