Spring Meeting Agenda Packet

Radisson Blu Aqua Hotel Chicago, IL April 25 – 27, 2023





The AASHTO/NSBA Steel Bridge Collaboration is a joint effort between the American Association of State Highway and Transportation Officials (AASHTO) and the National Steel Bridge Alliance (NSBA) with representatives from state departments of transportation, the Federal Highway Administration, academia, and various industry groups related to steel bridge design, fabrication, and inspection. The mission of the Collaboration is to provide a forum where professionals can work together to improve and achieve the quality and value of steel bridges through standardization of design, fabrication, and erection.

Contents

| AISC Antitrust Policy, Conflict of Interest and Code of Conduct | 1 |
|--|---------|
| Schedule Overview | 2 |
| Day 1 - Tuesday, April 25 | 2 |
| Day 2 - Wednesday, April 26 | 2 |
| Day 3 - Thursday, April 27 | 3 |
| Hotel Meeting Space Floor Plan | 4 |
| Wednesday Dinner Information | 5 |
| Meeting Agendas | 6 |
| TG 15 Data Modeling for Interoperability | 7 |
| TG 16 Orthotropic Deck Panels | 8 |
| Combined TG 1 Detailing, TG 15 Data Modeling for Interoperability | 9 |
| TG 1 Detailing | 10 |
| TG 13 Analysis of Steel Bridges | 11 |
| TG 8 Coatings | 12 |
| TG 12 Design for Constructability and Fabrication | 14 |
| TG 17 Steel Castings | 15 |
| Combined TG 1 Detailing, TG 11 Steel Bridge Handbook, TG 12 Design for Constructabil | ity and |
| Fabrication | 16 |
| TG 4 QC/QA | 17 |
| TG 10 Erection | 19 |
| TG 18 Duplex Stainless Steel | 20 |
| TG 14 Field Repairs and Retrofits | 21 |
| TG 11 Design | 22 |
| TG 2 Fabrication and Repair | 24 |
| MC Main Committee | 26 |
| Appendix A - Collaboration Document Status | 28 |
| Appendix B – Member Rosters (2022 – 2023) | 29 |
| TG 1 Detailing | 29 |
| TG 2 Fabrication and Repair | 30 |
| TG 4 QC/QA | 32 |

| TG 8 Coatings | 33 |
|---|----|
| TG 9 Bearings | 34 |
| TG 10 Erection | 35 |
| TG 11 Design | 36 |
| TG 12 Design for Constructability and Fabrication | 38 |
| TG 13 Analysis of Steel Bridges | 40 |
| TG 14 Field Repairs and Retrofits | 41 |
| TG 15 Data Modeling for Interoperability | 42 |
| TG 16 Orthotropic Deck Panels | 43 |
| TG 17 Steel Castings | 44 |
| TG 18 Duplex Stainless Steel | 45 |
| Main Committee | 46 |
| ppendix C – Meeting Announcement | 47 |

AISC Antitrust Policy, Conflict of Interest and Code of Conduct

Please honor AISC's policies regarding antitrust, conflict of interest, and conduct

ANTITRUST

Please remember that discussion among competitors of plans, consensus arrangements, agreements, strategies, and the like may be unlawful if they relate to any of the following:

- Current or future pricing or bidding information;
- Limits on production or product lines;
- Allocating customers or territories;
- Individual company marketing strategies, projections, or assessments; or,
- Establishing a practice of dealing with customers or suppliers.

CONFLICT OF INTEREST

Please consult the meeting Chair and Secretary before participating in this meeting if you are, or an organization with which you are affiliated is:

- Contemplating or currently doing business with AISC;
- Involved in litigation, arbitration, or another form of dispute resolution, the outcome of which could be affected by an action of this group on an issue before it; or,
- Otherwise subject to circumstances that could impair or appear to impair your judgement on an issue before this group.

CONDUCT

Please behave appropriately and refrain from discrimination and harassment.

AISC's full policies relating to these matters are available at https://www.aisc.org/about-us/

Schedule Overview

NOTE: All times are shown as Central Time Zone

Day 1 - Tuesday, April 25

| Meeting | Secretary | Chair | Vice Chair | Start (CT) | End (CT) | Room |
|---|--|----------------|-------------------|------------|----------|-----------------------|
| Breakfast | | | | 7:30 AM | 9:00 AM | Outside Meeting Rooms |
| TG 15 Data Modeling for Interoperability | John Hastings | Aaron Costin | Jonathan Stratton | 8:00 AM | 10:00 AM | Atlantic Ballroom D |
| TG 16 Orthotropic Deck Panels | Jeff Carlson | Sougata Roy | Frank Artmont | 9:00 AM | Noon | Atlantic Ballroom C |
| Combined TG 1 Detailing, TG 15 Data Modeling for Interoperability | John Hastings | Aaron Costin | Jonathan Stratton | 10:00 AM | Noon | Atlantic Ballroom D |
| Lunch | | | | Noon | 1:00 PM | Outside Meeting Rooms |
| TG 13 Analysis of Steel Bridges | Christopher Garrell | Deanna Nevling | Francesco Russo | 1:00 PM | 3:00 PM | Atlantic Ballroom C |
| TG 1 Detailing | Vin Bartucca | Randy Harrison | Gary Wisch | 1:00 PM | 5:00 PM | Atlantic Ballroom D |
| TG 8 Coatings | Jeff Carlson | Paul Vinik | Johnnie Miller | 3:00 PM | 5:00 PM | Atlantic Ballroom C |
| Cocktail Hour – Prior Registration Requested | Cocktail Hour – Prior Registration Requested | | | | | |

Day 2 - Wednesday, April 26

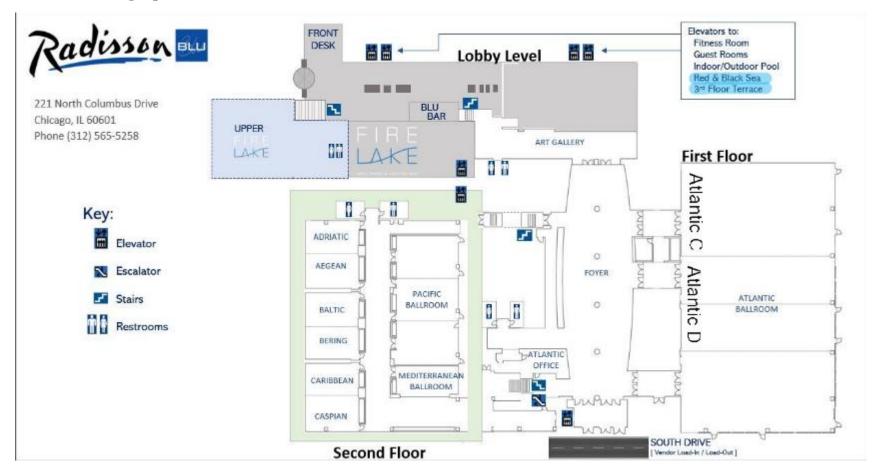
| Meeting | Secretary | Chair | Vice Chair | Start (CT) | End (CT) | Room |
|---|------------------|----------------------|----------------|------------|----------|-----------------------|
| Breakfast | | | | 7:00 AM | 8:00 AM | Outside Meeting Rooms |
| TG 12 Design for Constructability and Fabrication | Anthony Peterson | Christina Freeman | Russell Jeck | 8:00 AM | 9:00 AM | Atlantic Ballroom D |
| TG 17 Steel Castings | Jeff Carlson | Jennifer Pazdon | Jason Stith | 8:00 AM | 10:00 AM | Atlantic Ballroom C |
| Combined TG 1 Detailing, TG 11 Steel Bridge Handbook, TG 12 Design for Constructability and Fabrication | Anthony Peterson | Christina Freeman | Brandon Chavel | 9:00 AM | Noon | Atlantic Ballroom D |
| TG 4 QC/QA | Vin Bartucca | Jamie Hilton | Robin Dunlap | 10:00 AM | Noon | Atlantic Ballroom C |

| Meeting | Secretary | Chair | Vice Chair | Start (CT) | End (CT) | Room |
|---------------------------------------|---------------------------------------|----------------|-------------------|------------|----------|-----------------------|
| Lunch | | | | | | Outside Meeting Rooms |
| TG 10 Erection | Vin Bartucca | Brian Witte | Jason Stith | 1:00 PM | 3:00 PM | Atlantic Ballroom C |
| TG 18 Duplex Stainless Steel | Anthony Peterson | Jason Provines | Nancy Baddoo | 1:00 PM | 4:00 PM | Atlantic Ballroom D |
| TG 14 Field Repairs and Retrofits | Christopher Garrell | Kyle Smith | Jonathan Stratton | 3:00 PM | 5:00 PM | Atlantic Ballroom C |
| Dinner – Prior Registration Requested | Dinner – Prior Registration Requested | | | | | |

Day 3 - Thursday, April 27

| Meeting | Secretary | Chair | Vice Chair | Start (CT) | End (CT) | Room |
|-----------------------------|---------------------|----------------|-------------------|------------|----------|-----------------------|
| Breakfast | | | | 7:00 AM | 8:00 AM | Outside Meeting Rooms |
| TG 2 Fabrication and Repair | Christopher Garrell | Heather Gilmer | Duncan Paterson | 8:00 AM | 10:00 AM | Atlantic Ballroom C |
| TG 11 Design | John Hastings | Brandon Chavel | Domenic Coletti | 8:00 AM | 10:00 AM | Atlantic Ballroom D |
| MC Main Committee | Christopher Garrell | Ronnie Medlock | Christina Freeman | 10:00 AM | Noon | Atlantic Ballroom C |

Hotel Meeting Space Floor Plan



Wednesday Dinner Information

Location: TBD Start: 6:30 pm CT End: 9:00 pm CT



Meeting Agendas



TG 15 Data Modeling for Interoperability Radisson Blu Aqua Hotel Chicago, IL

Room Name: Atlantic Ballroom D

Task Group Mission: This Task Group's primary focus is on facilitating the development of bridge industry consensus standards for data description, modeling, and interoperability for integrated design, construction, and lifecycle management of bridges (i.e. BIM).

Task Group Leadership

Chair: Aaron Costin - University of Florida

Vice Chair: Jonathan Stratton - Eastern Steel Works, Inc.

Secretary: John Hastings - NSBA

Zoom Information

Meeting Link: https://us02web.zoom.us/meeting/register/tZYuf-

CrrTooHtx8z4ulrcU2UnUiTK q1dCv

Zoom Meeting ID: 940795

Meeting Agenda: 4/25/2023 (8:00 am - 10:00 am CT)

- 1. Chairperson's Welcome (8:00 am 8:10 am)
 - a. AISC Antitrust Policy and Meeting Code of Conduct.
 - b. Introductions (as needed).
 - c. Approval of Previous Meeting Minutes.
- 2. Current BIM for bridges projects overview (8:10 am 8:20 am)
- 3. Next Steps regarding BIM exchanges (8:20 am 8:50 am)
- 4. Data Dictionary Progress Update (8:50 am 9:05 am)
- 5. Review Data Dictionary (9:05 am 9:50 am)
- 6. Open Discussion (9:50 am 10:00 am)
- 7. Adjourn



TG 16 Orthotropic Deck Panels Radisson Blu Aqua Hotel Chicago, IL

Room Name: Atlantic Ballroom C

Task Group Mission: This Task Group aims to establish an Orthotropic Steel Deck (OSD) panel design that can be cost effectively produced in the United States for the bridge market.

Task Group Leadership

Chair: Sougata Roy - FHWA

Vice Chair: Frank Artmont - Modjeski & Masters, Inc.

Secretary: Jeff Carlson - NSBA

Zoom Information

Meeting Link: https://us02web.zoom.us/meeting/register/tZUvf-

ygrjsiE9Ib3emsK7biQxpvfEWFBW6r

Zoom Meeting ID: 531079

Meeting Agenda: 4/25/2023 (9:00 am - noon CT)

- 1. Chairperson's Welcome (9:00 am 9:10 am)
 - a. AISC Antitrust Policy and Meeting Code of Conduct.
 - b. Introductions (as needed).
 - c. Approval of Previous Meeting Minutes.
- 2. General updates and announcements review of mission statement:

This Task Group aims to establish an Orthotropic Steel Deck (OSD) panel design that can be cost effectively produced in the United States for the bridge market.

- 3. Review of Committee Goals
- 4. Discussion on State of Practice Synthesis Document
 - a. Review sections
 - b. Monthly webinar meetings schedule
- 5. Short Span Orthotropic Update (SSSBA) collaboration update
- 6. General update on ongoing projects/research
- 7. Old business and additional discussion
- 8. Review Action Items
- 9. Adjourn





Combined TG 1 Detailing, TG 15 Data Modeling for Interoperability Radisson Blu Aqua Hotel

Chicago, IL Room Name: Atlantic Ballroom D

Task Group Mission: This Joint Task Group's focus is to produce the data requirements needed for the development of Model View Definitions (MVDs) related to steel bridge detailing and fabrication that will be used in the Industry Foundation Classes (IFC).

Task Group Leadership

Chair: Aaron Costin - University of Florida

Vice Chair: Jonathan Stratton - Eastern Steel Works, Inc.

Secretary: John Hastings - NSBA

Zoom Information Meeting Link:

https://us02web.zoom.us/meeting/register/tZYlcuiurjlsHtz2J7wrxrQUZbC57rpKxLE6

Zoom Meeting ID: 313777

Meeting Agenda: 4/25/2023 (10:00 am - noon CT)

- 1. Chairperson's Welcome (10:00 am 10:10 am)
 - a. AISC Antitrust Policy and Meeting Code of Conduct.
 - b. Introductions (as needed).
 - c. Approval of Previous Meeting Minutes.
- 2. TG Progress Update (10:10 am 10:20 am)
- 3. Discuss plan and schedule for document review and balloting (10:20 am 10:35 am)
- 4. Review IDM and model definitions (10:35 am 11:35 am)
- 5. Next Steps for Model Requirements (11:35 am 11:55 am)
- 6. Open Discussion (11:55 am noon)
- 7. Adjourn



TG 1 Detailing Radisson Blu Aqua Hotel Chicago, IL

Room Name: Atlantic Ballroom D

Task Group Mission: This Task Group is specifically responsible for the creation and maintenance of guidelines and best practices for the creation of clear concise design and fabrication drawings.

Task Group Leadership

Chair: Randy Harrison - W&W | AFCO Steel, Hirschfeld Division

Vice Chair: Gary Wisch - DeLong's, Inc.

Secretary: Vin Bartucca - NSBA

Zoom Information

Meeting Link: https://us02web.zoom.us/meeting/register/tZwkce-prDsiEtOltLRW-

MJfjMsEsUe177cw

Zoom Meeting ID: 65465

Meeting Agenda: 4/25/2023 (1:00 pm - 5:00 pm CT)

- 1. Chairperson's Welcome (1:00 pm 1:10 pm)
 - a. AISC Antitrust Policy and Meeting Code of Conduct.
 - b. Introductions (as needed).
 - c. Approval of Previous Meeting Minutes.
- Continue open discussions on updating G1.4 Guidelines for Design Details (1:10 pm 5:00 pm)
 - a. Page 110 End Cross-frames
 - b. Page 111 Intermediate Cross-frames & Haunch Girders
 - c. Page 112 Rolled Shape & Bent Plate Diaphragms
 - d. Page 113 Basic Geometry Steel Tub Girders
 - e. Page 114 Tub Girder Lateral Bracing
 - f. Page 115 Tub Girder Camber Diagram
- 3. Adjourn



TG 13 Analysis of Steel Bridges Radisson Blu Aqua Hotel Chicago, IL

Room Name: Atlantic Ballroom C

Task Group Mission: This Task Group focus has been the development of guidance on the issues related to steel girder bridge analysis and to educate Engineers so that they can better make decisions for their own projects.

Task Group Leadership

Chair: Deanna Nevling - HDR

Vice Chair: Francesco Russo - Russo Structural Services

Secretary: Christopher Garrell - NSBA

Zoom Information Meeting Link:

https://us02web.zoom.us/meeting/register/tZAvceGhqjIuHNPA1 1PtA0yFvv3RRC3-MGT

Zoom Meeting ID: 549523

Meeting Agenda: 4/25/2023 (1:00 pm - 3:00 pm CT)

- 1. Chairperson's Welcome (1:00 pm 1:10 pm)
 - a. AISC Antitrust Policy and Meeting Code of Conduct.
 - b. Introductions (as needed).
 - c. Approval of Previous Meeting Minutes.
- 2. General Announcements (1:10 pm 1:25 pm)
 - a. Conferences/Research/Publications
 - b. NSBA Update Chris Garrell
 - c. FHWA Update Dayi Wang, FHWA Steel Specialist
 - d. TRB AKB20 (Steel Bridges Committee) Update Jamie Farris
 - e. AASHTO Bridge Update (T-14 Structural Steel Design) Tony Ream
- 3. Presentation Topic and Presenter TBD (1:25 pm 2:10 pm)
- G13.2 Guidelines for Steel Truss Bridge Analysis Volunteers (2:10 pm 2:45 pm)
- Software Validation and Checking Complex Models Progress update (2:45 pm 3:00 pm)
- 6. Adjourn

STEEL BRIDGE TO SERVICE TO SERVIC

AASHTO/NSBA Steel Bridge Collaboration

TG 8 Coatings Radisson Blu Aqua Hotel Chicago, IL

Room Name: Atlantic Ballroom C

Task Group Mission: This Task Group primarily focuses on the functions, operations, requirements and activities needed to achieve consistent quality in steel bridge coatings. At the same time the group acknowledges the need for a cooperative approach to quality, where the Owner's and Contractor's representatives work together to meet their responsibilities, resulting in efficient steel bridges coatings that meeting all contractual requirements.

Task Group Leadership

Chair: Paul Vinik - GPI

Vice Chair: Johnnie Miller - KTA-Tator, Inc.

Secretary: Jeff Carlson - NSBA

Zoom Information

Meeting Link: https://us02web.zoom.us/meeting/register/tZAoc-

CrrD0sHtBj9oVhpw0JQqS8 Uopi-K0

Zoom Meeting ID: 708007

Meeting Agenda: 4/25/2023 (3:00 pm - 5:00 pm CT)

- 1. Chairperson's Welcome (3:00 pm 3:10 pm)
 - a. AISC Antitrust Policy and Meeting Code of Conduct.
 - b. Introductions (as needed).
 - c. Approval of Previous Meeting Minutes.
- 2. BPETG FHWA/AASHTO T-9 Research Updates (1:10 pm to 1:20 pm)
 - a. Which of these research initiatives should be the priorities of TG8?
- 3. NBPP Coatings Working Group Reformed (1:20 pm to 1:30 pm)
 - a. Working group scope
 - b. Working documents
 - c. Coordination between NBPP Coatings Group and TG8 (Who attends both and could we designate someone to be a liason?)
- 4. Single Coat IOZ Synthesis Update (1:30 pm to 1:40 pm)
- 5. Performance Study Phase 1 and Phase 2 (1:40 pm to 1:50 pm)

- 6. Update from S8.1 document (1:50 pm to 2:00 pm)
- 7. G8.4 Detailing for Corrosion Protection Systems Update (2:00 pm to 2:45 pm)
 - a. Members of the other corrosion protection groups are:
 - i. Uncoated weathering steel/50CR Heather Gilmer, Jason Lloyd, Jeff
 Carlson
 - ii. Thermal spray Paul Wagar, Heather Gilmer, Ronnie Medlock, DaveJohnson, Bernardo Duran, Kevin Irving
 - iii. Liquid applied coatings Derrick Castle, Johnnie Miller, Bill Corbett, BrianFridley
- 8. Open discussion/New business (2:45 pm to 3:00 pm)
- 9. Adjourn



TG 12 Design for Constructability and Fabrication Radisson Blu Aqua Hotel Chicago, IL

Room Name: Atlantic Ballroom D

Task Group Mission: This Task Group primarily focuses on addressing the questions that have been and are continually asked concerning the constructability of steel bridges according to the latest practice for steel mills, fabrication, detailing, erection, and design.

Task Group Leadership

Chair: Christina Freeman - FDOT

Vice Chair: Russell Jeck - Tutor Perini Corp. **Secretary:** Anthony Peterson - NSBA

Zoom Information

Meeting Link:

https://us02web.zoom.us/meeting/register/tZMkceqorTIjH9bLzi7xowa 083QTe2hC2WF

Zoom Meeting ID: 376179

Meeting Agenda: 4/26/2023 (8:00 am - 9:00 am CT)

- 1. Chairperson's Welcome (8:00 am 8:10 am)
 - a. AISC Antitrust Policy and Meeting Code of Conduct.
 - b. Introductions (as needed).
 - c. Approval of Previous Meeting Minutes.
- 2. Discussion for Items to Add to Next Version of G12.1 (8:10 am 8:50 am)
 - a. Provide instructions on strategies for corrosion protection
 - b. Stability and flange slenderness issues
 - c. Phased construction cross-frames
 - d. Plate availability tables
 - e. Web to flange welds
 - f. Work points for cross-frames
 - g. Best practices for showing camber on shop drawings
 - h. Improved tub girder details
- 3. Closing Remarks (8:50 am 8:55 am)
- 4. Adjourn



TG 17 Steel Castings Radisson Blu Aqua Hotel Chicago, IL

Room Name: Atlantic Ballroom C

Task Group Mission: The mission of this Task Group will be to develop and disseminate resources specific to the US steel bridge community to support the increased and effective use of castings in steel bridges. The targeted community includes design engineers, DOT professionals, steel fabricators, steel erectors, inspectors, general contractors, and detailers.

Task Group Leadership

Chair: Jennifer Pazdon - Cast Connex

Vice Chair: Jason Stith - Michael Baker International

Secretary: Jeff Carlson - NSBA

Zoom Information Meeting Link:

https://us02web.zoom.us/meeting/register/tZYrcu6srT0rGdMtMioIZCmPK7llofHURr T

Zoom Meeting ID: 3654

Meeting Agenda: 4/26/2023 (8:00 am - 10:00 am CT)

- 1. Chairperson's Welcome (8:00 am 8:10 am)
 - a. AISC Antitrust Policy and Meeting Code of Conduct.
 - b. Introductions (as needed).
 - c. Approval of Previous Meeting Minutes.
- 2. Review of Mission, Goals and Timeline (8:10 am 8:15 am)
- 3. Review Draft Guide Specification (8:15 am 9:45 am)
- 4. Next Steps and Action Items (9:45 am 10:00 am)
- 5. Adjourn





Combined TG 1 Detailing, TG 11 Steel Bridge Handbook, TG 12 Design for Constructability and Fabrication

Radisson Blu Aqua Hotel Chicago, IL

Room Name: Atlantic Ballroom D

Task Group Mission: This group is focused on the development of guidance for the detailing, fabrication, design and construction of steel straddle bents.

Task Group Leadership

Chair: Christina Freeman - FDOT

Vice Chair: Brandon Chavel - Michael Baker International

Secretary: Anthony Peterson - NSBA

Zoom Information

Meeting Link: https://us02web.zoom.us/meeting/register/tZAoce-

pqjkjE9w4vvlu1PxSDWLgy mXTxTx

Zoom Meeting ID: 940084

Meeting Agenda: 4/26/2023 (9:00 am - noon CT)

- 1. Chairperson's Welcome (9:00 am 9:10 am)
 - a. AISC Antitrust Policy and Meeting Code of Conduct.
 - b. Introductions (as needed).
 - c. Approval of Previous Meeting Minutes.
- 2. Discuss comments on G11.2 Guidelines for Steel Bent Caps (9:10 am 11:50 am)
- 3. Closing Remarks (11:50 am Noon)
- 4. Adjourn



TG 4 QC/QA

Radisson Blu Aqua Hotel Chicago, IL

Room Name: Atlantic Ballroom C

Task Group Mission: This task Group primarily focuses on the requirements for a Fabricator's quality control program, with emphasis on the development and implementation of a quality control plan and minimum requirements for an Owner's quality assurance program.

Task Group Leadership

Chair: Jamie Hilton - KTA-Tator, Inc.

Vice Chair: Robin Dunlap - High Steel Structures

Secretary: Vin Bartucca - NSBA

Zoom Information Meeting Link:

https://us02web.zoom.us/meeting/register/tZArfuiurjMqHNKjCum8MpWT0YiIQLJHg4T3

Zoom Meeting ID: 3654

Meeting Agenda: 4/26/2023 (10:00 am - noon CT)

- 1. Chairperson's Welcome (10:00 am 10:10 am)
 - a. AISC Antitrust Policy and Meeting Code of Conduct.
 - b. Introductions (as needed).
 - c. Approval of Previous Meeting Minutes.
- G4.2 Guidelines for the Qualifications of Structural Bolting Inspectors Address ballot comments (10:10 am – 11:00 am)
- S4.1 Modified Steel Bridge Fabrication QC/QA Guide Spec Part C (11:00 am 11:45 am)
 - a. Discuss new title for document.
 - b. Review task group work.
 - c. Sections 9.2 and 9.6 Jon Stratton, Heather Gilmer, Teresa Michalk, Jon Edwards
 - d. Section 10.1 Robin Dunlap, Teresa Michalk
 - e. Various miscellaneous items to clean up Jamie Hilton, Robin Dunlap
 - f. Add Checklist for a pre-fab meeting Jamie Hilton
 - g. Discussion on use of unapproved drawings

- 4. G4.1 Steel Bridge Fabrication QC/QA Guidelines (11:45 am 11:55 am)
 - a. Status of review and updating
 - i. Select task groups to review sections for the 2024 update
- 5. Mission Statement Review (11:55 am Noon)

This task Group primarily focuses on the requirements for a Fabricator's quality control program, with emphasis on the development and implementation of a quality control plan and minimum requirements for an Owner's quality assurance program. At the same time the group acknowledges the need for a cooperative approach to quality, where the Owner's and Contractor's representatives work together to meet their responsibilities, resulting in the fabrication of efficient steel bridges meeting all contractual requirements.

6. Adjourn



TG 10 Erection Radisson Blu Aqua Hotel Chicago, IL

Room Name: Atlantic Ballroom C

Task Group Mission: This Task Group develops guidelines and specifications that establish and define the basic, minimum requirements for the transportation, handling and erection of steel bridge components to ensure safe steel erection as well as quality and value in the completed bridge structure.

Task Group Leadership

Chair: Brian Witte - Parsons

Vice Chair: Jason Stith - Michael Baker International

Secretary: Vin Bartucca - NSBA

Zoom Information

Meeting Link: https://us02web.zoom.us/meeting/register/tZUkceusqDooHdFuwfYaYIR-

kjtf0nIYA5 t

Zoom Meeting ID: 162138

Meeting Agenda: 4/26/2023 (1:00 pm - 3:00 pm CT)

- 1. Chairperson's Welcome (1:00 pm 1:10 pm)
 - a. AISC Antitrust Policy and Meeting Code of Conduct.
 - b. Introductions (as needed).
 - c. Approval of Previous Meeting Minutes.
- 2. Review and resolve any comments from AASHTO T14 ballot.
- 3. Brief discussion about release form for images and figures (three sample erection plans in Appendix D).
- 4. Discuss proposed G10.2 document for addressing erection issues in the field (with material borrowed from G14.2).
- 5. Open discussion about potential new business (time permitting).
- 6. Adjourn



TG 18 Duplex Stainless Steel Radisson Blu Aqua Hotel Chicago, IL

Room Name: Atlantic Ballroom D

Task Group Mission: This Task Group will include experts from the carbon steel and stainless steel communities and will work together to develop standalone material, design, welding, fabrication, and construction guide specifications for using duplex stainless steel for vehicular plate girder bridges. These guide specifications will be largely based on existing duplex stainless steel design and fabrication specifications (such as AISC 370), but will be revised to provide the same formatting and flow as the standards typically used in the steel bridge community, such as AASHTO LRFD or AASHTO/AWS D1.5.

Task Group Leadership

Chair: Jason Provines - Virginia Department of Transportation

Vice Chair: Nancy Baddoo - Steel Construction Institute

Secretary: Anthony Peterson - NSBA

Zoom Information

Meeting Link: https://us02web.zoom.us/meeting/register/tZUod-

iupzMuGNFQU4SudBsfVPITCpBT8PNG

Zoom Meeting ID: 84622

Meeting Agenda: 4/26/2023 (1:00 pm - 4:00 pm CT)

- 1. Chairperson's Welcome (1:00 pm 1:10 pm)
 - a. AISC Antitrust Policy and Meeting Code of Conduct.
 - b. Introductions (as needed).
 - c. Approval of Previous Meeting Minutes.
- 2. Duplex Materials Specification (1:10 pm 1:40 pm)
 - a. Discussion of third revision of draft specification
- 3. Duplex Design Specification (1:40 pm 3:15 pm)
- 4. Duplex Welding Specification (3:15 pm 4:00 pm)
 - a. Presentation on duplex stainless steel welding
 - b. Open discussion on duplex fabrication
- 5. Adjourn



TG 14 Field Repairs and Retrofits Radisson Blu Aqua Hotel Chicago, IL

Room Name: Atlantic Ballroom C

Task Group Mission: This Task Group primarily focuses on providing practical solutions for design and implementation of field repairs and retrofits of existing steel bridges.

Task Group Leadership

Chair: Kyle Smith - GPI

Vice Chair: Jonathan Stratton - Eastern Steel Works, Inc.

Secretary: Christopher Garrell - NSBA

Zoom Information Meeting Link:

https://us02web.zoom.us/meeting/register/tZUqcuGoqjwjHtcmcfGLI1qclEq8cDlok5ub

Zoom Meeting ID: 321517

Meeting Agenda: 4/26/2023 (3:00 pm - 5:00 pm CT)

National Steel Bridge Alliance

- 1. Chairperson's Welcome (3:00 pm 3:10 pm)
 - a. AISC Antitrust Policy and Meeting Code of Conduct.
 - b. Introductions (as needed).
 - c. Approval of Previous Meeting Minutes.
- Overview of TG 14 progress (3:10 pm 3:20 pm)
- 3. Discussion of G14.3 (3:20 pm 5:00 pm)
 - a. Template
 - b. Publication format
 - i. Typical AASHTO/NSBA publication
 - ii. Online NSBA Catalog
 - iii. Other
- 4. Adjourn



TG 11 Design Radisson Blu Aqua Hotel Chicago, IL

Room Name: Atlantic Ballroom D

Task Group Mission: This Task Group aims to develop and maintain consensus guidelines to assist with the design of steel bridges and their components.

Task Group Leadership

Chair: Brandon Chavel - Michael Baker International

Vice Chair: Domenic Coletti - HDR Secretary: John Hastings - NSBA

Zoom Information

Meeting Link: https://us02web.zoom.us/meeting/register/tZ0ucu-

ppzgjGtVmkRZZ9GYidojHh6VeLyZC

Zoom Meeting ID: 84652

Meeting Agenda: 4/27/2023 (8:00 am - 10:00 am CT)

- 1. Chairperson's Welcome (8:00 am 8:10 am)
 - a. AISC Antitrust Policy and Meeting Code of Conduct.
 - b. Introductions (as needed).
 - c. Approval of Previous Meeting Minutes.
- 2. Announcements and Administrative Items (8:10 am to 8:15 am)
- 3. Presentations (8:15 am to 8:40 am)
 - a. Cross-frame Gusset Plate Design Domenic Coletti
 - b. Get Bent on Bent Connection Plates Coletti, Chavel, others
- 4. Guidelines for the Design of Cross Frames & Diaphragms (8:45 am to 9:30 am)
 - a. Discussion on final items/topics/outstanding items
 - b. Completion as Handbook Chapter
- 5. General Open Discussion (9:30 am to 10:00 am)
 - a. Next potential items for the next design TG task.
 - b. Lateral Bracing
 - c. Others?

v01

6. Adjourn



TG 2 Fabrication and Repair Radisson Blu Aqua Hotel Chicago, IL

Room Name: Atlantic Ballroom C

Task Group Mission: This Task Group aims to achieve quality and value in the fabrication of steel bridges through standardization of steel bridge fabrication across the nation.

Task Group Leadership

Chair: Heather Gilmer - Pennoni

Vice Chair: Duncan Paterson - Alfred Benesch & Company

Secretary: Christopher Garrell - NSBA

Zoom Information

Meeting Link: https://us02web.zoom.us/meeting/register/tZElf--

vqTlvE9SjUD3XZlvEmnWpW7oQ6uVc

Zoom Meeting ID: 58534

Meeting Agenda: 4/27/2023 (8:00 am - 10:00 am CT)

- 1. Chairperson's Welcome (8:00 am 8:20 am)
 - a. AISC Antitrust Policy and Meeting Code of Conduct.
 - b. Introductions (as needed).
 - c. Approval of Previous Meeting Minutes.
 - d. Review of docs under spec (this will include an update of where the AASHTO fab spec stands and some upcoming interims--should that be a sub-item?)
- 2. G2.2 Guidelines for Resolution of Steel Bridge Fabrication Errors
 - a. Update "fracture-critical" terminology
 - b. Improper preheat
 - c. Framing members too short
 - d. Exceeding maximum interpass temperature
 - e. Hydrogen diffusion postheat not performed
- 3. AASHTO fab spec (this is the part of the agenda that probably won't be gotten to but if we get crickets on G2.2 section we might)
 - a. MT of bent material

- b. Scribing layout marks
- c. Approval of check assembly plans
- d. Bend radii
- e. Slip coefficients
- f. DTIs
 - i. 0.005" gap
 - ii. "Dead flat"
 - iii. Requirement for coating DTIs
 - iv. Self-indicating features
- g. Web flatness
- 4. Adjourn



MC Main Committee Radisson Blu Aqua Hotel Chicago, IL

Room Name: Atlantic Ballroom C

Task Group Mission: The Collaboration Main Committee provides oversight and guidance for all Task Groups. A meeting of the Main Committee will take place at the end of each Collaboration meeting.

Task Group Leadership

Chair: Ronnie Medlock - High Steel Structures

Vice Chair: Christina Freeman - FDOT Secretary: Christopher Garrell - NSBA

Zoom Information

Meeting Link: https://us02web.zoom.us/meeting/register/tZAld-

uqqD0oEtDsXctfEPWTfkq OpgNiNV1

Zoom Meeting ID: 472688

Meeting Agenda: 4/27/2023 (10:00 am - Noon CT)

- 1. Chairperson's Welcome (10:00 am 10:10 am)
 - a. AISC Antitrust Policy and Meeting Code of Conduct.
 - b. Introductions (as needed).
 - c. Approval of Previous Meeting Minutes.
- 2. General Collaboration Business (10:10 am 10:30 am)
 - a. 2024 2026 Membership Cycle.
 - b. New AASHTO/AISC Agreement Changes to Publishing/Typesetting.
 - c. Balloting Timeline Review.
- 3. Task Group Reports Approximately five minutes each (10:30 AM 11:40 AM)
 - a. TG 1 Randy Hasrrison (W&W|AFCO Steel)
 - b. TG 2 Heather Gilmer (Pennoni)
 - c. TG 4 Jamie Hilton (KTA-Tator, Inc.)
 - d. TG 8 Paul Vinik (GPI Construction Engineering)
 - e. TG 10 Brian Witte (Parsons)
 - f. TG 11 Brandon Chavel (Michael Baker)

- g. TG 12 Christina Freeman (FDOT)
- h. TG 13 Deanna Nevling (HDR)
- i. TG 14 Kyle Smith (GPI Construction Engineering)
- j. TG 15 Aaron Costin (University of Florida)
- k. TG 16 Sougata Roy (Rutgers University)
- I. TG 17 Jennifer Pazdon (CAST CONNEX)
- m. TG 18 Jason Provines (VDOT)
- n. Joint TG 1 Detailing, TG 11 Design, TG 12 Constructability Christina Freeman (FDOT)
- Joint TG 1 Detailing, TG 15 Data Modeling for Interoperability Aaron Costin
 (University of Florida)
- 4. Other Business (11:40 AM Noon)
- 5. Adjourn

Appendix A - Collaboration Document Status

| | | Year | Task | | |
|------------|--------------------------------|--------------------|-------|---|---|
| Document | Status | Completed/Targeted | Group | Task Group Name | Document Title |
| G1.3.2002 | Released | 2002 | 1 | Detailing | Shop Detail Drawing Presentation Guidelines |
| G1.2.2003 | Released | 2003 | 1 | Detailing | Design Drawing Presentation Guidelines |
| G1.4.2006 | Released | 2006 | 1 | Detailing | Guidelines for Design Details |
| G1.1.2020 | Released | 2020 | 1 | Detailing | Shop Drawings Approval Review/Approval Guide |
| G1.3 | Update - In-Progress | Unknown | 1 | Detailing | Shop Detail Drawing Presentation Guidelines |
| G1.4 | Update - In-Progress | 2024 | 1 | Detailing | Guidelines for Design Details |
| S2.1.2018 | Released | 2018 | 2 | Fabrication and Repair | Steel Bridge Fabrication Guide Specification |
| G2.2.2016 | Released | 2016 | 2 | Fabrication and Repair | Guidelines for Resolution of Steel Bridge Fabrication Errors |
| G2.2 | Update - In-Progress | Unknown | 2 | Fabrication and Repair | Guidelines for Resolution of Steel Bridge Fabrication Errors |
| G4.1.2019 | Released | 2019 | 4 | QC/QA | Steel Bridge Fabrication QC/QA Guidelines |
| G4.1 | Update - In-Progress | 2025 | 4 | QC/QA | Steel Bridge Fabrication QC/QA Guidelines |
| S4.1.2002 | Archived | 2002 | 4 | QC/QA | Guidelines for the Qualification of Structural Bolting Inspectors |
| G4.2.2021 | Released | 2021 | 4 | QC/QA | Steel Bridge Fabrication QC/QA Guide Specification |
| G4.2 | Completed Task Group Ballot | 2024 | 4 | QC/QA | Guidelines for the Qualification of Structural Bolting Inspectors |
| G4.4.2006 | Released | 2006 | 4 | QC/QA | Sample Owners Quality Assurance Manual |
| G4.4 | Update - In-Progress | 2024 | 4 | QC/QA | Sample Owners Quality Assurance Manual |
| S4.X | New - In-Progress | 2024 | 4 | QC/QA | Specification for Steel Bridge Third Party Quality Assurance |
| S8.1.2014 | Released | 2014 | 8 | Coatings | Guide Specification for Application of Coating Systems |
| S8.1 | Update - In-Progress | Unknown | 8 | Coatings | Guide Specification for Application of Coating Systems |
| S8.2.2017 | Released | 2017 | 8 | Coatings | Thermal Spray Coating Guide |
| S8.3.2022 | Submitted to AASHTO Publishing | 2022 | 8 | Coatings | Galvanizing Guide Specification |
| G8.4 | New - In-Progress | Unknown | 8 | Coatings | Detailing for Coatings and Weathering Steel |
| G9.1.2022 | Released | 2022 | 9 | Bearings | Steel Bridge Bearing Design and Detailing Guidelines |
| S10.1.2019 | Released | 2019 | 10 | Erection | Steel Bridge Erection Guide Specification |
| S10.1 | Submitted to T14 for Ballot | 2023 | 10 | Erection | Steel Bridge Erection Guide Specification |
| G11.1 | New - In-Progress | 2023 | 11 | Design | Guidelines for the Design of Cross-frame and Diaphragm Members |
| G11.2 | New - In-Progress | 2024 | 11 | Design | Guidelines for Straddle Bents |
| G12.1.2020 | Released | 2020 | 12 | Design for Constructability and Fabrication | Guidelines to Design for Constructability and Fabrication |
| G12.1 | Update - In-Progress | 2024 | 12 | Design for Constructability and Fabrication | Guidelines to Design for Constructability and Fabrication |
| G13.1.2019 | Released | 2019 | 13 | Analysis of Steel Bridges | Guidelines for Steel Girder Bridge Analysis |
| G13.2 | New - In-Progress | 2024 | 13 | Analysis of Steel Bridges | Guidelines for the Analysis of Trusses |
| G14.1.2021 | Released | 2021 | 14 | Field Repairs and Retrofits | Maintenance Guidelines for Steel Bridges to Address Fatigue Cracking and Details at Risk of Constraint Induced Fracture |
| G14.2 | Submitted to T14 for Ballot | 2023 | 14 | Field Repairs and Retrofits | Guidelines for Field Repairs and Retrofits of Steel Bridges |
| G14.3 | New - In-Progress | 2024 | 14 | Field Repairs and Retrofits | Database of Sample Field Repair and Retrofit Details for Steel Bridges |
| G15.10 | On Hold | Unknown | 15 | Data Modeling for Interoperability | BrIM Process Model Definition for Steel Bridge Erection |
| G15.1 | On Hold | Unknown | 15 | Data Modeling for Interoperability | Designer/Fabricator Exchange |
| G16.1 | New - In-Progress | Unknown | 16 | Orthotropic Deck Panels | Guidelines for the Manufacture of Orthotropic Decks and State of Practice |
| G16.2 | New - Not Started | 2024 | 16 | Orthotropic Deck Panels | Cost Effective Orthotropic Decks |
| G17.1 | New - In-Progress | 2024 | 17 | Steel Castings | Guide Specification for Cast Steel Connections |

Appendix B – Member Rosters (2022 – 2023)

TG 1 Detailing

| First Name | Lost Nove o | 60 | Puefeesianal Title | Primary Business |
|------------|-------------|--|-----------------------------------|---------------------|
| First Name | Last Name | Company | Professional Title | Туре |
| Domenic | Coletti | HDR | Principal Professional Associate | Consultant |
| Brad | Dillman | High Steel Structures | VP of Engineering | Fabricator |
| Keith | Griesing | Hardesty & Hanover, LLC | Chief Technical Officer | Consultant |
| Randy | Harrison | W&W AFCO Steel, Hirschfeld Division | Manager Bridge Drafting | Fabricator |
| Zane | Keniston | QMC Auditing | | Inspection Services |
| Frank | Kingston | abs Structural Corporation | President | Detailer |
| Jihshya | Lin | MnDOT | Bridge Evaluation and Fabrication | Bridge Owner |
| Jilisitya | | WINDOT | Methods Engineer | Bridge Owner |
| Eric | Rau | HDR | Senior Bridge Engineer | Consultant |
| Francesco | Russo | Russo Structural Services | Principal | Consultant |
| William | Salle | LB Construction | | Contractor |
| Jason | Stith | Michael Baker International | Technical Manager | Consultant |
| Jonathan | Stratton | Eastern Steel Works, Inc. | Managing Partner | Fabricator |
| Brian | Watson | HDR | Senior Bridge Engineer | Consultant |
| Gary | Wisch | DeLong's, Inc. | Vice President, Engineering | Fabricator |
| Brian | Wolfe | MDTA | Deputy Director of Engineering | Bridge Owner |

TG 2 Fabrication and Repair

| First Name | Lost Nome | Common | Professional Title | Primary Business |
|------------|-------------|-------------------------------------|---|---------------------|
| First Name | Last Name | Company | | Туре |
| Randall | Bernhardt | Bernhardt Forensic Engineering LLC | Forensic Civil/Structural Engineer | Consultant |
| Gerald | Bickerstaff | Eastern Services Company | QA/QC Director | Inspection Services |
| Art | Bustos | AISC | Certification Program Analyst | Trade Organization |
| William | Collins | University of Kansas | | Academia |
| Robert | Connor | Purdue University | Professor | Academia |
| Terry | Cummings | TRC Solutions | Project Manager | Inspection Services |
| Brad | Dillman | High Steel Structures | VP of Engineering | Fabricator |
| Jon | Edwards | DOT Quality Services | Technical Director | Inspection Services |
| Karl | Frank | Consultant | Consultant | Trade Organization |
| Michael | Garlich | Collins Engineers, Inc. | Senior Vice President | Consultant |
| John | Gast | Consultant | Steel Bridge Erection Consultant | Consultant |
| Heather | Gilmer | Pennoni | Senior Engineer | Inspection Services |
| Keith | Griesing | Hardesty & Hanover, LLC | Chief Technical Officer | Consultant |
| Randy | Harrison | W&W AFCO Steel, Hirschfeld Division | Manager Bridge Drafting | Fabricator |
| Matt | Hebdon | University of Texas at Austin | Associate Professor | Academia |
| Jamie | Hilton | KTA-Tator, Inc. | Vice President | Inspection Services |
| Robert | Horwhat | TRC Solutions | | Consultant |
| Zane | Keniston | QMC Auditing | | Inspection Services |
| Jihshya | Lin | MnDOT | Bridge Evaluation and Fabrication Methods Engineer | Bridge Owner |
| Ronnie | Medlock | High Steel Structures | VP - Technical Services | Fabricator |
| Teresa | Michalk | Texas DOT Material and Tests Div. | Transportation Engineer | Bridge Owner |
| Justin | Ocel | Federal Highway Administration | Structural Steel Research Program Manager | FHWA |
| Duncan | Paterson | Alfred Benesch & Company | Technical Manager | Consultant |
| Anna | Petroski | Atema, Inc. | President | Inspection Services |
| Eric | Rau | HDR | Senior Bridge Engineer | Consultant |
| Sougata | Roy | Rutgers | Associate Research Professor | Academia |

| | | | | Primary Business |
|------------|-----------|-------------------------------------|-----------------------------|---------------------|
| First Name | Last Name | Company | Professional Title | Туре |
| Phillip | Sauser | LIS Army Corns of Engineers | Structural Engineer | Owner/Federal |
| Pillilip | Sausei | US Army Corps of Engineers | Structural Engineer | Government |
| Ankit | Shah | Industrial Steel Construction, Inc. | Senior Project Manager | Fabricator |
| David | Stoddard | SSAB Americas | Senior Application Engineer | Material Producer |
| Jonathan | Stratton | Eastern Steel Works, Inc. | Managing Partner | Fabricator |
| Brad | Streeter | Scougal Rubber Corporation | Quality Manager | Fabricator |
| Maury | Tayarani | Pennoni | Senior Engineer | Inspection Services |
| Amit | Varma | Purdue University | | Academia |
| Gary | Wisch | DeLong's, Inc. | Vice President, Engineering | Fabricator |

TG 4 QC/QA

| First Name | Last Name | Company | Professional Title | Primary Business Type |
|------------|-----------|---|--|-----------------------------|
| Terry | Cummings | TRC Solutions | Project Manager | Inspection Services |
| Robin | Dunlap | High Steel Structures | Quality Control Manager | Fabricator |
| Heather | Gilmer | Pennoni | Senior Engineer | Inspection Services |
| Chad | Hawkins | Infrastructure Consulting and Engineering | Materials Laboratory Manager | Consultant |
| Jamie | Hilton | KTA-Tator, Inc. | Vice President | Inspection Services |
| Robert | Horwhat | TRC Solutions | | Consultant |
| Dave | Johnson | Industrial Steel Construction, Inc. | | Fabricator |
| Zane | Keniston | QMC Auditing | | Inspection Services |
| Terry | Logan | Atema, Inc. | VP and Director of Overseas Operations | Inspection Services |
| Teresa | Michalk | Texas DOT Material and Tests Div. | Transportation Engineer | Bridge Owner |
| Anna | Petroski | Atema, Inc. | President | Inspection Services |
| Shawn | Potter | Contech Engineering | Senior Quality Engineer | Fabricator |
| Phillip | Sauser | US Army Corps of Engineers | Structural Engineer | Owner/Federal Government |
| Jonathan | Stratton | Eastern Steel Works, Inc. | Managing Partner | Fabricator |
| Brad | Streeter | Scougal Rubber Corporation | Quality Manager | Fabricator |
| Maury | Tayarani | Pennoni | Senior Engineer | Inspection Services |
| Gary | Wisch | DeLong's, Inc. | Vice President, Engineering | |

TG 8 Coatings

| | | | | Primary Business |
|------------|-----------|------------------------------------|---|---------------------|
| First Name | Last Name | Company | Professional Title | Туре |
| James | Ault | Elzly Technology/KTA Tator | | Inspection Services |
| Caroline | Bennett | University of Kansas | Associate Professor | Academia |
| William | Corbett | KTA-Tator, Inc. | Chief Operating Officer | Consultant |
| Terry | Cummings | TRC Solutions | Project Manager | Inspection Services |
| Jon | Edwards | DOT Quality Services | Technical Director | Inspection Services |
| Heather | Gilmer | Pennoni | Senior Engineer | Inspection Services |
| Jamie | Hilton | KTA-Tator, Inc. | Vice President | Inspection Services |
| Zane | Keniston | QMC Auditing | | Inspection Services |
| Thomas | Langill | American Galvanizers Association | Technical Director | Coatings |
| Ronnie | Medlock | High Steel Structures | VP - Technical Services | Fabricator |
| Teresa | Michalk | Texas DOT Material and Tests Div. | Transportation Engineer | Bridge Owner |
| Johnnie | Miller | Texas Department of Transportation | Coatings & Traffic Materials Section Director | Bridge Owner |
| Justin | Ocel | Federal Highway Administration | Structural Steel Research Program Manager | FHWA |
| Shawn | Potter | Contech Engineering | Senior Quality Engineer | Fabricator |
| David | Stoddard | SSAB Americas | Senior Application Engineer | Material Producer |
| Brad | Streeter | Scougal Rubber Corporation | Quality Manager | Fabricator |
| Maury | Tayarani | Pennoni | Senior Engineer | Inspection Services |
| Paul | Vinik | GPI | Cathodic Protection Manager | Inspection Services |
| Gary | Wisch | DeLong's, Inc. | Vice President, Engineering | Fabricator |

TG 9 Bearings

| First Name | Last Name | Company | Professional Title | Primary Business Type |
|------------|---------------|-----------------------------------|---|--------------------------|
| Robert | Brantley | STV Incorporated | | Consultant |
| Domenic | Coletti | HDR | Principal Professional Associate | Consultant |
| Michael | Culmo | CHA Consulting, Inc. | Chief Bridge Engineer | Consultant |
| Zane | Keniston | QMC Auditing | | Inspection Services |
| Jihshya | Lin | MnDOT | Bridge Evaluation and Fabrication Methods Engineer | Bridge Owner |
| Teresa | Michalk | Texas DOT Material and Tests Div. | Transportation Engineer | Bridge Owner |
| Abbas | Mokhtar-zadeh | Westinghouse, Stone & Webster | | Contractor |
| Sougata | Roy | Rutgers | Associate Research Professor | Academia |
| Francesco | Russo | Russo Structural Services | Principal | Consultant |
| Gerard | Sova | Hardesty & Hanover, LLC | Structural Engineer | Consultant |
| Brad | Streeter | Scougal Rubber Corporation | Quality Manager | Fabricator |
| Michael | Sullivan | CME Associates, Inc. | Senior Project Manager | Consultant |
| Yonghai | Wan | WSP | | Consultant |
| Ron | Watson | RJ Watson, Inc. | President | Fabricator |
| Gary | Wisch | DeLong's, Inc. | Vice President, Engineering | Fabricator |

TG 10 Erection

| First Name | Last Name | Company | Professional Title | Primary Business Type |
|------------|-----------|---|---|--------------------------|
| Domenic | Coletti | HDR | Principal Professional Associate | Consultant |
| Christina | Freeman | FDOT | Structures Research Engineer | Bridge Owner |
| Michael | Garlich | Collins Engineers, Inc. | Senior Vice President | Consultant |
| John | Gast | Consultant | Steel Bridge Erection Consultant | Consultant |
| Heather | Gilmer | Pennoni | Senior Engineer | Inspection Services |
| Keith | Griesing | Hardesty & Hanover, LLC | Chief Technical Officer | Consultant |
| Nickolas | Haltvick | Minnesota Department of Transportation | | Bridge Owner |
| Todd | Helwig | University of Texas at Austin | Professor | Academia |
| Russell | Jeck | Tutor Perini Corp. | Sr. Design Engineer | Contractor |
| Zane | Keniston | QMC Auditing | | Inspection Services |
| Daniel | Kucz | HNTB | Assistant Department Manager | Consultant |
| Natalie | McCombs | HNTB | Senior Bridge Technical Advisor | Consultant |
| Ronnie | Medlock | High Steel Structures | VP - Technical Services | Fabricator |
| Paul | Orso | Northeast Structural Steel | | Erector |
| Joshua | Orton | Brasfield & Gorrie, LLC | Senior Design Engineer | Consultant |
| Stephen | Percassi | Genesis Structures, Inc. | Senior Structural Engineer | Consultant |
| Francesco | Russo | Russo Structural Services | Principal | Consultant |
| Kyle | Smith | GPI | Assistant Vice President / Director of Structural Engineering | Consultant |
| Gerard | Sova | Hardesty & Hanover, LLC | Structural Engineer | Consultant |
| Jason | Stith | Michael Baker International | Technical Manager | Consultant |
| Jeff | Svatora | HDR | Bridge Engineer | Consultant |
| Maury | Tayarani | Pennoni | Senior Engineer | Inspection Services |
| Douglas | Whittaker | Michael Baker International | | Consultant |
| Brian | Witte | Parsons | Vice President, Construction Engineering | Contractor |
| Brian | Wolfe | MDTA | Deputy Director of Engineering | Bridge Owner |

TG 11 Design

| First Name | Last Name | Company | Professional Title | Primary Business Type |
|------------|-----------|---|---|--------------------------|
| Domenic | Coletti | HDR | Principal Professional Associate | Consultant |
| Robert | Connor | Purdue University | Professor | Academia |
| Brad | Dillman | High Steel Structures | VP of Engineering | Fabricator |
| Thomas | Eberhardt | HDR | Columbus Bridge Section Manager | Consultant |
| Jamie | Farris | Texas Department of Transportation | Deputy Bridge Division Director | Bridge Owner |
| Karl | Frank | Consultant | Consultant | Trade Organization |
| Christina | Freeman | FDOT | Structures Research Engineer | Bridge Owner |
| Keith | Griesing | Hardesty & Hanover, LLC | Chief Technical Officer | Consultant |
| Michael | Grubb | MA Grubb and Assoc., LLC | | Consultant |
| Todd | Helwig | University of Texas at Austin | Professor | Academia |
| Srinivasa | Kotha | PGH Wong Engineering, Inc | Bridge Engineer | Consultant |
| Natalie | McCombs | HNTB | Senior Bridge Technical Advisor | Consultant |
| Bryan | Miller | Pennsylvania Department of Transportation | | Bridge Owner |
| Deanna | Nevling | HDR | Senior Bridge Engineer | Consultant |
| Dusten | Olds | HDR | Senior Bridge Engineer | Consultant |
| Joshua | Orton | Brasfield & Gorrie, LLC | Senior Design Engineer | Consultant |
| Stephen | Percassi | Genesis Structures, Inc. | Senior Structural Engineer | Consultant |
| Taylor | Perkins | Stantec | | Consultant |
| Anthony | Ream | HDR | Senior Bridge Engineer | Consultant |
| Francesco | Russo | Russo Structural Services | Principal | Consultant |
| Kyle | Smith | GPI | Assistant Vice President / Director of Structural Engineering | Consultant |
| Gerard | Sova | Hardesty & Hanover, LLC | Structural Engineer | Consultant |
| Jason | Stith | Michael Baker International | Technical Manager | Consultant |
| David | Stoddard | SSAB Americas | Senior Application Engineer | Material Producer |
| Eric | Stone | HNTB | Technologist (Bridge) | Consultant |
| Jeff | Svatora | HDR | Bridge Engineer | Consultant |
| Brian | Watson | HDR | Senior Bridge Engineer | Consultant |

| Donald | White | Georgia Tech | | Academia |
|--------|-------|--------------|--------------------------------|--------------|
| Brian | Wolfe | MDTA | Deputy Director of Engineering | Bridge Owner |

TG 12 Design for Constructability and Fabrication

| | | | | Primary Business |
|------------|-----------|-------------------------------------|---|---------------------|
| First Name | Last Name | Company | Professional Title | Туре |
| Domenic | Coletti | HDR | Principal Professional Associate | Consultant |
| Brad | Dillman | High Steel Structures | VP of Engineering | Fabricator |
| Jamie | Farris | Texas Department of Transportation | Deputy Bridge Division Director | Bridge Owner |
| Karl | Frank | Consultant | Consultant | Trade Organization |
| Christina | Freeman | FDOT | Structures Research Engineer | Bridge Owner |
| John | Gast | Consultant | Steel Bridge Erection Consultant | Consultant |
| Heather | Gilmer | Pennoni | Senior Engineer | Inspection Services |
| Keith | Griesing | Hardesty & Hanover, LLC | Chief Technical Officer | Consultant |
| Randy | Harrison | W&W AFCO Steel, Hirschfeld Division | Manager Bridge Drafting | Fabricator |
| Matt | Hebdon | University of Texas at Austin | Associate Professor | Academia |
| Russell | Jeck | Tutor Perini Corp. | Sr. Design Engineer | Contractor |
| Frank | Kingston | abs Structural Corporation | President | Detailer |
| Natalie | McCombs | HNTB | Senior Bridge Technical Advisor | Consultant |
| Ronnie | Medlock | High Steel Structures | VP - Technical Services | Fabricator |
| Deanna | Nevling | HDR | Senior Bridge Engineer | Consultant |
| Justin | Ocel | Federal Highway Administration | Structural Steel Research Program Manager | FHWA |
| Dusten | Olds | HDR | Senior Bridge Engineer | Consultant |
| Duncan | Paterson | Alfred Benesch & Company | Technical Manager | Consultant |
| Stephen | Percassi | Genesis Structures, Inc. | Senior Structural Engineer | Consultant |
| Eric | Rau | HDR | Senior Bridge Engineer | Consultant |
| Anthony | Ream | HDR | Senior Bridge Engineer | Consultant |
| Francesco | Russo | Russo Structural Services | Principal | Consultant |
| Kyle | Smith | GPI | Assistant Vice President / Director of Structural Engineering | Consultant |
| Gerard | Sova | Hardesty & Hanover, LLC | Structural Engineer | Consultant |
| Jason | Stith | Michael Baker International | Technical Manager | Consultant |
| David | Stoddard | SSAB Americas | Senior Application Engineer | Material Producer |
| Brian | Watson | HDR | Senior Bridge Engineer | Consultant |

| First Name | Loot Name | Compone | Dysfessional Title | Primary Business |
|------------|-----------|-----------------------------|--|------------------|
| First Name | Last Name | Company | Professional Title | Туре |
| Donald | White | Georgia Tech | | Academia |
| Douglas | Whittaker | Michael Baker International | | Consultant |
| Brian | Witte | Parsons | Vice President, Construction Engineering | Contractor |
| Brian | Wolfe | MDTA | Deputy Director of Engineering | Bridge Owner |

TG 13 Analysis of Steel Bridges

| | | | | Primary Business |
|------------|------------|--|--|------------------|
| First Name | Last Name | Company | Professional Title | Туре |
| Domenic | Coletti | HDR | Principal Professional Associate | Consultant |
| Douglas | Crampton | Wiss, Janney, Elstner Associates, Inc. | Associate Principal | Consultant |
| Thomas | Eberhardt | HDR | Columbus Bridge Section Manager | Consultant |
| Jamie | Farris | Texas Department of Transportation | Deputy Bridge Division Director | Bridge Owner |
| Christina | Freeman | FDOT | Structures Research Engineer | Bridge Owner |
| Todd | Helwig | University of Texas at Austin | Professor | Academia |
| Dongzhou | Huang | Atkins | Consulting Engineer | Consultant |
| Srinivasa | Kotha | PGH Wong Engineering, Inc | Bridge Engineer | Consultant |
| Hussam | Mahmoud | Colorado State University | | Academia |
| Natalie | McCombs | HNTB | Senior Bridge Technical Advisor | Consultant |
| Danie | N.4:II.o.s | Pennsylvania Department of | | Bridge Owner |
| Bryan | Miller | Transportation | | |
| Deanna | Nevling | HDR | Senior Bridge Engineer | Consultant |
| Dusten | Olds | HDR | Senior Bridge Engineer | Consultant |
| Joshua | Orton | Brasfield & Gorrie, LLC | Senior Design Engineer | Consultant |
| Stephen | Percassi | Genesis Structures, Inc. | Senior Structural Engineer | Consultant |
| Eric | Rau | HDR | Senior Bridge Engineer | Consultant |
| Anthony | Ream | HDR | Senior Bridge Engineer | Consultant |
| Francesco | Russo | Russo Structural Services | Principal | Consultant |
| Kulo | Cmith | GPI | Assistant Vice President / Director of | Consultant |
| Kyle | Smith | | Structural Engineering | |
| Gerard | Sova | Hardesty & Hanover, LLC | Structural Engineer | Consultant |
| Jason | Stith | Michael Baker International | Technical Manager | Consultant |
| Jeff | Svatora | HDR | Bridge Engineer | Consultant |
| Brian | Wolfe | MDTA | Deputy Director of Engineering | Bridge Owner |

TG 14 Field Repairs and Retrofits

| | | | | Primary Business |
|------------|-------------------|--|--|---------------------|
| First Name | Last Name | Company | Professional Title | Туре |
| Domenic | Coletti | HDR | Principal Professional Associate | Consultant |
| Robert | Connor | Purdue University | Professor | Academia |
| Douglas | Crampton | Wiss, Janney, Elstner Associates, Inc. | Associate Principal | Consultant |
| Jon | Edwards | DOT Quality Services | Technical Director | Inspection Services |
| Christina | Freeman | FDOT | Structures Research Engineer | Bridge Owner |
| Heather | Gilmer | Pennoni | Senior Engineer | Inspection Services |
| Nickolas | Haltwick | Minnesota Department of | | Bridge Owner |
| NICKOIAS | Nickolas Haltvick | Transportation | | bridge Owner |
| Matt | Hebdon | University of Texas at Austin | Associate Professor | Academia |
| Hussam | Mahmoud | Colorado State University | | Academia |
| Joshua | Orton | Brasfield & Gorrie, LLC | Senior Design Engineer | Consultant |
| Dhillin | Caucar | LIC Army Corns of Engineers | Structural Engineer | Owner/Federal |
| Phillip | Sauser | US Army Corps of Engineers | Structural Engineer | Government |
| Kyle | Smith | GPI | Assistant Vice President / Director of | Consultant |
| Куїс | SIIIIIII | GFI | Structural Engineering | Consultant |
| Jonathan | Stratton | Eastern Steel Works, Inc. | Managing Partner | Fabricator |
| Brian | Wolfe | MDTA | Deputy Director of Engineering | Bridge Owner |

TG 15 Data Modeling for Interoperability

| First Name | Last Name | Company | Professional Title | Primary Business |
|---------------|---------------|-------------------------------------|-------------------------|-----------------------------|
| FIISt Ivallie | Last Name | Company | Professional fitte | Туре |
| Aaron | Costin | University of Florida | Assistant Professor | Academia |
| Brad | Dillman | High Steel Structures | VP of Engineering | Fabricator |
| Randy | Harrison | W&W AFCO Steel, Hirschfeld Division | Manager Bridge Drafting | Fabricator |
| Hanjin | Hu | Michael Baker International | | Consultant |
| Frank | Kingston | abs Structural Corporation | President | Detailer |
| Ronnie | Medlock | High Steel Structures | VP - Technical Services | Fabricator |
| Abbas | Mokhtar-zadeh | Westinghouse, Stone & Webster | | Contractor |
| Phillip | Sauser | US Army Corps of Engineers | Structural Engineer | Owner/Federal Government |
| Grant | Schmitz | HDR | | Consultant |
| Jason | Stith | Michael Baker International | Technical Manager | Consultant |
| Eric | Stone | HNTB | Technologist (Bridge) | Consultant |
| Jonathan | Stratton | Eastern Steel Works, Inc. | Managing Partner | Fabricator |
| Cheng | Yu | University of North Texas | | Academia |

TG 16 Orthotropic Deck Panels

| P' I Al | | | Des Constant Letter | Primary Business |
|------------|-----------|--------------------------|--|---------------------|
| First Name | Last Name | Company | Professional Title | Туре |
| Frank | Artmont | Modjeski & Masters, Inc. | Engineer – Structures | Consultant |
| Domenic | Coletti | HDR | Principal Professional Associate | Consultant |
| William | Collins | University of Kansas | | Academia |
| Karl | Frank | Consultant | Consultant | Trade Organization |
| Keith | Griesing | Hardesty & Hanover, LLC | Chief Technical Officer | Consultant |
| Christian | Haberle | Haberle Steel | Vice President | Fabricator |
| Jamie | Hilton | KTA-Tator, Inc. | Vice President | Inspection Services |
| Zane | Keniston | QMC Auditing | | Inspection Services |
| Terry | Logan | Atema, Inc. | VP and Director of Overseas Operations | Inspection Services |
| Ronnie | Medlock | High Steel Structures | VP - Technical Services | Fabricator |
| Duncan | Paterson | Alfred Benesch & Company | Technical Manager | Consultant |
| Anna | Petroski | Atema, Inc. | President | Inspection Services |
| Sougata | Roy | Rutgers | Associate Research Professor | Academia |
| David | Stoddard | SSAB Americas | Senior Application Engineer | Material Producer |

TG 17 Steel Castings

| First Name | Last Name | Company | Professional Title | Primary Business Type |
|------------|-------------|---|---|--------------------------|
| Nicholas | Altebrando | STV Incorporated | National Director of Bridge Engineering | Consultant |
| Frank | Artmont | Modjeski & Masters, Inc. | Engineer – Structures | Consultant |
| Domenic | Coletti | HDR | Principal Professional Associate | Consultant |
| Diana | David | Steel Founders Society of America | Research Manager | Trade Organization |
| Carlos | de Oliveira | Cast Connex | President | Fabricator |
| Karl | Frank | Consultant | Consultant | Trade Organization |
| Heather | Gilmer | Pennoni | Senior Engineer | Inspection Services |
| Jason | Gramlick | California Department of Transportation | Associate Steel Inspector | Bridge Owner |
| Keith | Griesing | Hardesty & Hanover, LLC | Chief Technical Officer | Consultant |
| Greg | Hausbrouck | Parsons | | Contractor |
| Tom | Hickman | Hickman Consulting | | Fabricator |
| Dawn | Lehman | University of Washington | | Academia |
| Ronnie | Medlock | High Steel Structures | VP - Technical Services | Fabricator |
| Thomas | Murphy | Modjeski and Masters | Vice President / Chief Technical Officer | Consultant |
| Justin | Ocel | Federal Highway Administration | Structural Steel Research Program Manager | FHWA |
| Jennifer | Pazdon | Cast Connex | Vice President | Fabricator |
| Sougata | Roy | Rutgers | Associate Research Professor | Academia |
| Jason | Stith | Michael Baker International | Technical Manager | Consultant |

TG 18 Duplex Stainless Steel

| | | | | Primary Business |
|------------|-----------|--------------------------------|-----------------------------------|--------------------|
| First Name | Last Name | Company | Professional Title | Туре |
| Nancy | Baddoo | Steel Construction Institute | Associate Director | Trade Organization |
| Ted | Bush | HDR | Principal Bridge Engineer | Consultant |
| Brandon | Chavel | Michael Baker International | Area Technical Manager - Bridge | Consultant |
| Gary | Coates | Nickel Institute | Manager | Trade Organization |
| Karl | Frank | Consultant | Consultant | Trade Organization |
| Leroy | Gardner | Imperial College London | Professor | Academia |
| Stan | Gingrich | Amentum | Director | Consultant |
| Randy | Harrison | W&W AFCO Steel, Hirschfeld | Manager Pridge Drafting | Fabricator |
| Kanuy | Паттізоп | Division | Manager Bridge Drafting | Fabricator |
| Ronnie | Medlock | High Steel Structures | VP - Technical Services | Fabricator |
| Justin | Ocel | Federal Highway Administration | Structural Steel Research Program | FHWA |
| Justin | Ocei | rederal Highway Administration | Manager | FUMA |
| Jennifer | Pazdon | Cast Connex | Vice President | Fabricator |
| lacan | Provines | Virginia Department of | Senior Research Scientist | Pridge Owner |
| Jason | FIOVITIES | Transportation | Sellioi Research Scientist | Bridge Owner |
| Juan | Sobrino | Pedelta | CEO | Consultant |

Main Committee

| First Name | Last Name | Company | Professional Title | Primary Business Type | | |
|------------|-----------|-------------------------------------|---|-----------------------------|--|--|
| Allan | Berry | RS&H | Ft. Lauderdale Bridge Group Leader | Consultant | | |
| Brandon | Chavel | Michael Baker International | Area Technical Manager - Bridge | Consultant | | |
| Domenic | Coletti | HDR | Principal Professional Associate | Consultant | | |
| Aaron | Costin | University of Florida | Assistant Professor | Academia | | |
| Michael | Culmo | CHA Consulting, Inc. | Chief Bridge Engineer | Consultant | | |
| Brad | Dillman | High Steel Structures | VP of Engineering | Fabricator | | |
| Karl | Frank | Consultant | Consultant | Trade Organization | | |
| Christina | Freeman | FDOT | Structures Research Engineer | Bridge Owner | | |
| Heather | Gilmer | Pennoni | Senior Engineer | Inspection Services | | |
| Randy | Harrison | W&W AFCO Steel, Hirschfeld Division | Manager Bridge Drafting | Fabricator | | |
| Jamie | Hilton | KTA-Tator, Inc. | Vice President | Inspection Services | | |
| Ronnie | Medlock | High Steel Structures | VP - Technical Services | Fabricator | | |
| Deanna | Nevling | HDR | Senior Bridge Engineer | Consultant | | |
| Duncan | Paterson | Alfred Benesch & Company | Technical Manager | Consultant | | |
| Jennifer | Pazdon | Cast Connex | Vice President | Fabricator | | |
| Sougata | Roy | Rutgers | Associate Research Professor | Academia | | |
| Francesco | Russo | Russo Structural Services | Principal | Consultant | | |
| Phillip | Sauser | US Army Corps of Engineers | Structural Engineer | Owner/Federal Government | | |
| Kyle | Smith | GPI | Assistant Vice President / Director of Structural Engineering | Consultant | | |
| Jason | Stith | Michael Baker International | Technical Manager | Consultant | | |
| Jonathan | Stratton | Eastern Steel Works, Inc. | Managing Partner | Fabricator | | |
| Paul | Vinik | GPI | Cathodic Protection Manager | Inspection Services | | |
| Gary | Wisch | DeLong's, Inc. | Vice President, Engineering | Fabricator | | |
| Brian | Witte | Parsons | Vice President, Construction Engineering | Contractor | | |
| Brian | Wolfe | MDTA | Deputy Director of Engineering | Bridge Owner | | |
| John | Yadlosky | HDR | Bridge & Structures, Dir. of Operations | Consultant | | |

Appendix C – Meeting Announcement

AASHTO/NSBA Collaboration Meeting



Spring 2023 Meeting April 25 - 27 - Chicago, IL

Meeting Schedule

Tuesday, April 25 (7:30 am - 5:00 pm)

| Meeting | Start | End | Room | |
|---|----------|----------|---------------------------|--|
| Breakfast - Provided | 7:30 am | 9:00 am | | |
| TG 15 Data Modeling for Interoperability | 8:00 am | 10:00 am | Atlantic Ballroom D | |
| TG 16 Orthotropic Deck Panels | 9:00 am | Noon | Atlantic Ballroom C | |
| Combined TG 1 Detailing, TG 15 Data Modeling for Interoperability | 10:00 am | Noon | Atlantic Ballroom D | |
| Lunch - Provided | Noon | 1:00 pm | | |
| TG 13 Analysis of Steel Bridges | 1:00 pm | 3:00 pm | Atlantic Ballroom C | |
| TG 1 Detailing | 1:00 pm | 5:00 pm | Atlantic Ballroom D | |
| TG 8 Coatings | 3:00 pm | 5:00 pm | Atlantic Ballroom C | |
| Cocktail Hour - Registration Required | 5:30 pm | 7:00 pm | Red Sea/Black Sea Room | |

^{*} All times shown are Central Time

Wednesday, April 26 (7:00 am - 5:00 pm)

| Meeting | Start | End | Room | | |
|---|----------|----------|------------------------|--|--|
| Breakfast - Provided | 7:00 am | 8:00 am | | | |
| TG 12 Design for Constructability and Fabrication | 8:00 am | 9:00 am | Atlantic Ballroom D | | |
| TG 17 Steel Castings | 8:00 am | 10:00 am | Atlantic Ballroom C | | |
| Combined TG 1 Detailing, TG 11 Steel Bridge Handbook, TG 12 Design for Constructability and Fabrication | 9:00 am | Noon | Atlantic Ballroom D | | |
| TG 4 QC/QA | 10:00 am | Noon | Atlantic Ballroom C | | |

^{*} All times shown are Central Time

Meeting Schedule (con't)

Wednesday, April 26 (7:00 am - 5:00 pm)

| Meeting | Start | End | Room | | |
|-----------------------------------|---------|---------|------------------------|--|--|
| Lunch - Provided | Noon | 1:00 pm | | | |
| TG 10 Erection | 1:00 pm | 3:00 pm | Atlantic Ballroom C | | |
| TG 18 Duplex Stainless Steel | 1:00 pm | 4:00 pm | Atlantic Ballroom D | | |
| TG 14 Field Repairs and Retrofits | 3:00 pm | 5:00 pm | Atlantic Ballroom C | | |
| Dinner - Registration Required | 6:30 pm | 9:00 pm | TBD | | |

^{*} All times shown are Central Time

Thursday, April 27 (7:00 am - 1:00 pm)

| Meeting | Start | End | Room | | |
|------------------------------|----------|----------|------------------------|--|--|
| Breakfast - Provided | 7:00 am | 8:00 am | | | |
| TG 2 Fabrication and Repair | 8:00 am | 10:00 am | Atlantic Ballroom C | | |
| TG 11 Design | 8:00 am | 10:00 am | Atlantic Ballroom D | | |
| Collaboration Main Committee | 10:00 am | 1:00 pm | Atlantic Ballroom C | | |

^{*} All times shown are Central Time

Hotel Information

This meeting will take place at the <u>Radisson Blu Aqua Hotel, Chicago</u>. Hotel reservations can be made from Monday, April 24, through Thursday, April 27. Please make your reservations as soon as possible as the room block is not guaranteed to not sell out.

Address: 221 N Columbus Dr, Chicago, IL 60601

Phone Number: (312) 638-6686

Rate: \$209

Cut-Off Date: April 3

Reservations: AISC NSBA-AASHTO Collaboration

Registration Information

All collaboration meetings are free and open to anyone interested in attending. However, we request that you register ahead of time so that we can better organize the event. Please **register** using the link below **before Friday, March 31**.

Meeting Registration Link

Travel Reimbursement

AISC will provide travel reimbursement for eligible AASHTO/NSBA Steel Bridge Collaboration meeting attendees who are currently employees of state or county transportation departments, toll authorities, government agencies or universities. Please contact us for more information (nsbacollaboration@aisc.org).

Contact Information

Please do not hesitate to contact us (nsbacollaboration@aisc.org) if you have any issues or questions. For further information, please visit the NSBA web site AASHTO/NSBA Steel Bridge Collaboration section (websacollaboration. Thank you for your time, participation and continued contributions.

About the Collaboration

| The mission | of the | Collaboration | is to | achieve | quality | and | value in | steel | bridges | by s | standar | dization | of | desig | ξn, |
|--------------|----------|-----------------|--------|------------|----------|------|----------|---------|-----------|--------|---------|-----------|-----|-------|-----|
| fabrication, | and erec | ction and by th | e shar | ing of res | sources. | Thro | ough the | Collabo | oration, | steel | bridge | professi | ona | ls wo | rk |
| together in | a spirit | of cooperation | on and | d mutual | respec | t to | develop | details | s, specif | icatio | ons and | d practio | ces | and | to |
| exchange kn | owledge | e, technology a | nd exp | ertise. | | | | | | | | | | | |