

NATIONAL STEEL BRIDGE ALLIANCE

AASHTO/NSBA Steel Bridge Collaboration

Fall Meeting Minutes - Combined

Minneapolis, MN

October 11 – 13



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

Task Group List.....	2
TG 1 Detailing.....	3
TG 2 Fabrication and Repair.....	5
TG 4 QC/QA.....	12
TG 8 Coatings	14
TG 10 Erection.....	15
TG 11 Design	17
TG 12 Design for Constructability and Fabrication	21
TG 13 Analysis of Steel Bridges	23
TG 14 Field Repairs and Retrofits	26
TG 16 Orthotropic Deck Panels	32
TG 17 Steel Castings	34
TG 18 Duplex Stainless Steel	36
Combined TG 1 Detailing, TG 11 Steel Bridge Handbook, TG 12 Design for Constructability and Fabrication	40
Combined TG 1 Detailing, TG 15 Data Modeling for Interoperability	65
Main Committee	66
Appendix A – Attendee List.....	73
Appendix B – Document Release Schedule and Status	76
Appendix C – Meeting Attachments.....	79
TG 2 Fabrication and Repair – Updated Meeting Notes from Spring 2022 Meeting	80
TG 13 Analysis of Steel Bridges – Meeting Presentations	85
TG 13 Analysis of Steel Bridges – Draft Software Survey.....	112
Appendix D – Meeting Schedule	116
Schedule Overview	117
Tuesday, October 11	117
Wednesday, October 12	117
Thursday, October 13	118

Task Group List

Group Name	Chair	Chair Company	Vice Chair	Vice Chair Company
TG 1 Detailing	Randy Harrison	W&W AFCO Steel, Hirschfeld Division	Gary Wisch	DeLong's, Inc.
TG 2 Fabrication and Repair	Heather Gilmer	Pennoni	Duncan Paterson	Alfred Benesch & Company
TG 4 QC/QA	Jamie Hilton	KTA-Tator, Inc.	Robin Dunlap	High Steel Structures
TG 8 Coatings	Paul Vinik	GPI	Johnnie Miller	KTA-Tator, Inc.
TG 9 Bearings	Michael Culmo	CHA Consulting, Inc.	Ron Watson	RJ Watson, Inc.
TG 10 Erection	Brian Witte	Parsons	Jason Stith	Michael Baker International
TG 11 Design	Brandon Chavel	Michael Baker International	Domenic Coletti	HDR
TG 12 Design for Constructability and Fabrication	Christina Freeman	Florida Department of Transportation	Russell Jeck	Tutor Perini Corp.
TG 13 Analysis of Steel Bridges	Deanna Nevling	HDR	Francesco Russo	Russo Structural Services
TG 14 Field Repairs and Retrofits	Kyle Smith	GPI	Jonathan Stratton	Eastern Steel Works, Inc.
TG 15 Data Modeling for Interoperability	Aaron Costin	University of Florida	Jonathan Stratton	Eastern Steel Works, Inc.
TG 16 Orthotropic Deck Panels	Sougata Roy	FHWA	Frank Artmont	Modjeski & Masters, Inc.
TG 17 Steel Castings	Jennifer Pazdon	Cast Connex	Jason Stith	Michael Baker International
TG 18 Duplex Stainless Steel	Jason Provines	Virginia Department of Transportation	Nancy Baddoo	Steel Construction Institute
Main Committee	Ronnie Medlock	High Steel Structures	Christina Freeman	Florida Department of Transportation

TG 1 Detailing

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

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.

Approved
2. Continue discussion of comments for Updating of the G1.4 – Guidelines for Design Details (1:10 PM – 3:00 PM)
 - a. Page 104 – Typical Girder Details II & Flange Slabbing and Stripping Details
 - i. Reference AASHTO 6.6
 - ii. 48"? Comment – Remove Note
 1. Reference G12.1 Constructibility Document & Plate Availability Document White Paper Under Design on NSBA Website
 - iii. Comment No. 11,12 approved change
 - iv. Comment 17-Drip Bar Details Section K – Leave as shown. Sealing to be accomplished by welding or caulking ...add note to TG for adhesive alternate in future. Revise weld detail
 - b. Page 105 – Typical Girder Details III
 - i. Safety Hand Rail Connection – Spec/Grade of Steel? Grade 50/W
 1. Bar Size Recommendation Detail – Remove 5/8" bar & Nut and make round bar
 2. Add Note for 3/16" oversize hole for roundbar
 - ii. Note 2 for Design Drawings: Remove
 - iii. Note C for Designers: Leave note as is. Allow bolt option?
 - iv. Safety Handrail Details: Add note to check OSHA compliance for min width. Remove less than 4 feet note
 - v. End Connection Detail – Larry Kruth suggested welding a 3"x3" plate to bar end in lieu of welding a nut for fall protection
 - c. Page 106 – Typical Girder Details IV

- i. Note 1 for Design Drawings: Leave as is, Allow Oversized Holes. Side Note: Ronnie recommended an MSC article for common practice of oversized holes on lateral bracing
 - ii. Note 2 for Design Drawings: Clarify Note
 - iii. Note 3 for Design Drawings: Replace 8" spacing to 10" in accordance to G12.1 commentary, Ref. Bridge Welding Reference Guide
 - iv. Alt. Bent Conn. PL: Reference guidance on welded pipe
 - v. Lateral Bracing Conn – hyphenate "stay-in-place"
 - vi. Note D for Designers: Rephrase to "Field welding options may be used in lieu of bolting"
 - vii. Avoid This Detail: Move to appendix of future appendix for Unperforated Details. Avoid using detail shown for adequate access for bolting installation.
 - d. Page 107 – Standard Bolted Field Splices
 - i. Note 4 for Design Drawings: Add "flange"
 - ii. Detail A: Remove Detail/Note H...Bolts threads in shear plane. Side note: Reference HDR research in T14
 - iii. Page 107 will be finished at Spring Collaboration
3. Adjourn

TG 2 Fabrication and Repair

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 - HDR Engineering Inc.

Secretary: Christopher Garrell - NSBA

NOTE: TG2 meeting notes from the spring 2022 meeting were updated after the spring 2022 meeting packet was posted for download. The updated notes can be found in TG 2 Fabrication and Repair – Updated Meeting Notes from Spring 2022 Meeting. The previously posted meeting packet will stand “as-is” and will not be updated to reflect these changes.

1. Chairperson’s Welcome (8:00 AM - 8:30 AM)

- a. [AISC Antitrust Policy and Meeting Code of Conduct.](#)
- b. Introductions (as needed).

Reviewed the member and advisor policy. Attendees proceeded to introduce themselves. There were about 40 people in attendance.

c. [Approval of Previous Meeting Minutes.](#)

Chair Heather Gilmer proposed changes to previously posted meeting minutes. The updated notes have been attached (see Appendix C “TG 2 Fabrication and Repair”). There were no additional comments.

d. Reminder of documents currently under the task group’s scope

TG2 used to have two documents, S2.1, Fabrication Specification, and G2.2, Guidelines for Shop Nonconformances. S2.1 became an AASHTO specification which was approved at the recent AASHTO CBS meeting; TG2 maintains an advisory role. (See next item.)

e. AASHTO steel fabrication specification status update

The new fabrication specification was approved at the recent AASHTO CBS meeting. It is expected to be released later in 2022. Gilmer encouraged states to incorporate the document by reference and make exceptions as needed. The document has an appendix, intended as an aid in implementation, with information about what was not specified in the document and needs to be included in state specifications. These should be specified by the state themselves. The document should be available November 2022.

Ronnie Medlock mentioned the importance of marketing the document and broader awareness of the new document. He also mentioned that it would be valuable to review the specification table of contents as many people in the current meeting are not familiar with it.

TO DO: Consider having Alex Bardow and Heather give a webinar talking through the new document. Look into other marketing efforts jointly by NSBA and AASHTO.

Gilmer reviewed the table of contents. This document will only be available on the AASHTO website for cost. A link to the AASHTO bookstore will be added to the NSBA Collaboration webpage. Hannah Cheng, AASHTO T-17 vice chair, asked if Chapter 11 of the AASHTO Bridge Construction Specification would be removed. A draft is about to be submitted which retains erection language and a reference to the new fabrication specification for bolting. This will be sent to AASHTO T-4. Deletion of portions of AASHTO/AWS D1.5 will also need to be made, with those portions to be replaced by reference to the new document. There will be a period where there is duplication (depending on what documents the state already references); precedence would need to be established.

TO DO: Develop language that provides an example of how to handle this transition period. Consider including this as part of the webinar.

f. “Fracture-critical” update

FHWA is phasing out the term “fracture critical” and using the term “non-redundant steel tension members”. There are also IRMs and SRMs. All will continue to be fabricated under the current fracture control plan. This change of terms will need to propagate its way through all documents. The NSBA Redundancy Task Force is developing guidance language which it will make available to the bridge community. Ed Wasserman, the chair of the RTF, has drafted language which will be discussed further at the next BTF/AASHTO T-14 meeting in January 2023. Need a single term that encompasses NSTMs, SRMs, and IRMs. A proposed plan would be to make all A709 material to the current fracture toughness requirements and remove the need to specify special material when fabricating a NSTM. There is a task group looking further at whether it would be possible to unify other special fabrication requirements either through deletion of requirements that are no longer needed or applying requirements across the board for all tension members if they have value. This would simplify material specifying and fabrication.

TO DO: Circulate the spreadsheet of D1.5 fracture-critical requirement to help assess their effect would be on both larger FC-endorsed fabricators and small fabricators who do not currently produce FCMs.

TO DO: Look at reconstituting Reduncy Task Force membership to lead this effort at guidance. Identify if anyone from TG2 would be a good candidate. Coordinate with Ronnie Medlock and Ed Wasserman.

A question was raised as to how this might affect other industries who have chosen to adopt the fracture critical concept. For example, outdoor crane rail which is exposed and subject to dynamic loadingm as a bridge. AISC will be developing a new guide on fracture in response to the Salesforce building fracture.

2. AASHTO fabrication specification (formerly S2.1)

a. Updates within current scope:

i. MT of bent material (from AASHTO ballot comment)

NYS commenter proposed requiring MT for all cases, not just “suspected damage”. T-17’s ballot response was that this would be on as new business. Even the “suspected damage” requirement is not in the current AASHTO Bridge Construction Specifications; this requirement in the AASHTO Fab Spec came from S2.1.

Karl Frank mentioned that the current radius (5t) is intentionally large not only to prevent cracking but also preserve material properties and sees no need to impose testing as cracking would not occur in the first place. He noted that the older requirements allowed much tighter radii and we lived with those for a long time. Ronnie Medlock asked if the ribs on an orthotropic deck, for example, would be subject to this requirement. They would, as would bent-plate tub girders. People present noted that this would be a lot of MT. Teresa Michalk of TxDOT did not see a need to MT all of that.

Dave Stoddard (SSAB) mentioned that he had been working with NYSDOT, who currently do not allow cold bending, to look at various bends and when cracks would appear. They were unable to create cracks. Michalk mentioned that TxDOT is moving away from bent plate connections (which do have an AASHTO exemption from the t5 requirement) in favor of split pipe. Mike Johnson (Idaho DOT) suggested that the need for MT be handed on a case-by-case basis. Kent Nelson noted that DOTs can specify additional requirements.

The TG2 recommendation to T-17 is not to add MT as new requirement for all bends.

Brad Dillman thought the “suspected damage” language was too vague and suggested something more along the lines of suspected damage that can be visually identified. For example, remove the term “suspected” and replace it with a more definitive term or phrase (e.g., visual indication of cracking/damage). Jon Edwards voiced a concern that by the time you see a crack, you have definitive proof and no need to perform MT, which is intended to find cracks. You would use MT to locate cracks that you cannot see (i.e., are suspicious). Mill scale can cause it to look suspicious when it pops-off during the bending. Karl Frank reiterated that you should not have to perform MT on a material bent to 5t. He also mentioned the importance of not having “rough cut” edges. (There is a requirement in the specification to break corners.)

TO DO: develop commentary language to clarify “suspected”. Brad Dillman, Karl Frank, and Will Johnson.

Stoddard noted that mills expect plate to be bendable to the radii given in an appendix in A6 (the old AASHTO radii), and cracks at those radii would be basis for a claim—and they don’t see many claims.

ii. Camber tolerances (from AASHTO ballot comment)

(1) Wording:

This section was copied directly from D1.5. A commenter noted that the code is written so that camber is checked during assembly, which could be interpreted to mean that if there is no assembly (say, a bridge short enough not to need a splice), the tolerance does not apply.

Karl Frank pointed out that eating up the haunch affects moment capacity and also wondered about how camber tolerances relate to precast deck panels. Brian Witte stated that the panels sit on foam blocks, whose height can be varied.

Gilmer wondered whether the section on top flange embedded in concrete without a haunch was needed. Karl Frank noted that the haunch is a way to account for changes in flange thickness.

A question was raised in a sidebar after this discussion as to how the inspector knows there is a haunch. *This question will be directed to TG1.*

TO DO: Clean up the language in response to the comment so that a splice is not required for applying the tolerance. Other issues future business. Heather Gilmer, Gerard Sova, Brad Dillman.

(2) Technical requirement:

Commenter from MnDOT said that the allowable max camber is too much and doesn't work. He stated that this has led fabricators to impose lower tolerances on themselves. MnDOT is thinking of lowering the tolerance.

Erectors in the room did not report issues. Gary Wisch said they aim for about half the tolerance so that there is room for error, but they wouldn't want to be rejected for going over that smaller value.

Ronnie Medlock and Wisch both said that camber problems are more prevalent in smaller girders because they move around more during fabrication.

Medlock noted that the tolerances have been around for decades.

TG2 recommendation to T-17 is not to change the camber tolerances at this time.

iii. Bearing stiffener contact requirements (from AASHTO ballot comment)

Commentary was thought to be confusing—it could be taken to imply that the tolerance does not apply in the shop but only under load.

TO DO: Ronnie Medlock and Heather Gilmer will fix the commentary, explaining that this is why 1/32" gap is allowed, and also clarify that this is the “mill to bear” tolerance.

Gilmer is also looking for better language for what a “finish to bear tolerance” should be. If anyone has suggestions, they should feel free to send them to her. Phil Sauser and Jon Edwards suggested similar requirements as intermediate stiffeners, with just fillet welds and allowable gap. Welds are often added to finish-to-bear stiffeners because the contact of previously installed stiffeners can change as more nearby stiffeners are installed. Medlock said that High Steel typically issues an RFI requesting mill to bear with fillet. TG consensus was that the end the weld should be designed. Rater than it being an RFI, it should be part of the original design. Karl Frank recommended wrapping welds at bearing stiffeners to help control corrosion. Karl Frank mentioned there was concern with cracking at the top of bearing stiffeners on deep girders.

Unofficial sub-TG formed to work on revisions to bearing contact language; however, it will not be an official agenda item unless something is actually developed. Members: Karl Frank, Jon Edwards, Ronnie Medlock, Phil Sauser, Duncan Paterson, Keith Griesing.

Wrapping stiffeners could be purview of T-14, TG1, TG12

iv. Pins (from AASHTO ballot comment)

(1) Holes in Pins:

Commenter said that the hole down the middle of the pin should be shown on the plans and that this should be a design code requirement.

Holes are required for pins greater than 9 inches in diameter. The question is whether this is a material consideration. For example, if there are not uniform properties, then center would be removed. Consider putting a maximum on the hole to ensure that the design is not compromised. How much material could be removed? However, the center part would be the more ductile part of the pin and there does not seem to be a benefit to removing it in the first place, other than to facilitate handling. **TO DO: Reach out to a supplier or pin manufacturer for additional information.** Wecall is a supplier of smaller pins. Hannah Cheng suggested that pins be handled by special provision. Gilmer noted that AREMA has also discussed this issue and there will be an AREMA meeting next week.

Holes for Pins: Commenter noted that it is difficult to fit up pins with the tolerances given. AREMA had considered changing these tolerances and decided not to. Heather Gilmer and Duncan Paterson will coordinate with AREMA.

v. Wordsmithing “fabricator” and “contractor” roles (from AASHTO ballot comment)

These definitions came over from S2.1. Commenter had issue with implying that anything the fabricator can do can also be done by the contractor. However, TG consensus was that in the roles of contractor, fabricator, and erector do not need to belong to separate parties and that the language is correct.

TG2 supports T-17 ballot response that the language is correct, and does not propose any further tweaking.

vi. Scribing/etching of layout marks

This was brought forward as continued business from S2.1. Fabricators want to use different layout methods but are not always allowed. Gilmer noted that any numerical tolerance means that someone would be expected to measure it. Undercut tolerances had previously been proposed for layout mark depth, but the group noted that the tension tolerance of 0.01 can be detected by dragging your nail over it, and should this be a concern? Karl Frank said if we start worrying about little scratches in the plate, we’re in trouble. He noted that in the scanning tour in the late 1990s they saw that Japan used laser marking. But he has also seen some ugly markings. He suggested that perhaps commentary about avoiding deeper than 1/32", or something about gouges, could be appropriate.

Ronnie Medlock supported allowing all methods and having commentary to discuss good workmanship. He will reach out to fabricators.

Jason Lloyd said that John Barsom has a report on fatigue resistance of uncoated weathering steel. Typical surface roughness was about 0.03", close to 1/32". Mike Johnson said that it matters where the marking is, what the state of stress is at that location, whether the fabricator can demonstrate that the method is ok. Likes language such as "depth > 1/32" should be avoided unless..."

FDOT did a small research project with Florida Structural Steel on plasma etching. Christina Freeman of FDOT reported that the result showed "negative effects on fatigue".

Karl Frank reminded the group that deep marks can be removed by grinding, and that a welded repair was not desirable.

TO DO: Come up with workmanship commentary. Ronnie Medlock, Teresa Michalk, Tim McCullough of FDOT (not present at meeting)

vii. CNC & shop assembly (question brought up in sidebar after meeting)

Hannah Cheng brought up that the commentary implies that the owner has control over the check assembly plan but the code implies that the expressed default for check assemblies would be acceptable without submittal. This could use clarification. Should the owner always need to approve check assembly plans?

3. Adjourn. Meeting ended at 11:55 PM CT. The remainder of the original agenda was not covered.

TG 4 QC/QA

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

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. G4.2 – Guidelines for the Qualifications of Structural Bolting Inspectors (3:10 PM – 3:30 PM)
 - a. RCSC – other bolting applications to add to G4.2. Jason Gramlick/Heather Gilmer
 - i. Notes: Add F3148 TNA Bolts, Goal to get document to T14/T17 for review for balloting end of this year for 2024 publish target
 - ii. Action Item: HG to add to content
3. S4.1 – Steel Bridge Fabrication QC/QA Guide Spec Part C (3:30 PM – 4:30 PM)
 - a. G4.4 Sample Owner's QA Manual – to be incorporated in with S4.1 Part C and revised to third party (QA/QV) inspection requirements. Jamie Hilton/Heather Gilmer/Robin Dunlap/Teresa Michalk
 - i. Notes: Review editorial changes to document, reviewed & comments provided by Jamie Hilton & Teresa Michalk
 - ii. Action Item: Change of QA to Owner Inspection, Owner Inspector throughout document
 - iii. Clarification discussion on Chapter N: D1.1 NDT scope on Contractor or QA Owner function, provisions must be met for optionality
 - iv. 8.1.2 Section 3 to be written to be in accordance with QA,QCI
 - v. Action Item: Review Section 3.2.1 and decide to include in document
 - vi. Section 8.2 Scheduling: Delete 2.1.2 & 2.4.3 reference notes
 - vii. Section 9.2 Interaction with Fabricator Quality Inspector: Define "serious problems"
 1. Action Item: John Stratton to provide definition for "serious problems" and to be reviewed by Heather Gilmer

- 2. Potential nonconformance, contract violations and/or safety hazards should be reported to QCI immediately
- viii. Section 9.3 Interaction with the Owner: Change” alternate” to “alternative”
- ix. Section 9.6 Nonconforming Materials and Workmanship: define “serious deficiencies”
 - 1. Action Item: John Stratton to provide clarification/definition and to be reviewed by TG
- x. Section 10.1 Familiarization with Requirements
 - 1. Action Item: Jamie Hilton to reorganize and update document titles listed
 - 2. Editorial changes in sub section 10.4.1 reviewed
 - 3. Action Item: Teresa to review Michigan/Vermont communication protocols/best practices
 - 4. Rephrase Subsection 10.4.4 in regards to photograph policy between fabricator and owner
 - 5. Action Item: Jamie to move section 10.5 to 11.1.3
 - 6. Action Item: Add Prefabrication Meeting check list
 - 7. Action Item: Investigate Subsection 10.3 Use of Non-approved Shop Drawings: Violation of CSC.
- xi. Section 11 QA Functions
 - 1. Subsection 11.1.3 replace should with shall
 - 2. Subsection 11.2 Welding reorganized lists, to be reviewed by TG and provide comments if required
 - 3. Reviewed editorial comments for subsection 11.6 Nondestructive Evaluation
- xii. Review of G4.4-2006 Action Item: Robin to provide recommendation list on inspection equipment for section 2 in G4.4
- 4. G4.1 - Steel Bridge Fabrication QC/QA Guidelines (4:30 PM – 4:45 PM)
 - a. Status of review and updating
 - i. Reviewed G4.1 definitions and decided not to replace with AISC terminology that is referenced in AISC 207-20 Standard Certification Programs.
 - ii. Select task groups to review sections for the 2024 update
- 5. New Business? (4:45 PM – 5:00 PM)
- 6. Adjourn

TG 8 Coatings

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

Notes not provided. See summary in Main Committee notes.

TG 10 Erection

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: Anthony Peterson - NSBA

1. Review and resolve TG10 and MC comments from Fall 2022 ballots
 - a. S10.1 was balloted through TG10 and Main Committee in August/September 2022. Although the document passed both ballots, some of the changes required to resolve comments were deemed significant enough to require reballoting.
 - b. Section 9.2 Tolerances
 - As written, section 9.2.3 has direct conflict with AWS D1.5. In the spirit of advancing this specification to AASHTO, Brian proposed keeping 9.2.1 & 9.2.2 and deleting 9.2.3. Medlock, Gilmer and Haltvick suggested this section should be rewritten to address the core concern that the tolerances are trying to address before publishing the next edition. Stith stated that bridge owners need language like this to address issues in the field during erection. Brian to set meetings to resolve this issue and develop a proposed text (Witte, Stith, Medlock, Haltvick, Gilmer)
 - c. Section 3.2 and 3.3 – Discussed and made several changes to sections 3.2 and 3.3 to resolve comments including the following.
 - 3.2.a – Task group agreed to keep clause relating to identifying permits (but not obtaining them) was acceptable as written.
 - C3.2.d – After reviewing parametric study about limiting radius of curvature, the task group agreed that 600' was appropriate for this document.
 - Reorganized and reworded some text between sections 3.2 and 3.3
 - d. Section 3.3 – It was also noted that AISC Erector requirement document requires that the Erector is responsible for all requirements in the Bridge Erection specification. Several of the requirements in this specification are out of the control of the erector (and under the responsibility of the fabricator, such as shipping from the fabrication shop to the bridge site), and thus increasing

liability for the erector unnecessarily. AISC may need to review the Erector requirements it currently has and consider clarifications/changes to language.
Brian to follow up with Jamie Hinton.

2. **Open discussion about potential new business (time permitting)**

- a. Although not discussed in TG10 meeting, TG14 has good text in Chapter 7 of the balloted version related to erection issues during retrofit. It seems this text may be better suited for a TG10 guideline document. This item will be considered for future business in Spring 2023.
- b. Brian will schedule interim TG10 meeting in December to discuss and resolve outstanding comments. The goal is to reballot S10.1 to TG10 and address any new comments in spring 2023 meeting.

TG 11 Design

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 Engineering Inc.

Secretary: Christopher Garrell – NSBA

1. Chairperson's Welcome (8:00 AM - 8:10 AM)
 - a. [AISC Antitrust Policy and Meeting Code of Conduct.](#)
 - b. Introductions (as needed).

About 30 people in attendance.

- c. [Approval of Previous Meeting Minutes.](#)
2. Announcements and Administrative Items (8:10 AM to 8:15 AM)

Brandon reviewed the mission statement and the current work tasks. TG 11 is specifically working the development of a new cross-frame guide and partnering with TG1 and TG12 on a steel straddle bent guide. Brandon and Russo are on EC for IBC. The next IBC will take place June 12-14 in Washington, DC. Call for abstracts due on October 14, however they likely will be forgiving about late submissions.

3. Presentations (8:15 AM - 8:35 AM)
 - a. FHWA Bridge Geometry Manual (20 minutes) – Tom Eberhardt

Released in April (www.fhwa.dot.gov/bridge/pubs/hif22034.pdf). Documenting a bridge's geometry accurately on bridge layouts and detailed drawings during the design process is fundamental to successful bridge construction. The purpose of this manual is to provide bridge engineers and technicians with a basic framework for evaluating and computing the various components of bridge geometry. The manual includes practical examples for implementing the topics discussed. Reference is also made to numerous outside resources for further direction and discussion. The manual is organized into three Parts including General Topics, Concrete Topics, and Steel Topics.

4. Guidelines for the Design of Cross Frames & Diaphragms (8:35 AM - 9:45 AM)
 - a. Discussion on unbalanced welds at end of cross-frame members - Topic from Christina Freeman

Final review took place over the summer. Coletti and Chavel received last set of comments in September, and they continue to work through those. There are about 10 substantive comments that require more careful discussion. One change will be removal of repetition between sections.

Section 2.3.1.1 - Unbalanced Welds. This is something that is not specifically addressed in AASHTO that can be an issue but could benefit from more detailed discussion. This more specifically applies to angles used in cross-frames. The goal was not to assess and revise existing state standards. It would also be useful to consult with fabricators if they have any preferences for welds at the end of a angles of cross-frames. Gary Wisch reminded the group that wrapping welds was not something they would prefer. Right now, is covered on diagonals, but really applies elsewhere (or simply angle connection). The text will also make more references to where the reader can obtain more information on analysis methods rather than stating methods specifically. Don White asked if there was information about what is best for economy in fabrication. He thought it may be beneficial to speak to this. Gary Wisch stated that “simple is better”. Consider citing instances of typical RFI that may come from a fabricator and how to address them. For example, Russo mentioned a case where a fabricator asked to make the shorter weld length equal to the longer. This likely would not introduce a problem by adding weld.

b. Review major comments based on Final TG11 Review

2.3.3.2 – Bent Plate Eccentricity. Comments on this section were specifically related to a need for more detailed discussion. In the absence of performing a detailed analysis for this guide, Chavel asked if there might be information elsewhere that can be referenced instead. A paper in the AISC EJ 3rd Quarter 2001 has some information that Chavel found useful. Steps for analysis and not necessarily a fully developed example. Russo, Paterson and Butz will investigate this in more detail. G12.1 Section 2.1.2.6 has specific recommendations related to specifying skewed connections.

2.4 – Phased Construction and Closure Bay Cross-Frames. Commentors thought a more detailed discussion and resolution of typical issues during fit-up would be beneficial. For example, working through fit-up by allowing field drilling or welding. For example, when to do it (i.e., connect cross-frame between phases) and how to do it. The section will be rewritten. Consider including reference to lean-on, which Witte recommended. Russo thought a graphic would be useful also to help describe the before, during and after conditions to illustrate the problem. Sovo recommended that the closure cross-frame be “shallower” to account for the

differential deflection that will occur across the closure bay. G12.1 Section 1.6.2 included some commentary on the subject also.

2.5.9.2 Seismic Loads. Recommendations that were received were that the section should be reduced and include more direct references (i.e., make it shorter).

2.6.3.2 – Galvanizing and Overlapping Surfaces. Wisch stated that it really comes down to what the state wants. If not sealed, bleeding will occur. While not sealing is easier, you will end up with bleeding at some point after galvanizing. The fabricator will do what is specified on the plans, so the designer/owner should be specific in their plans. Explicit language for engineers and owner on what bleeding is would be beneficial. A repair language on how to address bleeding may be good to include also. Images would also be helpful as some people are not aware of what bleeding is and how to recognize it.

3.1 – Line Girder Analysis. Specifically computing live load forces should be more succinct. Again, this is another section that may have too much information and would benefit from a simple outline of what should be used in computing forces and leave it at that. A continual issue is that some engineers still feel the need to use of more advanced analysis beyond simply a line girder analysis. This should be reinforced. Fatigue and differential deflections seem to be a point of confusion on straight bridges for engineers that results in cross-frames that are oversized.

5.1 Summary and NCHRP 962 references. Consider move references into sections within the document rather than as a closing section. Russo mentioned that there are now concerns with the results that are coming from performing this analysis that result in a requirement that main members be increased in size to a point that is not logical. In these cases, a recommendation should be made to add lateral bracing rather than change the member size. AASHTO specification currently is silent on this and provides no “off ramp” alternative to solution for resizing the main members.

c. Next steps

End of November is still the target for finalizing edits. An update will be recirculated in December. A final version being readied in January. The question remains whether this should be a new chapter of the design handbook or a collaboration document. Now that the design examples have been removed, should this be a Collaboration document. For now, the decision was to make this a new Steel Bridge Handbook chapter and then consider it as an official Collaboration document later.

5. General Open Discussion (9:45 AM - 10:00 AM)
 - a. Design issue discussions

No further discussions took place.

b. Other potential items for the next design TG task.

No further items were discussed.

6. Adjourn

The meeting ended at 9:40 AM.

TG 12 Design for Constructability and Fabrication

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: John Hastings - NSBA

Opened up

Focus on addressing questions that were asked.

Approximately 40 attendees

Went through past meeting minutes, they were approved

Talk in general about G12 document, comments have been resolved, went through table of contents section by section

Randy discussed how G1.4 is going to reference G12.1

Brian discussed Steel Bridge Erection guide

Ronnie mentioned corrosion protection to add to G12.1 M&M Weathering steel, and Jennifer McConnell

Wind loads have started to cause issues during construction, some are using span length to help (L/b). Designers are using smaller flanges and basing it on shipping lengths.

Maintain constant flange widths in sections, wide as possible to help with wind/lateral loads.

Issues with staged construction and position with respect to adjacent girders. Bigger issue with skewed bridges. Need to give guidance on cross frames. This is addressed in TG11 but not details.

Table 1.4.1.-2 plate available. Time to update tables. Chris has worked on this in the past

Discussion about welds fillets/CJP

Possibly discuss WP locations for cross frames. They don't have to line up and fabricators prefer WP on gusset or bolt hole.

Best practice of camber layout/table

Add somethings that Todd has developed when AASHTO updates it spec. It should be voted on in January.

Figure 1.8-1, haunch is correct from a designer point of view.

TG17 working on steel castings, should this be referenced in G12.1

TG 13 Analysis of Steel Bridges

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

NOTE: Additional supporting materials can be found in Appendix C – Meeting Attachments.

1. Chairperson’s Welcome – (1:00 PM – 1:10 PM)
 - a. [AISC Antitrust Policy and Meeting Code of Conduct.](#)
 - b. Introductions (as needed).

There were approximate 45 attendees.

- c. [Approval of Previous Meeting Minutes.](#)

There were no comments on the meeting minutes from the spring meeting.

2. General Announcements (1:10 PM – 1:25 PM)
 - a. Conferences/Research/Publications

- Accelerated Bridge Construction Conference - December 7-9 | Miami, FL
- TRB Annual Meeting - January 8-12 | Washington, D.C
- NASCC – The Steel Conference - April 12-14 | Charlotte, NC
- WTS International Conference - May 10 -12 | Atlanta, Georgia
- AASHTO Committee on Bridges & Structures Annual Meeting - May 22 -25 | Kansas City, Missouri
- International Bridge Conference - June 12-14 | National Harbor, MD

- b. NSBA Update – Chris Garrell

Provided an overview of documents that were approved at CBS. The S8.3 and G9.1 were both approved and are currently being finalized by the AASHTO publishing group. The collaboration is bringing forward two documents in 2023. These are the S10.1 and G14.2. Both have already gone through collaboration-based ballots. The new Need for Speed guide to specifying uncoated weathering steel has been completed and will be made available in October. The NSBA plans on also releasing the new Lean on Bracing guide later this year. This recently completed the 95% draft stage. There are three Steel Bridge Forums planned for the remains of 2022. These are NC on October 27, SC on November 8 and IL on November 15. Lastly, the

NSBA will be sending out a designer survey to assess design resource needs. This will be sent out in the next few days and remain open for about 2 week. Attendees were asked to forward the survey to their colleagues if they receive so that a larger number of responses from varying levels of experience are received.

c. FHWA Update – Dayi Wang, FHWA Steel Specialist

Dayi did not attend and was unable to provide an update.

d. TRB AKB20 (Steel Bridges Committee) Update – Jamie Farris

Jamie was unable to attend, however she provided a presentation with voice over. Reviewed TRB committee and upcoming webinars. See presentation in TG 13 Analysis of Steel Bridges – Meeting Presentations.

e. AASHTO Bridge Update (T-14 Structural Steel Design) – Tony Ream

Tony provided an update on AASHTO and T14 meetings. The next AASHTO Meeting will be in Kansas City, MO May 22 – 25, 2023. He also went over the new documents that were release by AASHTO in 2020, and various approved ballot items. See presentation in TG 13 Analysis of Steel Bridges – Meeting Presentations.

3. “Parametric Paradigms Improving Bridge Analysis Workflows” – Michael Roberts of HDR (1:25 PM – 2:10 PM)

Provided context by reviewing building design. Overview of software use. Discussed interoperability and concluded with a demo.

4. G13.2 Guidelines for Steel Truss Bridge Analysis (2:10 PM – 2:30 PM)

a. Volunteers

Jerry Sova volunteered to review of section 2.3.1. Nick Cervo volunteered to review section 3.1.1. Brandon Chavel and Jeff Svatora volunteered to review section 3.3. Tony Ream volunteered to finalize section 4.5.3 and incorporate comments. Daniel Baxter and Sri Kotha volunteer to review the sections when Tony is done.

b. Schedule

The document currently stands at 90% complete. Deanna would like to provide an early copy to AASHTO T14 sometime in November. This will not be a ballot consideration until next year.

5. Software Validation and Checking Complex Models (2:30 PM – 3:00 PM)

a. Progress update

Continuation of conversation from St. Louis meeting. End goal is more transparency in what various software products are doing internally. The task group will develop

a survey which will be issued via Modern Steel Construction similar to a recent survey of building related software. See draft located in TG 13 Analysis of Steel Bridges – Draft Software Survey.

b. Volunteers

6. Adjourn

TG 14 Field Repairs and Retrofits

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: Devin Altman - NSBA

The Meeting began with a welcome to attendees, the agenda was shown to the group, the reading of the AISC Antitrust Policy and Meeting Code of Conduct. Introductions were made for all of those in attendance. Meeting minutes were posted and approved from the previous Spring 2022 meeting in St. Louis. The mission of the task group was shown to the group along with the current initiatives G14.2 and G14.3. Today's meeting will primarily focus on G14.2 and the comments that were made for public review.

The first comment discussed was a general comment from MnDOT recommending adding a section on testing methods and potentially providing a matrix of when they are good/bad such as ICRI for NDT tech overview for reinforced concrete. Jason Lloyd and Heather Gilmer discussed that the recommendation was a good one, however, the document can hold up well without it and to potentially add this to a future edition of G14.2 rather than hold up the publication and delay it further. MnDOT clarified that the comment was for the recommendation was for post-repair/retrofit testing. The group came to consensus that this is covered throughout, and this comment would be tabled for the time being.

The second comment was under section 2.1.4.2 Owner Inspector (OI) Qualification to add verbiage "When welding is involved, the OI should be a CWI" and essentially put the qualification point into the guideline document. The group agreed that this should be added.

The third comment discussed was under 2.1.5 Quality Control to consider mentioning QA in a section following QC. It should note that the OI is the QA. The group agreed that this should be clarified and perhaps to put this in the definitions section. Jon Stratton brought up an affiliated comment that OI can have a different abbreviation. QA will be noted that it may be called for the owner's procedure.

The next comments discussed were section 2.2 Considerations for Riveted Construction, of which there were two. The comments were both related but recommended to remove a large portion of the last paragraph. Jason Lloyd recommended if we remove this portion of the paragraph, we should do so a little further down because the intent was to let engineers know about hot dipped rivets. The discussion of high-strength bolts being slip-critical seemed to

confuse many of the readers. If this was simplified to state that these should be bearing type connections rather than mentioning slip-critical and high-strength bolts. Jason discussed he was thinking when he wrote this that all the rivets would be removed but one of the commentors was thinking that only some of the rivets could be removed instead. Jason recommended we put this language in that was discussed into the paragraph along with the deletion of the last portion of the paragraph. Jason asked whether we should add something about jacking the connection to the paragraph for the recommendation to take the stress of the dead load out of the connection before the new fasteners are added and take this load when they are pretensioned. Larry voiced whether we should provide the recommendation or leave it up to the engineer. Eric thought we should state it should be a bearing type connection per AASHTO LRFD BDS and leave it at that. Some of the challenges of designing slip-critical connections will be discussed in the paragraph along with clarifying a partial replacement vs a full replacement of rivets. There will be a note that if all rivets are replaced that DL will be transferred, potentially not if only some are replaced, and the discussion related to jacking to reintroduce DL into the replaced high-strength bolts. The paragraph will also note that bolts should be pretensioned regardless of whether designing for slip or not. The group agreed and moved on to the next comment.

The next comment discussed amongst the group was under section 2.4 Field Considerations and that the majority of the section on welding reads like a primer on bridge welding in general and seems a bit overbroad for a document particularly about field repairs and retrofits. Consider reducing the scope of the section to include only information directly applicable to field welding. The group discussed and seemed most could go either way, and Frank Artmont mentioned that he provided that comment and that he was fine leaving it as-is because he was unaware that the section had already been reduced. Jon Stratton said that Frank's comment would be addressed, and he would steward this section as he has been doing so.

The next discussion item was whether we should remove "Fracture Critical" and replace it with the new Nonredundant Steel Tension Member (NSTM) terminology introduced by FHWA. Heather thought we could not get rid of the term because of AWS D1.5 Clause 12 and that many of the various bridge codes and specifications use this term. Brandon proposed we put in the new terminology and put in parentheses about fracture critical. The group seemed to agree and both terms will be shown for clarity.

The next comment pertained to section 2.4.2.5 Inspection Processes and why should RT be limited when the structure is under live load. The proposed resolution was to explain and if this is a safety concern, rather than mention this and say radiation must be mitigated for safety concerns due to the duration of exposure. The RT takes a while for exposure to fully develop. The group came to consensus to delete the sentence to explain why this is. Safety for nearby

motorists and duration of image time due to the vibration of the structure under moving loads because it was questioned if this was true all the time or not.

The next comment discussed amongst the TG pertained to section 3.2 Options to Address Section Loss and specifically that the plating is limited to bolting to the existing member and if this was correct or can plating be performed by welding as well? Russell went on to discuss a specific case where there was a conflict for bolting or suppose if there were time sensitive issues for the project. Clarity could be provided that if bolting is primarily used to indicate there are other means and methods that are available. Brandon mentioned that in Ohio he has welded to the existing compression flange or the girder web. Russell also mentioned that in NYC this is also common to field weld for projects. Jihshya voiced that bolting is preferred by MnDOT due to deformation that can occur from welding. Brian voiced that his comment was because it seems the paragraph's intent is that bolting is the only option. More discussion commenced within the group on the subject. Brian suggested we change "bolted" to "connected" and the group seemed to like this small change. It was agreed upon and the group moved on. There was some concern that other parts of the section no longer made sense such as to remove additional capacity sentence, and it was agreed to remove the last portion of that sentence.

The next comment pertained to section 3.2.1.1 Bent Plate and the group read the entire highlighted paragraph and then discussed the two comments. The first was the bending radius of 5t or 2t can be used, per the AASHTO LRFD Bridge Construction Specifications, 4th edition. 11.4.3.3.2 – Cold Bending. AASHTO T14 is working on this, and this guideline should be consistent with the new specs. The proposed resolution is to make adequate revisions to match T14's changes. Heather discussed the current T14 philosophy and what they are trying to convey to the community which is primarily the 5t except for connection plates. The use of 2t from the older guidance seems to contradict the current AASHTO requirements. Can we recommend deviating from the current guidance? Jihshya said that MnDOT prefers the guidance of AASHTO and the 5t, however, Betty from MnDOT pointed out that the existing could be 2t and that it should still be repaired even though it is less than the current limit recommendation. It was decided that the 5t limit would be noted to apply to new construction. More discussion ensued if this made it better as far as a guideline document is concerned. Jason proposed we keep it as-is with the new construction piece pertaining to 5t. No one was opposed and the group moved on to the next item.

The next comment pertained to section 3.3.2.1 Welded Partial Replacement that "if the type of steel is not known for historic structures, minor material sampling and chemical analysis may be required before welding." However, the steel at the sampling location may not be the same steel at the field welding location. In many of MnDOT steel bridges used several different

steels. When it's painted, one would not be able to know the steel material grade if design or shop drawings are not available anymore. In some bridges the flange steel is different from the web steel, especially for built-up members. There for some additional wording is needed to address issue. A reference will be added to the section on the matter (field welding to existing steel structures 1998 and 2003 by AISC David Ricker to 2.4.2.5.1). Also add caution based on Jihshya's comment.

The next comment pertained to section 3.3.3.3 Repair and Retrofit of Pin and Hanger; it was Doug who made the comment that we should discuss. It was discussed briefly in the group and proposed to call the "reduced diameter" as a "step down" instead. The group briefly adjourned for a 10-minute break.

After the break was over the next comment discussed amongst the group pertained to section 4.5 Addition of Bracing to Increase Lateral-Torsional Buckling Capacity. Nick discussed his comment in further detail and provided some additional clarification for the current design code standard practice. Much of the discussion on the LTB resistance fails to mention that the deck can be considered braced only when the shear connectors are present, or when the deck encases the top flanges. Nick points out that this isn't entirely true, there are methods for partial composite action to take place. He would like to add something here to address this. Russell discussed the composite comment. Eric pointed out that there are two separate items, and they should be treated as such, the first is whether it is braced or not, and the second is whether it is composite or not. He went on further to discuss the load rating manual (AASHTO MBE) said that the top flange is composite if the top flange is encased in concrete. Russell and Eric discussed further when the deck cracks, DeAnna said we should be careful to differentiate between analysis (modeling moments, shears, stresses, etc.) and capacity (the code, i.e., AASHTO LRFD BDS). Nick thinks we should provide some guidance. Eric wanted to provide some caution for LTB at the negative moment regions that are now in the code 9th edition (the moment gradient factor) can make the load ratings go down and control considerably for bridges that need to be load posted. Kyle brought back to the group; how should we address this comment? Nick proposed a sentence to satisfy the owner side and MnDOT. Eric recommended we mention the MBE section 6.9.3 and the condition affects the level of restraint when there are no shear studs present. The group was satisfied, and it was approved with this change.

The next comment pertained to section 5.2 Gouge Repairs Resulting from Impact "A minimum fairing slope of 2.5:1 is recommended for elements in compression. A minimum slope of 10:1 in the longitudinal direction is recommended for tension elements to improve the fatigue performance of the repair." The ratio of the 10:1 was questioned if this should be 5:1 instead. Jon Edwards mentioned that 10:1 is in AWS D1.5 The Bridge Welding Code Section 5.2.5 for the

limit in the fabrication shop. Jason read aloud G14.1 which conveys the 2.5:1 ratio limit and then the practical 5:1 and then as a conservative limit providing 10:1 is preferred where practical. It was proposed to reference G14.1 section 4.3.1. The group reached consensus and moved on to the next item.

The next comment pertained to section 5.6 Clearance Modifications showing haunched girder repair details to provide the necessary clearance below to prevent impact damage. The group thought it was an interesting detail but were also concerned with the load distribution or redistribution of the bridge and whether we should be recommending this detail or not. No one has any details or photos of something like this. Is this cheaper than regrading the roadway below? It was proposed to table this for a future edition of the guideline document unless someone has a specific case study. The group agreed and moved on to the next agenda item. The next comment pertained to the same section as the previous item, specifically Figure 5-16 Examples of Steel Pedestals Under Bearings. Josh voiced he likes it as is but wanted to hear from others if they attempt to keep the bearings the same as much as possible. Jihshya went on to discuss MnDOT's process and trying to replace them similarly as far as restraint but not necessarily the same type of bearing exactly. The rocker bearings are a point of concern since they are not typically used anymore in new construction due to maintenance and serviceability issues. Brian proposed showing a more generic concept sketch rather than the drawing detail with a large degree of specificity that could lead engineers to use the detail as shown without modern bearing details and specifications. Jihshya voiced that MnDOT typically replaces rocker bearings with elastomeric bearings. In the same section it was decided to add text that the pedestal can be welded or bolted in Figure 5-17. For future considerations G14.2 guideline should provide some guidance on the minimum shim thickness and steel grade recommendation. The detail source file was brought up that every detail provided within the document needs to be drawn in CAD for future reference and modification. This will be brought up at the main committee for further clarification. Later it was determined that a high resolution jpeg file may be substituted for a CAD detail where applicable.

The next comment pertained to section 6.2 Anchor Rods Figure 6-1 (which shows example details of a guide block), do these guide blocks with embedded plates provide a durable solution? It does not seem to be easily replaceable. Eric mentioned that this is a common detail for seismic prone design regions, and Brian brought up that it is difficult to replace as shown. Nick mentioned that this is also common for MnDOT and he could pull some details that are similar to the one shown which also have galvanized plates and are not stainless. Josh and Eric agreed that we could show something more generic and simpler and add a statement that sometimes more modifications may occur for more elaborate situations. The group seemed to be content with this recommendation.

The next comment pertained to section 7.1.2.2.2 Sweep and Middle Ordinate; Brian disagreed with checking curved girders as the bridge erection sequence progresses. The theoretical line and elevation of a partially completed structure is not given on the design drawings so not exactly sure how it can be checked. The geometry of a curved bridge is probably “wrong” until the steel is erected. Jihshya discussed this further with Jon Stratton in more detail. Jon wanted to step back and look at why we wrote this section the way that we did, and that this generic overview is meant to get the engineer/fabricator/erector/owner to think about these items up front initially and not provide detailed guidance on how to mitigate field issues. Heather and Jon Stratton both brought up where we are in the document which indicates something is wrong, and this is what we need to ask for next. This is typically addressed at the contractor level, but this could be sent to the engineer level. Much discussion ensued on this, and time ran past the noon hour end of the meeting duration. This section will be looked at again by Jon Stratton and Heather. The meeting was adjourned. The next meeting will be in a few weeks and Kyle will send out a poll followed by a meeting invite.

TG 16 Orthotropic Deck Panels

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

1. Meeting started at approximately 3:15pm.
2. Last meeting minutes were approved without discussion.
3. General Updates and Announcements
 - a. Karl Frank said he was at the Throgs Neck Bridge and said there was an issue with butt welds between OSD panels. He said that there was a very tight tolerance on butt joint fit up of about 10% of the deck plate thickness, which seems overly cautious. A larger tolerance of about 15% would be more workable and shouldn't cause fatigue issues.
 - b. Michael Roberts gave an update on a presentation he gave internally at HDR on orthotropic decks.
4. Discussion on State of Practice Synthesis Document
 - a. Frank and Jeff will work with Sougata to set up a meeting schedule to get the document moving forward again. This approach has been successful in other task groups.
 - b. Karl suggested that we reach out to Thorton Thomasetti as he said they are doing a lot of these designs and should be involved. Karl said he would help us find the right contact at TT.
5. Short Span Orthotropic Update (SSSBA) collaboration update
 - a. Duncan said that they proposed orthotropic deck systems to Wyoming for their bundled bridge project. WyDOT said no thanks. Jeff will reach out to them (with Duncan Patterson) to inquire as to why.
 - b. The group brainstormed ideas to develop an economical design for rural road orthotropic deck solutions. One problem is the wearing surface, and another is the crash tested guard rail.
 - c. Can we put out an RFP for a research process for a group to come up with this simple design that would include the guard rail system?
 - d. Frank said that it's possible there is FHWA funding to move this forward (as an optional task of the contract for producing the FHWA Guide for Standard Design of Orthotropic Steel Decks), but there needs to be an owner who wants to build

a prototype project. Dan Snyder is going to bring this up at an SSSBA meeting. Duncan Paterson said he would help introduce and discuss this project.

- e. Michael Roberts from HDR said that the Oregon DOT has a good example very close to their office that was built in 1967 and is still in good condition. Michael said Devin Altman was at these meetings as well. Can we consider working with Alex Lim to write an article on this bridge? Michael will reach out to Alex Lim about this bridge.
 - f. Jeff will work with Duncan to search NBI data for short span orthotropic deck bridges to get some statistics.
 - g. Karl Frank said he is going to talk to some contacts he knows at a cable guide rail system company to see if it can be put on a bridge.
 - h. Frank said he will check on the status of the FHWA Guide for Standard Design of Orthotropic Steel Decks.
 - i. The group discussed trying to talk to grid deck fabricators as maybe they would be interested in production of short span orthotropic decks.
6. Meeting adjourned at 4:45pm

TG 17 Steel Castings

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: Devin Altman - NSBA

The meeting began with the chairperson's welcome to all attendees. This was followed by introductions for those who were present and the reading aloud of the AISC Antitrust Policy and Meeting Code of Conduct. Meeting Minutes from the spring 2022 meeting were approved with no objections.

Jennifer went over the guideline specification that she shared with the group last week (10/05/2022). The goal of this meeting is to go through the guideline specifications and comments meant to improve the document. The mission statement of TG 17 Steel Castings was read aloud to those present before the review of the guideline document commenced. The group spent time reading through the guideline document that Jennifer provided. Jennifer then shared her screen with the group over the virtual zoom meeting to go through specifics of the guideline document.

Ronnie asked about the two different types of castings being utilized, such as nodes at connections and cable clevises used on tied arches. Jennifer clarified this was for castings in place of steel bridge fabrication components and pieces. Jason suggested the title of the document should be "Steel Engineered Castings for Bridges" rather than "Steel Castings for Bridges." The title of the document will be considered to the change of "Custom Steel Castings for Bridges." Jon brought up a recent project with Jennifer that allowed for clevis castings to be used on a steel bridge design that alleviated the effort of full penetration welds that could have been very cumbersome and costly, however, the designer had a hard time understanding the concept and being comfortable with this alternative option. Ronnie brought up trying to understand who the casting engineer works for whether it is the steel fabricator, the contractor, or the designer. Discussion took place on this and that it could be any of the parties that the casting engineer be a subcontractor to, but typically, it would be the steel bridge fabricator or the steel bridge erector. Ronnie brought up that the steel casting engineer and product manufacturer is similar to the MSE wall proprietary business model in our industry. More similar discussion took place for several minutes amongst the group.

Jon Stratton showed some generic plans that call out a steel casting in-place of adjoining members being heavily CJP welded which can lead to deformations and warpage. Karl, Carlos, and Ronnie discussed that the engineer of record needs to show the casting on their steel bridge drawings as an option for consideration on projects. Karl voiced that tubular members could be a huge benefit in conjunction with steel castings for reduced member sizes, less weldments, and better fatigue and serviceability performance. Phil asked how it works in the building world for the workflow between the designer-casting engineer, and Jennifer explained that the casting engineers can provide the structural building engineer the stiffness of a cast node to use in their modeling efforts upfront. Tony agreed with Carlos and Karl that trying to provide the castings for the project initially rather than at the end of the project is in general more beneficial and cleaner.

Jihshya, Hana, Ronnie, and Carlos discussed further the owner's perspective with regard to the inspection and approval. There are 3 potential workflows, the first would be an optional callout in the final bridge plans, it could also be called out specifically in the plans without the option, or lastly it could be value engineered after the final design based on the tonnage savings, reduced loads, better fatigue, increased serviceability, etc. Ken mentioned his experience with the foundry that they typically contracted with the contractor who provided them with detailed design plans and specifications to which the foundry manufactured the steel castings. Jason voiced that we should just write the guideline specifications with one contract type in mind instead of going through all the what if scenarios. Karl thought this was very important to distinguish in the document. Jihshya voiced providing flowcharts in the appendix of the guideline document to provide further clarity for the typical process over time for the various bridge contract types utilized in the United States of America. Jennifer will provide in the preface what type of steel castings the guideline document covers. The general contractor entity will be defined in the glossary for further information pertaining to the flowcharts. Larry voiced harmonizing the AISC Code of Standard Practice because the structural engineer of record and other definitions are within that document. This was voiced in response to Jon questioning if the structural engineer of record needed to be in the glossary. It will remain there for now, but revisions will be considered in the future if deemed necessary. More detailed review of the guideline document took place for the remaining duration of the meeting.

TG 18 Duplex Stainless Steel

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

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.](#)

Minutes were approved. No objections or comments.

Jason gave a brief overview of TG 18's mission and general description of duplex stainless steel. Duplex SS provides excellent corrosion resistance in severe environments, maintaining a silvery finish. Duplex SS is less costly than other stainless steels that provide similar strength and corrosion resistance due to its lower content of nickel. Nickel is the high cost element of stainless steels.

It was suggested to have a fabricator who has fabricated a duplex SS bridge to come present at our next collaboration meeting. Mariani Metal fabricated the duplex SS Garrison Crossing pedestrian bridge in Canada. Gary Coates will get in touch with Mariani Metal to see if they would be willing to come to the next TG18 meeting.

AWS D1.6 covers stainless steel welding, but is missing many key factors that are critical to welding duplex SS. Specifications for welding duplex SS, including bridges, are needed.

2. Duplex SS Materials Specification (8:10 AM - 9:10 AM)
 - a. Discussion of second draft specification (Jason)
 - Separate specifications will be developed for plates and laser welded structural shapes.

- This second draft of the materials specification was revised based on discussions during an interim virtual call a couple months ago. Made changes regarding welding, coil, and references to ASTM A480.
- Heat treatment and finish need to be specifically identified in this specification. Discussion was had about removing heat treatment and finish from the Ordering section of this specification. Instead, a purchaser would refer to this materials specification, rather than stating it specifically on an order.
- Weld repairs to base metal may stick-out aesthetically? This was discussed, and agreed it could be a possibility, but not likely.
- The current edition of the materials specification allows weld repairs for non-FC members, but does not allow them for FC members. It is currently proposed that for FC members the steel will have to be heat-treated after the repair. There was discussion about not allowing any weld repairs to base metal since it would remove the distinction between FC and non-FC members. Discussions will be had with the SS plate suppliers to see how often weld repairs are made to the base metal.
- Ferrite content requirements added. This is important for weldability.
- Required impact resistance values need to be explained in commentary for clarity. Consider using a test temperature of -40 F instead of -60 F. Most seemed to agree with this. A minimum CVN test value of 70 ft-lbs at -40 F was recommended. Ted Bush confirmed that duplex SS plate producers can achieve this value.
- Finish requirements – this needs to be more prescriptive? Likely so, but this needs to be discussed/developed further. Pickling/blasting required? Appears so. Simplify this section to No. 1 finish? Incorporate some of the existing commentary into the specifications. Remove cold-rolled?

3. Duplex SS Design Specification (9:10 AM - 10:10 AM) (Nancy)

- Recommend that it be a supplemental guide specification separate to AASHTO section 6.
- An introduction will be added which gives guidance on when it will be cost-effective to use duplex SS for bridge structures (i.e. when weathering steel cannot provide sufficient durability and traditionally prestressed concrete beams have been the only solution)
- Duplex SS mechanical properties are different to carbon steel regarding a defined yield point and strain hardening. Thus, buckling behavior of compression members is different.

- Karl Frank suggested not to worry about addressing AASHTO Section 6 Appendices for duplex SS, as these are not used very often at all. Karl suggested focusing on flexural members for the 1st edition of this design specification. Ted Bush suggested to include tension and compression members for cross frames and diaphragms. All agreed.
- HSS not planned to be included in the 1st edition of this specification. They should be considered for a 2nd edition since duplex SS could be used for trusses, which could be common for aesthetics. Tapered sections should be included since they are commonly used for haunched girders. Cover plates should not be included since they are not used anymore.
- Karl Frank suggested focusing this 1st edition of the specification on beam/girder bridge types (typically 95% steel bridges) , otherwise it will get too complicated/involved. Once SS is readily used in bridges, then expand the SS design specification to cover arches/trusses/etc.
- Involve Mike Grubb, Karl Frank & HDR (Ted Bush and Dominic Coletti) to review the draft design specification.
- Consider using an existing NHI or Steel Bridge Design Handbook bridge design example, and replicate it with duplex SS. That way engineers will be able to get more familiar and comfortable with the duplex SS bridge design process.
- Currently working on SS shear stud testing behavior verification. Karl Frank pointed out that shear connector spacing is governed by fatigue.
- Slip coefficients for bolted connections need to be determined/verified for duplex SS. This can largely be done though the current AISC 370 specifications. Blast media and pickling process need to be worked through. Does pickling affect slip coefficient? Probably not, but will investigate. Pickling can be applied by dipping or spraying.

4. Break (10:10 AM - 10:25 AM)

5. Duplex SS Welding Specification (10:25 AM - Noon)

a. Presentation on laser welding of duplex stainless steel shapes

Mattia Del Giacco from Stainless Structural presented on laser welding of duplex SS shapes (angles, channels, beams). This laser welding process appears to be a proven technology used in Europe for quite some time. It appears to be high quality and competitive in cost compared to hot-rolling and extrusion processes. Nancy Baddoo and SCI are developing a program of fatigue testing of laser welded shapes. Laser

welding has a relatively small HAZ so the strength and corrosion effects of welding on the microstructure are relatively small compared to traditional SS welding. Can weld up to 1.5" thickness. Stainless Structurals are the only shape producer in USA for duplex SS. Duplex SS material cost appears to be not significantly more than ASTM A709-50CR, and if so, this appears to be good as it is overall a superior product than 50CR. Stainless Structurals can weld beams with a maximum length of 60 feet and can cut holes in the beams if needed for bolted connections.

b. Discussion on first draft specification (Stan Gingrich)

- Stan gave an overview of this first draft welding specification.
- Discussed iron contamination of welds and consequences. Should not be an issue according to Stan. However, this specification will need to identify iron contamination, what is cause for potential rejection, and plan to rectify. Could use commentary to provide recommendations for an iron contamination prevention and remediation plan, but probably should not specify one to allow fabricators freedom to do it as they see fit.
- 2205 SS is approximately 65% iron.
- Smoothness/cleanliness requirements of joint surfaces to be welded need to be defined.
- Acceptable preheat temperatures need to be defined. Consider preheat requirements to drive out moisture, but also consider current SS industry practices.
- Will ferrite content testing occur in production welds or just in PQR testing? If during production welds, need to develop specifications for repairing areas which do not pass ferrite content requirements.
- Ted Bush will speak with DOT engineers and fabricators about whether the most appropriate way of writing the duplex SS weld spec is as a draft new chapter of AWS D1.5. It was agreed that a standalone chapter is better than trying to combine it with the draft chapter for 50CR because there are many differences between welding the two different stainless steel alloys.

Overall, all these specifications need to be as such to prevent major problems that would cause rejection of fabricated steel assemblies. Be specific in specifications when required. Develop a strong commentary when specifications are general.

6. Adjourn

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

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

Secretary: John Hastings - NSBA

The Task Group addressed comments received during recent review of new “Guidelines for Steel Bent Caps” document. See table below.

Comment Number	Section Number	Section Name	Page Number	Line Number	Comment	Proposed Resolution (Optional)	Classification (Optional)	Response	Status
1	3.9.b	Global Longitudinal Stability		1046-1050	"The 6' vertical offset from the CG of the truck to the top of deck should not be included as an eccentricity when calculating torsion in a bent cap. Individual trucks are not all connected as a single rigid body... each truck acts independently. The eccentricity of the braking force from the CG of the truck to the top of deck manifests itself as a force couple between the front and rear axles of the truck. Each truck has these force couples and they tend to offset each other along the length of a given span. Similarly, the depth of the superstructure should not be considered an eccentricity that directly contributes to the torsional moment in the bent cap, especially in a multi-span continuous superstructure supported by a single line of bearings on the straddle bent cap. The overturning moment caused by the eccentricity between top of deck and bearings tends to produce a force couple between adjacent supports (adjacent bents) rather than producing a torsional moment in the bent cap.	Domenic is correct, update to remove 6' above deck surface	Substantive		
2	5.2	Tolerances		1827-1830		Work with Heather to get tolerance in fabrication spec and reference in this document. Possible locate them in this document until they can be moved to fab spec. Reach out to fabricators to confirm tolerances. High Steel and W&W confirmed numbers. Possibly add detail to clarify	Substantive		
3	5.2	Tolerances		1840-1848	What causes a torsional moment in the bent cap is the longitudinal shear applied at the superstructure bearings, multiplied by the eccentricity to the bent cap supports."		Substantive		
4	2.3	Bent Cap and Longitudinal Girder Framing Options	19	546	Discuss appropriate camber tolerance. Bob suggests: For transverse, single-span caps, camber variance should not exceed +3/4", -1/8" from theoretical value; camber for continuous multi-column or cantilevered steel bent caps should not exceed +3/8", -1/8". Conventional girder span cambers do vary +3/4", -1/8" for		Editorial	Revise as stated.	Done

Comment Number	Section Number	Section Name	Page Number	Line Number	Comment	Proposed Resolution (Optional)	Classification (Optional)	Response	Status
					shorter spans, and up to about +1 ½", - 1/4" for spans exceeding 150 ft.				
5					From Brian Witte, confirm bearing tolerance matches bearing document. Bob suggests: Traditional bearing point tolerances are +/- 1/8 inch (3 mm) for plan and elevation. Note that substructure tolerances, survey accuracy, and complex geometry associated with steel bent cap assemblies can lead to bearing points varying up to +/-1/4 inch for plan and elevation, even after adjusting for thermal effects (beyond that alignment level, cross-frame and integral bent cap moment connection alignment becomes difficult).		Substantive		
6	4.8	Drainage and Ventilation	59	1789	Replace with "Figure 2.3-1: Integral Connection Detail"	change to recommend a drainage hole.	Substantive		
7	2.3	BENT CAP AND LONGITUDINAL GIRDER FRAMING OPTIONS	19 OF 71	518	The FHWA made a final ruling on 05/06/2022 to address MAP-21 requirements. New ruling changes notation "Fracture Critical Member (FCM) to Nonredundant Steel Tension Member (NSTM)."	Miscellaneous Resolution	Editorial	Revise as stated.	Done
8	3.5	LOADS	28 OF 71	787	As an owner, drain holes would be considered in members with sealed doors. If door deteriorates and seal is broke water could still exit the box. Perhaps remove the example sentence?		Editorial	Revise as stated.	Done
9	3.7	FATIGUE AND FRACTURE DESIGN AND DETAILS	31 OF 71	883	The sentence states "They differ of relative elevation of the steel cap beam..."; it should be "They differ in relative elevation of the steel cap beam...".	Update drawing to correct FCM and add note. Not intended to show every configuration. Use different hatching in different areas or just use shading. No concrete on top of cap, studs shouldn't be used.	Substantive		
10	3.10	FIT CONDITIONS	39 OF 71	1126	Note that Seismic Loads must be considered in some locations.	Remove comment.	Substantive		
11	4.2	BOX CORNER FABRICATION	52 OF 71	1584	Perhaps I am not understanding it properly, but I think that Figure 3.7-3 is very confusing. Is the member shown in elevation the cap beam? Is it being supported by the two interior bearings? Is it supporting the two exterior longitudinal girders? If so, it is a two-span continuous member with two cantilevers. Therefore,		Editorial	Revise as stated.	Done

Comment Number	Section Number	Section Name	Page Number	Line Number	Comment	Proposed Resolution (Optional)	Classification (Optional)	Response	Status
					the bottom flange might be in tension between the two bearings, and if so, is an FCM. Also, if the top flange is an FCM, it must be in tension, so why is only the bottom of the web the FCM? The bottom of the web is hatched, which the legend in the figure states is the FCM portion of the web. Please revisit this figure.				
12	4.2	BOX CORNER FABRICATION	53 OF 71	1619	It is stated that "For the connection of longitudinal girders to an integral steel bent cap (beam), assume a no-load fit." Why? What if the longitudinal girder connects to the mid-span point of the bent cap? Please explain. The next sentence seems to contradict the one in question.	Remove coated and preferred and show dimension.	Substantive		
13	4.6	BEARINGS	56 OF 71	1689	Add the sentence "Backer bars that are to remain must be fabricated with full-penetraton groove welds, so that they are continuous for the entire length of the box girder cap beam."		Editorial		
14	4.6	BEARINGS	56 OF 71	1710	In Figure 4.3-1, remove the word "COATED".		Editorial		
15	5.4	FABRICATION	65 OF 71	1904	In the phrase "masonry plates", the word "masonry" should be in quotation marks, and followed by (i.e., bottom steel plate below Elastomer or reinforced Elastomer).		Editorial	Added, alog with a reference to section 4.2	Done
16					After "base plate" , add ("masonry plate").	Save for small group seismic discussion. Jason Bring up general awareness of it. Work with Jerry on"bumpers??"	Substantive		
17					Should the following sentence be added: "For the fabrication of the third and fourth side of a welded box section cap beam, consideration should be given to being able to install the weld from the outside of the box; backer bars help to permit fabrication from the box exterior."?	Save for small group seismic discussion.	Substantive		
18					"It's a good comment related to capacity protection of the straddle bent. Depending on the accelerations and/or the length of the straddle bent, lateral loads could be quite large. The document seems to address this a bit. Having floating bearings sounds like a good idea,	update, Non redundant steel tension member	Substantive		

Comment Number	Section Number	Section Name	Page Number	Line Number	Comment	Proposed Resolution (Optional)	Classification (Optional)	Response	Status
					but that would likely result in much larger tributary lengths than intended. I can't say I've designed several straddle bents, in the few I've been a part of, there's always been at least 1 direction of fixity at one of the bearings.				
19							Substantive		
20					It doesn't look like there anything in the document related to seismic analysis requirements? In my opinion, straddle bent caps likely shouldn't be considered "regular", especially if there are unequal distances to each column? It may also be a good idea to mention different b/t limits in the AASHTO Seismic Guide specs compared with LRFD if the element is in the seismic load path."		Editorial	Revise as stated.	Done
21					"One concern with having a steel bent cap on bearings on a concrete (or steel) pedestal is required support lengths for the pedestal. These can become very large, which may end up defeating the purpose of using the straddle bent to begin with (space constraints). Shear keys, bumpers, or cable restrainers could be added to avoid excessive support lengths. Another option would be to include a damping device or isolation bearing to control the movement.	Ask Justin for proposed language.	Editorial		
22	2.3 and 3.17	Bent Cap and Longitudinal Framing Options vs. Evaluation of Existing Structures	8 and 36	538-539 and 1540 -1551		Coordinate the 2 sections. Maybe clarify the difference between I beams and box girders? Sketches from DG 9 Below for reference and discussion. Leave as is.	Substantive		
23	3.6	Geometry and Proportions	14	761-762	Another concern may be capacity protection of the straddle bent itself, if fixed connections are used. The guide already states to use pinned connections, but it may be worthwhile to add this as another reason for doing so."	Clarify whether it is the span length of the adjacent longitudinal girder spans or the length in between supports of the bent cap	Substantive		
24		Skew Effects	15	808	"1)	Clarify that it is the effect from the bending moments of the longitudinal girders on the bent cap (or otherwise)	Editorial	Revise as stated.	Done
25		Global Transverse Stability	22	1015	"2)	For Steel Bent Caps on Single Columns. Are the bolts that connect the bent cap to the column "figuratively" the same as FCM's -	Substantive		

Comment Number	Section Number	Section Name	Page Number	Line Number	Comment	Proposed Resolution (Optional)	Classification (Optional)	Response	Status
						where one bolt failure could lead to collapse. It might not be critical in warm weather states but in states where salt is used, the concrete and bolts may corrode. Should we point this out. For discussion. Where anchor rods provide stability consider redundancy in the number of anchor rods.			
26	3.9.e	Member and Local Stability	24	1101	"3)	Torsional Buckling - remove "stability"	Editorial	Revise as stated.	Done
27	3.13.1	Internal Diaphragms and Compression Plates	29	1252	"4)	Discuss with Russ and show him figure 4.5-2.	Editorial		
28	5.2	Fabrication and (Erection)	46	1834	Possible difference between Vertical Shear and Torsion vs. Flange Lateral Stresses and torsional theory as explained in AISC DG 9 - Lines 538-539 and 1540-1551. Not clear whether torsion causes lateral bending in the flange or additional stress due to warping. Also maybe both sections should mention additional shear forces on the web.	change "nearest" to "adjacent"	Editorial		
29	5.5	Fabrication and Erection	51	1942	the span length....	Updated language in document. Bob will get photos on 555.	Substantive		
30	5.5	Fabrication and Erection	51	1945	superstructure bending moment is partially restrained	during erection and wind loads	Editorial		
31	5.5	Fabrication and Erection	51	1959-1960	Stability Against Overturning	cross frame connections should not be torqued until....	Editorial		
32	5.5	Fabrication and Erection	51	1959-1960	minor editorial - Torsional Buckling Stability	clarify "lift with cranes "	Substantive		
33		Existing Literature	2	313	The girder splice plates can resist negative bending moments - aren't the plates in tension at the top of the girder? - Also previous lines in this section talk about fill plates for a positive connection to the top flange...this section says not necessary	Possibly add ...Some states include language in their Bridge Design manuals that FCM's such as box girders shall be avoided also acknowledge that in many situations, there are no good alternatives to their use due to highway geometry and vertical clearance restrictions	Editorial		
34		Bent Cap types	5	450	nearest longitudinal sections - editorial	This produces vertical loads that are applied at or near the horizontal center of the cap beam, reducing eccentricity on the cap beam.	Editorial		
35		Bent Cap types	10	590	"Rotating the beam cap" I am not sure how that is accomplished with a reasonable degree of safety...sounds like trying to balance it in an out of plumb condition - likely unstable or putting unknown loads on equipment	Single Girder Bent Cap - Non-Integral, Corbel Connection - Label Bottom Flange of Bent Cap	Editorial		

Comment Number	Section Number	Section Name	Page Number	Line Number	Comment	Proposed Resolution (Optional)	Classification (Optional)	Response	Status
36		Design, Analysis. Load rating	19	915	Minor Editorial - during erection and due to wind load	Figure 3.8-1 - Add IRM to photo description	Editorial		
37	4.1.1	Preferred Details	38	1564	-cross-frame connections should be left snug - comment could be more specific	Mention that the stacked configuration is much easier to fit-up and erect in the field	Editorial		
38		Longitudinal Girder Connections	40		or lift with cranes - do we mean use a crane to maintain the geometry on the longitudinal girders	Clarify	Editorial	Has been revised to flange continuity plate.	
39	Task Group Member Lists		iv		some states that appear to prohibit box girders actually have several in their inventory		Editorial		
40	1.2	Nomenclature	1	275	Editorial - vertical is used 3 times in one sentence - one of the verticals should be horizontal and one eliminated		Editorial		
41	1.4	Existing literature	2	311	Figure 2.3-3 Clarify Photo		Editorial		
42	1.4	Existing literature	3	352	Figure 3.8-1 - description	Make applicable updates throughout entire document	Substantive		
43	2.1	Selection Criteria	4	375-398	Mention that the stacked configuration is much easier to fit-up and erect in the field		Editorial		
44	2.1	Selection Criteria	4	408-416	Figure 4.5-2 Doubler Plate - is arrow pointing to the correct plate? ...It's usually an additional web plate		Editorial		
45	2.2	Bent Cap Types	5	419-	Review member list and confirm company information is accurate		Editorial		
46	2.2	Bent Cap Types	5	432	Update to nonredundant steel tension member to follow latest FHWA guidance?		Editorial		
47	2.2	Bent Cap Types	5	440	Define all acronyms. Example HPS on page 14 needs defined.		Editorial		
48	2.2	Bent Cap Types	5	460	Add info. from FHWA 2022 memo regarding Nonredundant Steel Tensions members.		Editorial		
49	2.2	Bent Cap Types	6	480	Consider adding a figure or two to visually show what the text is stating		Editorial		
50	2.3	Bent Cap and Long. Framing Options	7	517-520	Consider putting this example in table format to reduce the amount of text.		Editorial		
51	2.3	Bent Cap and Long. Framing Options	8	538-542	Add figure to show hammerhead cap and columns. This section has a lot of text and would benefit from figures, tables, and/or bullet list to reduce the amount of text.		Editorial		
52	2.3	Bent Cap and Long. Framing Options	8	Figure 2.3.1	Figure to show multi-column configuration		Editorial		
53	2.3	Bent Cap and Long. Framing Options	9	Figure 2.3.2	Add figure depicting the integral and non-integral		Editorial		
54	2.3	Bent Cap and Long.	10	596-599	Why aren't the figures shown here. Place		Editorial		

Comment Number	Section Number	Section Name	Page Number	Line Number	Comment	Proposed Resolution (Optional)	Classification (Optional)	Response	Status
		Framing Options			figures here or move descriptions to section where figure is shown.				
55	3.1	Appropriate Levels and	10(2) There are two page tens	621-622	actual figure should immediately follow the paragraph that references the figure so the reader doesn't have to search for the figure. Typical comment for entire document	There are scenarios where a bridge may include a straddle bent and a refined analysis isn't necessary.	Substantive		
56	3.2	Bridge Stiffness Systems	10(2) There are two page tens	634	Delete. This information is covered in the following sections. Avoid repeating information in multiple sections (typical comment to apply to entire document)		Editorial		
57	3.2	Bridge Stiffness Systems	10(2) There are two page tens	639	Delete and move to the design section.		Editorial		
58	3.2	Bridge Stiffness Systems	10(2) There are two page tens	649	Label and point out terms used in text above: strap plates, tie plates, aligning long. girder bf with bent cap bf		Editorial		
59	3.2	Bridge Stiffness Systems	11	660	Label and identify components in this figure		Editorial	Revise as stated.	Done
60	3.7	Fatigue	15		Add sketch of both options		Editorial		
61				1122-1129	Is there a reference for this statement? Updated in document. The refined analysis may need to be.....		Editorial		
62		General			Make sure all references are consistent		Editorial		
63				352-353	insert the word 'to' between hammerhead and illustrate	Frank and Justin can update.	Editorial		
64				573	Should figure reference in this line be 3.2.1		Editorial		
65				780	Define k.		Editorial		
66				923-927	Update for new FHWA memo and terminology		Editorial	Revised per Ocel comment.	Done
67				1568-1570 and lines 1572-1574	Add the following sentence at the end of this paragraph: "The bearings may require lateral restraints for possible excessive lateral deflections during fit-up erection for highly curved and/or skewed bridges."		Editorial		
68			39-45		No references are listed for this document. It's unusual for such official document.		Editorial		
69				1625-1626	The FHWA Technical Memorandum "Clarification of Requirements for Fracture Critical Members" (2012) states that for design and fabrication, only Load Path Redundancy can be considered in		Editorial		

Comment Number	Section Number	Section Name	Page Number	Line Number	Comment	Proposed Resolution (Optional)	Classification (Optional)	Response	Status
					eliminating FCMs. - This document was rescinded on 05/09/2022. It was replaced by "Guidance for the approval of procedures for determining system or internal redundancy for steel tension members without load path redundancy".				
70				1688-1689	Consider changing the word "Class" to "Category". It's generally referred to as Fatigue Category. I've seen usage such as "this detail is classified as Category C". I know the terminology "Category" had been used in the early 2000s because Dexter repeated this word multiple times in a single class. This is a professional guideline, thus I think wording should follow the general usage and not create a new term.	Compare with G9.1 document	Editorial		
71				1698-1701	Used "Category E fatigue detail", which is in line with what's generally called. Probably several different people contributed to this writing.		Editorial		
72				1698-1701	Revisit "It is crucial to note that as of this writing, 2022, the FHWA does not yet offer relief from fracture-critical (FC) inspection requirements for IRMs." based on the new document issued on 05/09/2022.	Updated in document.	Substantive		
73				1844-1848	Lines 1568-1570 and lines 1572-1574 are the same material. Maybe one of them should be deleted.	No change, I think this was an internal question for MnDOT.	Editorial		
74				1859-1860	(odd number pages only, such as pages 39, 41, 43, etc) : "Chapter 5: Fabrication and Erection" was shown at the top of this page, while the main text is Chapter 4.		Editorial		
75				2009-2010	"Use of oversize holes should not be necessary; however, use of bolts that are 1" in diameter are helpful compared to smaller bolts because they offer more play". What does "more play" mean? More capacity? More tolerance? If you don't know what it means, then maybe it's beneficial to modify this word.	Updated in document.	Substantive		
76				2050 - 2052	HLMR bearings are typically designed and fabricated with both a base plate and masonry below and a load plate and sole		Substantive		

Comment Number	Section Number	Section Name	Page Number	Line Number	Comment	Proposed Resolution (Optional)	Classification (Optional)	Response	Status
					plate above. Do we call them "base plate" and "load plate"? DS Brown calls them "upper and lower bearing plate."				
77	1.1		13	269	Consider word change. Class C fatigue detail - Category C fatigue detail.	Define or find a different word. Updated in document. Also appears in G12.1	Substantive		
78	1.4		13	300	Class D and E fatigue detail - It's not just 4 inches, but also 12t, also depends on the plate thickness (less than 1.0" or equal to and more than 1.0"). See AASHTO LRFD 9th edition, Table 6.6.1.2.3-1, Section 7 - Longitudinally loaded welded attachments.	Rather than adding it, add the forthcoming AASHTO LRFD Steel Bridge Fabrication Specifications (supposed to be published this month).	Editorial		
79	1.4		15	352	At least one state specifies that "all steel required to be shop assembled for line camber and/or profile verification, ...shall be aligned so that the control points (bearing locations) are within +/- 1/8" from the locations shown on the approved shop drawings." Do we have this requirement?	Either take a look or pretend that you already passed too late a stage of document production to incorporate it...	Substantive		
80	2.1		16	412	One parenthesis is missing. Clarification for Figure 5.2-1. Is box girder in the figure the steel bent-cap? Since longitudinal girders can be box girders too, it may be helpful to clarify. Longitudinal girder is shown as perpendicular to the box girder.	If we can't make our point with realistic examples, delete this.	Substantive	Longitudinal concrete box beams do typically have voids. This example is for a concrete bent cap, which are typically solid.	No change.
81	2.2		17	422	"FCMs require that the inspector's eyes be no more than 4' from any portion of the member that is in tension." In the inspection training I had, the instructor stressed the word "hands-on." All the other document mentioned "arms-length", or "hands-on, close-up 360° inspection." etc. Can you check the 4' dimension or ask the committee to check this dimension? (I have never heard of it. I'm of the opinion to only get the correct information on an official document. If not	Add a figure.	Substantive	Look for example details and discuss with Jerry.	

Comment Number	Section Number	Section Name	Page Number	Line Number	Comment	Proposed Resolution (Optional)	Classification (Optional)	Response	Status
					sure, then don't mention that information.)				
82	2.2		17	431	"No fewer than two people should inspect the interior of a box girder; if possible, there should be a third inspection team member who will always remain outside of the box...." From the training I had, one person outside is mandated – it's not something nice to have, thus not "if possible". That outside person is never allowed to get inside (except for one or two limbs maybe).	Provide photos of real examples, and address which is preferable, either here or in the more detailed hammerhead section later--or don't mention the taper. I don't have a warm fuzzy feeling about tapered boxes.	Substantive	Look for example details and discuss with Jerry.	
83	2.2		17	464	What's a Contracting Engineer?	Consider deleting through "presently".	Substantive		
84	2.2		18	468	S2.1 is not on the "Further reading" list although the other docs in this paragraph are.	add figure reference	Substantive		
85	2.2		18	485	Big can of worms, but it sounds like there's been another memo getting rid of FC and adding NSTM and I believe defining SRMs and IRMs as well.	Compare the right thing to the right thing. Or frame it as "ok, it's easier than a box, but one should be aware that it is more difficult than typical I-girder erection". IF you do that, handle it in the paragraph beginning with line 489.	Substantive		
86	2.3		21	578	This does not seem like a fair comparison for the concrete. Box beams have voids.	add	Substantive		
87	2.3		22	590	Do you mean where the top of the column flares out to meet the "hammerhead"? That's not what I think of when I think "tapered".	Add a photo or iso view	Substantive		
88	3.2		25	655	Are tapered cap beams really a thing? I haven't see them. Are we encouraging such a thing? How about having more than one bearing, at different elevations, on a flared column?	say that but better than I did Update sentence and remove K's. Frank will update paragraph.	Substantive		
89	3.7		31	872	In the past, EVERYTHING was formed by riveting, including any I-shaped members too big to be made of rolled sections. Do you really need this?	Not sure what would be a good way to do it-without having an example in front of me. "All but the upper 4" of the web" maybe? Or delete the example.	Substantive		
90	3.8		33	902	I'm probably not the only reader who won't know what "multiple batten plates" are	Are 3-girder bents IRMs? Discuss	Substantive		
91	3.8		34	923	Fitup is more difficult than putting up stringer girders, but our point of comparison is box bents. How does that compare?	check it out and revise as needed	Substantive		
92	3.8		34	928	The bolster section desperately needs a	Reconsider the level of detail for various	Substantive		

Comment Number	Section Number	Section Name	Page Number	Line Number	Comment	Proposed Resolution (Optional)	Classification (Optional)	Response	Status
					figure	aspects of design			
93	3.12		42	1213	I'm having trouble telling what I'm looking at here.	Rewrite.	Substantive		
94	3.15		45	1335	somewhere in this paragraph you should explicitly state that the stiffness difference results from the distance of the girder location from the bent cap support and the resultant potential deflection	Would be nice if this photo could be referred to from the weathering steel section, but don't worry about it if trying to do so gets awkward.	Substantive		
95	3.15		46	1361	You just got through advising against designating the whole web as FC. Don't do that here. Designating the whole web catches the whole compression flange by the attachment rule, which means the fabricator needs to send an RFI or be on the hook for guessing that the designer intended them to disregard that rule in this case.	add	Substantive		
96	3.17		48	1463	Somewhere in here can we talk about using 3 I-girders rather than retreating to 1920s-style mechanically fastened construction?	explain	Substantive		
97	3.17		48	1467	Didn't FHWA just come out with something? (And if they did, I'm still not sure what they came up with regard to fabrication)	explain or reword	Substantive		
98	3.17		48	1474	It seems a bit odd to have this very specific list of geometry requirements and then not say what the faulted state is or what the special load case is. It's like you started to write something standalone based on the guide doc and then reverted back to discussing what's in the guide doc.	explain	Substantive		
99	4.3		53	1619	How are bolts not orthogonal to the connected members? I think maybe you mean the line of bolts, not the bolt itself.	explain or delete	Substantive		
100	4.4		53	1626	This has a nice example of drip bars.	reconsider	Substantive		
101	4.5		55	1657	Figure would be nice	Check with your fabricator and erector friends and consider revising. In particular, maybe take out the part about match-marking (since that's required for all splice plates too) and change "careful material control for handling and positioning" to "additional effort for positioning".	Substantive		
102	4.5		55	1663	It needs to be stated a bit more explicitly that the old design for redundancy only	If so, say so.	Substantive		

Comment Number	Section Number	Section Name	Page Number	Line Number	Comment	Proposed Resolution (Optional)	Classification (Optional)	Response	Status
					considered the capacity of two of the three. Also, what's the change? Why can we use 3 now without paying the consequence of loss of redundancy?				
103	4.8		59	1788	What does "perceived" mean? Is it spurious and not to be used? Should it maybe be "calculated"?	Consider.	Substantive		
104	4.8		59	1795	Measurable amount? What does that mean? What does it mean not to be measurable?	Maybe stick with the 2" and screens	Substantive		
105	5.2		62	1820	What's with the different dimension for coated?	Reorganize. Bullet out tolerance recommendations. Move the very last paragraph to the beginning.	Substantive		
106	5.2		61	1825	Use of big bolts is not without its drawbacks because of the greater forces needed--have your erector friends vetted this recommendation? That "extra play" is in there because it's needed because of manufacturing irregularities in the bolts, so it's not all that extra.	"The AASHTO/AWS D1.5 Bridge Welding Code specifies dimensional (length, depth, flange tilt, etc.), horizontal sweep, and vertical camber tolerances for individual field sections, as well as for beams and girders spliced together longitudinally within bridge spans. However, these tolerances may not be suitable to the rigidity of bent cap beams and their framing members. The tolerance recommendations listed below are specific to integral bent cap assemblies and their adjacent, moment-connected longitudinal girders. Although these tolerances are specified in AASHTO/AWS D1.5, what is listed below is, and are considered reasonable and achievable for the assemblies discussed in Section 5.1. These tolerances are stricter than those in AASHTO/AWS D1.5 and would need to be specified in contract documents.	Substantive		
107	5.2		62	1835	Unique match-marking and material control is expected all the time. The machining is the biggest issue.		Substantive		
108	5.2		62	1842	Does this basically mean leaving out the optional beveled plate in Figure 4.5-2?	Throughout this section, refer to these as alternative tolerances, not ""practical limits"". (Although...the last paragraph in this section suggests otherwise. Basically the whole section needs to be reorganized with some logical sequencing; see other comment to this effect.)"	Substantive		
109	5.2		62	1855	How confident are we that true sealing is actually really possible? Do we want to	Delete the paragraph	Substantive		

Comment Number	Section Number	Section Name	Page Number	Line Number	Comment	Proposed Resolution (Optional)	Classification (Optional)	Response	Status
					express a preference for good ventilation and drainage? My recollection from TxDOT, admittedly a long time ago, was that water always found a way, even if it was just condensation, and then couldn't get out.				
110	5.6		69	2006	As small as possible, but still at least 2"? I think these recommendations conflict. 2" hole can easily admit bats and small birds.	Reword all this. Pull the parenthetical out into another sentence. Handle the "what if".	Substantive		
111	5.6		70	2043	In general, do a better job separating out straight-up recommendations for what the designer should specify from general discussion. There are a lot of dimensions floating around, but some are "here is what might happen" and some are "you should limit them to this to avoid trouble". As a designer, I think I'd be reading this and thinking, "OK, but what do you want me to DO?"	Rewrite.	Substantive		
112	Miscellaneous				""""These tolerances""", coming after the previous sentence, means the special tolerances in this paragraph, but those are NOT specified in D1.5. Also, D1.5 doesn't specify camber for individual field sections.	cut down some of the detail, concentrate more on what might affect the design, and don't phrase it as instructions to an inspector	Editorial		
113	Miscellaneous				Also, are these alternative tolerances to be specified, or practical limits that the fabricator might choose to use? I vote alternative tolerances, because fabricators aren't the target audience for this document."	Address depth issue	Editorial		
114	Miscellaneous	Further Reading	9		This whole paragraph is rationale for the D1.5 tolerances, not particularly for the tighter tolerances given in this section. We don't need D1.5 rationale here. The tighter tolerances are because stuff needs to fit together but we can't wiggle it around as much, not because we're worried about haunches and such. And characterizing geometry within D1.5 tolerances but outside of these tighter tolerances "excessive" is not appropriate.	add references, including to subfigures (a, b, c, etc.)	Editorial		
115	Miscellaneous		5	68	What does "that alignment level" refer to? 1/4"? Is the 1/4" something that might happen, or that should be allowed to	Just define it in your abbreviation list and use the short version throughout.	Editorial		

Comment Number	Section Number	Section Name	Page Number	Line Number	Comment	Proposed Resolution (Optional)	Classification (Optional)	Response	Status
					happen? I think what you're trying to say is that cumulative tolerances happen, and this should be allowed up to 1/4", but beyond that you could have a problem-- but you haven't actually said that at all. And you haven't said what to do if those tolerances do add up beyond 1/4".				
116	Miscellaneous		7	148	Hard to say what's happening in this sentence. Hole alignment is a risk? Do you mean misalignment? What's a "check-fit hole"? Isn't it the holes that AREN'T in the check fit that are a concern, not the ones that ARE? What exactly is being corrected by customized plates? "Values" should be "tolerances".	add	Editorial		
117	Miscellaneous	Foreword	8	185	This whole section has a LOT of detail on inspection how-tos (including the use of lots of imperatives). It's not where the inspector will go to learn what needs to be done, and seems like a lot more than the designer needs to know	fix	Editorial		
118	Miscellaneous	Foreword	8	189	Wouldn't the girders need to be shallow enough that head alone would be close enough to the top of the cap?	change please	Editorial		
119	Miscellaneous	Foreword	8	190	Throughout, make sure that figures are referenced from the text. Some of them aren't.	Either delete "the" before "design, detailing..." or add "of these members" at the end of the sentence. I vote the first option because it's shorter.	Editorial		
120	1.1		13	272	"AASHTO LRFD Bridge Design": how often are you defining this poor thing? In some sections it's at the beginning of the section; in some it's defined over and over again in each paragraph.	"provide" should be "provides" (goes with "document")	Editorial		
121	1.3		13	289	G1.4 is not on this list	add comma after "detail"	Editorial		
122	1.4		13	293	tab formatting on several entries in the participant list on pages iii-v is off	I vote hyphenated, throughout the document	Editorial		
123	1.4		13	303	My employer is now Pennoni	Put 'em all in, even those defined in situ at first use (since the ones you do have here also get defined in situ, so there's no real clear division on what goes here and what doesn't). Examples: FEA, AASHTO, NSBA, LRFD, NCHRP, FHWA, MnDOT, FCM, KLF, CBF, LRFR, ASR, LFR, OSHA	Editorial		
124	1.4		14	307	grammar not quite right	do it	Editorial		
125	1.4		14	328	grammar	fix	Editorial		

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126	1.4		14	349	punctuation consistency: elsewhere in the paragraph you had serial (Oxford) commas	change "to use" to "the use of"	Editorial		
127	1.5		15	362	be consistent about whether to hyphenate "fracture-critical"; it's both ways in this one sentence.	delete "current" or "9th edition". It should still be current in the next edition, so maybe delete the edition #?	Editorial		
128	1.5		15	368	These are NOT your only abbreviations in this document.	"Redundancy". Also applicable throughout the document (unless you decide not to use titles at all)	Editorial		
129	1.5		15	370	Italicize the titles of the documents.	delete	Editorial		
130	2.1		16	380	capitalize "Collaboration"	E.g., Guide Specifications for...	Editorial		
131	2.1		16	381	grammar	fix	Editorial		
132	2.1		16	387	9th edition is about to not be current.	fix	Editorial		
133	2.1		16	394	put quote marks around section titles	I vote (1)	Editorial		
134	2.1		16	398	Delete "The" before "NCHRP". Things with numbers on them don't get "the". Don't ask me why.	delete "and should be considered"	Editorial		
135	2.1		16	405	Italicize the titles of the documents (not including the organization name)	delete "always"	Editorial		
136	2.1		16	409	don't capitalized "Based" inside the parentheses and spell out "Specification"	Easier to delete than add, so I vote no titles. Also I have a preference for "Section" over "section", but I suggest doing a search and going by majority rule to minimize editing. (Though there's also something to be said for distinguishing a numbered Section reference from a geometric section...)	Editorial		
137	2.2		17	422	"single column" isn't modifying anything and shouldn't be hyphenated	Add #. See other comment about whether to use titles.	Editorial		
138	2.2		17	443	Here you have (1) for in-line list items; earlier you had 1). Be consistent throughout the document.	In Word, type the single or double quote and then when it autocurls, hit ctrl-Z.	Editorial		
139	2.2		17	454	If it may play a role in choosing a configuration, you don't need to say "and should be considered" on top of that.	fix	Editorial		
140	2.2		18	473	What does "always preferable" mean if sometimes you're going to choose something else?	"webs". Also line 447	Editorial		
141	2.2		18	475	Be consistent throughout the document about whether to include section titles (in quotes, of course) after the numbers, or not. Also be consistent about whether to capitalize "Section".	fix	Editorial		
142	2.2		18	499	Give a section number for "Seismic Considerations"	"multi-girder units" maybe?	Editorial		
143	2.3		19	518	Make sure you're being consistent	Fix; I have a mild preference for the 2nd	Editorial		

Comment Number	Section Number	Section Name	Page Number	Line Number	Comment	Proposed Resolution (Optional)	Classification (Optional)	Response	Status
					throughout the document about your units (hash marks vs. alpha abbreviations), but if you use hash marks, they should be straight and not curly.	option			
144	2.3		19	518	"caps" should be plural	Start new paragraph here.	Editorial		
145	2.3		19	521	For chatty intro you really don't need things like "web(s)". There's usually more than one, and if there isn't, the reader can adjust.	delete extra space	Editorial		
146	2.3		20	533	typo: "muti" for "multi"	"differ in"?	Editorial		
147	2.3		20	555	I know what you mean by "multi-girders" but it's not a standard steel term and has not been heretofore defined.	Stick to multilevel Arabic numbers. This should be 2.3.1, etc.	Editorial		
148	2.3		20	556	either "A triple I-section configuration" or "triple I-section configurationS"	add	Editorial		
149	2.3		21	558	From "All closed sections" onward, this is not the I-section discussion of the previous text	"Advantages and disadvantages of stacked systems include the following:"	Editorial		
150	2.3		21	569	extra space after "plate/"	Fabrication, erection, and construction are simpler and faster compared to the integral system, leading to time savings and potential cost savings.	Editorial		
151	2.3		21	573	"differ of" doesn't work	add	Editorial		
152	2.3		21	575	Why are you using lettered subsections here when elsewhere you have X.X.X numbering?	Start new sentence at "a steel corbel consists"	Editorial		
153	2.3		21	578	need semicolon at the end of the 1st bullet to go with the one near the end of the 2nd bullet	change to "Category"	Editorial		
154	2.3		21	579	This bulleted list needs some kind of intro	Whatever it is, make the number match. Either make the antecedent single ("a blah blah", or "with bearings atop them". Probably the former.	Editorial		
155	2.3		22	593	This bullet is a noun phrase whereas the rest are sentences.	fix	Editorial		
156	2.3		22	599	need "for" between "than" and "in-line"	add one	Editorial		
157	2.3		22	601	run-on sentence	"can", not "could"	Editorial		
158	2.3		23	606	fatigue categories are categories, not classes	"angles or bent plates"	Editorial		
159	2.3		23	608	What is the antecedent of "it", as in "atop it"? Is it "bolsters" from the beginning of the sentence? Is it the stuff beginning with "supporting"?	Change "it should be noted that" to "However,"	Editorial		
160	3.1		24	623	This bulleted list is a mix of sentences and noun phrases	reexamine this whole single/double shear discussion	Editorial		

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161	3.2		24	633	This bulleted list needs an intro	add	Editorial		
162	3.2		24	638	Its observability is not hypothetical	Make sure I'm right, then fix for all AASHTO LRFD refs	Editorial		
163	3.2		24	639	Slashes don't get spaces around them, but it's better to avoid them entirely when normal English conjunctions will do	fix here and also lines 787-788	Editorial		
164	3.2		24	646	"It should be noted" is never great. It SHOULD be, but you could choose not to? They've read it. They've noted it. Telling them to won't change that one way or the other.	Revise sentence to have a clear subject, verb, and object. Might need to divide into two sentences.	Editorial		
165	3.2		24	649	Isn't this last sentence reundant with the first part of the sentence starting on line 602?	consider replacing with "supported by", throughout the document	Editorial		
166	3.2		25	652	bulleted list needs intro and 1st bullet needs period	fix	Editorial		
167	3.2		25	657	I believe the AASHTO sections are referred to as Articles. Which will further help distinguishing its sections from our sections (though it doesn't help with references to other SBC docs).	Delete the sentence and the "A-A" and "B-B" references	Editorial		
168	3.2		26	687	Italicize the title and delete "(REF)"	change "3" in left figure to "THREE"	Editorial		
169	3.2		26	695	This sentence has two verbs, "shows" and "illustrate", and I think there are bits of two sentences running into each other.	fix	Editorial		
170	3.2		27	712	"sitting on" seems a bit informal	delete	Editorial		
171	3.2		27	717	don't capitalize "elevation"	I'd prefer if you just deleted "layover (" and then "(", but if you're feeling compelled to keep it for some reason, then make it two words and put it in scare quotes.	Editorial		
172	3.2		27	718	There is no Figure 3.14.3.1-1. But do you really need this?	add	Editorial		
173	3.2		27	719	be consistent regarding using numeral or word for the number of concrete bents	"columns". Or if you really want to emphasize that there can be only one, "column or columns"	Editorial		
174	3.2		27	722	"different from", not "different than"	end the sentence after "bent caps"	Editorial		
175	3.2		27	728	Do you really need to say "and should be considered"? That point is made without these words.	"Although there are no bearings, there is still a need to accurately model..."	Editorial		
176	3.3		27	741	"layover" as a verb should probably be two words, but really it's slang.	How about, "As discussed in Section X"? (where you first talked about the various configurations)	Editorial		
177	3.3		27	741	need comma after the) to go with the comma on the previous line	"in terms of both rotational and translational"	Editorial		
178	3.3		27	742	In this kind of prose, you don't need the	... the NSBA Steel Bridge Design Handbook	Editorial		

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					messiness of "column(s)". If there's only one, the reader can still figure it out.	and the NSBA White Paper A Primer on Weathering Steel (italics, addition of "the", and deletion of comma)			
179	3.4		28	758	This definition seems rather tautological, and besides, you defined it before.	add	Editorial		
180	3.4		28	761	"Neglect" doesn't apply to something that isn't there, but only to something that is there but doesn't matter.	AASHTO/AWS D1.5. You have this elsewhere in the doc but not everywhere. Be consistent.	Editorial		
181	3.4		28	767	"Keep in mind" seems too chatty, but I usually don't like "Note that" either.	Put a nonbreaking space between "Figure" and the number, and also turn on "widow/orphan protection" for the paragraph	Editorial		
182	3.4		28	769	"both" should have two things in its immediate scope	fix	Editorial		
183	3.4		28	773	some editorial oddities about how the docs are referenced	delete	Editorial		
184	3.4		28	774	shouldn't these docs be in the "further reading" list?	Either delete "furthermore" or put some kind of other reason for the avoidance before this sentence. I think just deleting it works fine.	Editorial		
185	3.5		28	786	In an AASHTO/NSBA document we should acknowledge the AASHTO side of D1.5.	Just say "stiffeners".	Editorial		
186	3.7		30	843	I'd like to think that AASHTO Publications would take care of this, but just in case it doesn't, take steps to ensure that figure number isn't stranded on the next page.	I think you can just delete this sentence.	Editorial		
187	3.7		31	884	delete comma after "web depth"	"X should be considered"	Editorial		
188	3.8		33	911	delete "(REF)"	fix	Editorial		
189	3.9		36	1003	"furthermore" implies you've made some kind of case for why they should do this.	Change "FCM Members" to "FCMs"	Editorial		
190	3.10		38	1118	You don't need the messiness of "stiffener(s)". First of all, it's hard to imagine there just being one, but also if there is, the reader can figure it out.	fix	Editorial		
191	3.12		41	1189	The sentence beginning with "The engineer should" is redundant with earlier text	fix	Editorial		
192	3.12		42	1204	imperative "consider" is inconsistent with the way the rest of the document has been written so far	give the paper title	Editorial		
193	3.12		42	1205	"an FCM", not "a FCM". It goes by how you'd say it if you were reading it aloud.	add	Editorial		
194	3.12		42	1220	"M" stands for "Member".	fix	Editorial		
195	3.13.3		44	1288	spell out "Specifications"; don't say "Spec"	Subject, verb, object. Maybe two sentences.	Editorial		
196	3.13.3		44	1293	Again, use X.X.X rather than letters	fix	Editorial		

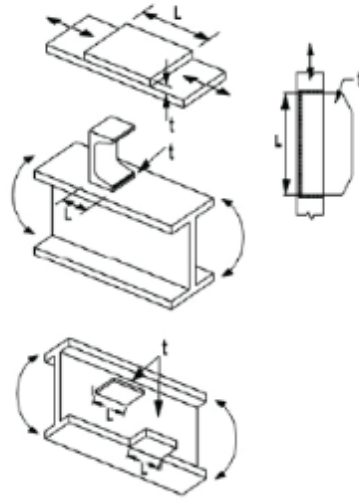
Comment Number	Section Number	Section Name	Page Number	Line Number	Comment	Proposed Resolution (Optional)	Classification (Optional)	Response	Status
197	3.13.13		44	1295	so far you've been giving full titles rather than brief references in parentheses	put it first	Editorial		
198	3.14		45	1315	need "the" before "cap beam"	fix	Editorial		
199	3.14		45	1319	"Include provisions..." another imperative that should be written as declarative	add	Editorial		
200	3.14		45	1320	Another sentence with too many verbs. "It is critical in the design...is the interplay..."	Pick one of "and" or "or". In this context it doesn't really make a difference.	Editorial		
201	3.15		45	1326	add section number and remove highlight	consider the suggested rewrite	Editorial		
202	3.15		45	1328	everywhere else so far you've put the alphanumeric designation of the SBC docs first	consider the suggested rewrite here and on line 1163	Editorial		
203	3.15		46	1337	put comma after title and italicize title	Consider changing to "between the bent cap and the concrete columns"	Editorial		
204	3.15		46	1341	construction holes TO facilitate bolting	fix	Editorial		
205	3.15		46	1341	"some combination of" means you don't need "and/or"	fix	Editorial		
206	3.15		46	1353	suggested rewrite: "which is different from longitudinal girder field splices, typically located at or near..."	"stiffener or stiffeners"	Editorial		
207	3.15		46	1356	suggested rewrite for fewer words: "Therefore, a rigorous design of such splices should be performed."	If "should" is too weak, make it "needs to be"	Editorial		
208	3.15		46	1359	You don't really need to say "triple I-girder steel bent cap" twice in this sentence.	If it is a recap of Section 3.9, then make it "Section 3.9 notes that...". Otherwise I don't even know what to tell ya	Editorial		
209	3.15		46	1361	"affect" should be "affects" to agree with "configuration"	"Minimal change: ""When the designer has determined that the bearing should be designed...""	Editorial		
210	3.17		47	1417	need "bearings" after "HLMR"; it's not a type of elastomeric bearing	Better: ""If the bearing is to be designed...""	Editorial		
211	3.17		47	1418	You already know I hate (s), but in this case it really doesn't work because the "s" aspect doesn't match the "A".	change	Editorial		
212	3.17		48	1442	This is not a "shall" document.	Fix @ 4 locations in this paragraph	Editorial		
213	3.17		48	1459	"Regarding stability (in section 3.9), it is noted..." What are you trying to say here? Is this a recap of Section 3.9? Some other remarks?	add	Editorial		
214	3.17		48	1472	"When the designer has determined that the bearing is designed..." This is written as if the designer doesn't know how the bearing was designed and is finding out.	Rethink quoting the equation	Editorial		
215	3.17		49	1495	Change "For the times when" to "If"	If the former, delete it since it's not used again	Editorial		
216	3.17		49	1501	Slashes don't get spaces around them.	Be consistent. Perhaps "this document" so	Editorial		

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						that it's not dependent on what wording you pick for the title? Otherwise use the wording in the title.			
217	3.17		50	1533	I think you need "Equation" or "Eq." or something before "3.17-1"	While ratings do not need to be computed based on these proportion limits, the engineer needs to determine if the resistance equations in the AASHTO LRFD Design, and the research used to develop them, are still applicable if these limits are violated, especially if by a measurable amount.	Editorial		
218	4.1		52	1558	Why are we including this equation specifically when there are presumably lots of others that are also needed?	add	Editorial		
219	4.2		52	1580	Is "EV" just an abbreviation for "emergency vehicle" or is it a load that gets plugged into an equation?	Fix. Same for other similar dashes throughout the document.	Editorial		
220	4.2		53	1596	Is "these guidelines" this very document? Elsewhere it's been "this guide" or "this guideline"	Delete "(" and ")".	Editorial		
221	4.3		53	1616	This sentence is really hard to plow through.	delete	Editorial		
222	4.3		53	1616	Need comma before "may be necessary" to go with the one before "including"	Delete the "such as" parentheticals	Editorial		
223	4.4		53	1626	that dash should be an em dash with no spaces around it	I actually prefer including "AASHTO/NSBA" but you may want to look through the doc and go with majority rule to minimize editing	Editorial		
224	4.5		55	1663	You don't need the parentheses in this sentence.	fix	Editorial		
225	4.5		55	1667	delete "the" before "integral" and "non-integral"	fix here and wherever else applicable	Editorial		
226	4.6		56	1698	Here and in (3): your target audience neither knows nor cares about D1 standard joint designations.	fix	Editorial		
227	4.6		56	1698	Put the alphanumeric designation first (to be consistent with most of the document so far) and italicize the title. Also be consistent throughout the document whether you're going to start referenced Collaboration docs with "AASHTO/NSBA" or just jump right in with the alphanumeric designation. Same for 1608 and 1612.	Consider deleting from "floating" through the comma	Editorial		
228	4.6		57	1728	pretty sure "corner slip" is supposed to be	add reference	Editorial		

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					"corner clip"				
229	4.6		57	1732	For "X by Y" dimensions, use an × symbol, not a letter "x"	Change "Class" to "Category" throughout this paragraph	Editorial		
230	4.6		57	1733	"is helpful", not "are helpful" (agreement with "use")	delete	Editorial		
231	4.6		57	1749	I don't know that the "floating" phrase really adds clarity	adjust verb mood for consistency	Editorial		
232	4.6		58	1760	The discussion of the T-shaped weldments also needs a reference to Figure 4.5-2	add	Editorial		
233	4.6		58	1763	fatigue categories are categories, not classes	move it	Editorial		
234	4.7		58	1767	delete "a" before "Class [Category] C fatigue details"	delete	Editorial		
235	4.7		58	1783	"develop" is a stray imperative	add	Editorial		
236	4.8		59	1798	add "for bearing replacement" at the end	Add "approximately" before the dimension and delete the makeshift plus-minus thing. Consider also adding "of" before "masonry plate width"	Editorial		
237	5.1		61	1813	This paragraph belongs before the previous paragraph	How about "should provide"?	Editorial		
238	5.2		62	1835	Delete "a" before "minimal"	move	Editorial		
239	5.2		62	1840	need comma after "assumed"	Delete "show"? No idea what was meant.	Editorial		
240	5.2		62	1840	Don't use "(+/-)" after the dimension.	just say "relative to tolerances"	Editorial		
241	5.2		62	1853	"must consider providing" is rather wishy-washy	change to "prohibit" (2 locations)	Editorial		
242	5.2		62	1859	Typicall the 316 goes before the "stainless steel"	fix @ 2 locations (3rd location uses the correct symbol) and anywhere else it might apply	Editorial		
243	5.2		62	1862	"show screen"?	delete	Editorial		
244	5.3		63	1875	The tolerances in the next section only apply if someone takes the trouble to specify them, so it's not the case that they "are" checked.	"When connections between girders and bent caps are reamed or drilled in assembly, ...	Editorial		
245	5.3		63	1879	"preclude" means, basically, "set things up so that it doesn't happen"	Similar issue line 1879"	Editorial		
246	5.3		63	1879	Use ± rather than +/-	delete	Editorial		
247	5.3		64	1882	Delete "note that"	fix	Editorial		
248	5.3		64	1895	"when girders are reamed into connections" is weird usage. Also, drilling in assembly is an option.	HLMR	Editorial		
249	5.4		65	1913	stray ")"	fix	Editorial		
250	5.5		65	1928	This sentence needs wrestling to the ground. Start a new sentence at "provided".	I think it's "check-fit or else reamed or drilled in assembly". Also see comment on line 1853 about "ream girder into connection" language.	Editorial		

Comment Number	Section Number	Section Name	Page Number	Line Number	Comment	Proposed Resolution (Optional)	Classification (Optional)	Response	Status
251	5.5		65	1929	Why not say "HLMR" like you did everywhere else?	add	Editorial		
252	5.5		67	1939	"checked fit" should be "check-fit" (or maybe check-fitted, but not "checked")	revise	Editorial		
253	5.5		67	1948	"assembled, check-fit, reamed" looks like a list of three alternatives but they're not	consider adding	Editorial		
254	5.5		67	1951	need comma before "which"	delete "-like"	Editorial		
255	5.5		67	1957	Suggested rewrite: "While some fabricators can handle pieces over 100 tons, and the actual geometry and configuration of the piece affect specific handling requirements, 75 tons can be handled and rolled safely and efficiently by most fabricators involved in these types of bridge projects."	I think mostly you've capitalized it	Editorial		
256	5.5		69	1979	Add OSHA CFR to Further Reading?	clarify	Editorial		
257	5.5		69	1979	What's a "spreader beam-like"?	I think you can delete the 1st one, maybe bring some of its content into the last sentence	Editorial		
258	5.5		69	1979	be consistent about capitalization of "figure" throughout the document	add	Editorial		
259	5.6		69	1983	Appendix D of which AASHTO document?	I think you can fix it by added "when" before "dropping"	Editorial		
260	5.6		69	1998	1st and last sentences are somewhat redundant with each other.	delete	Editorial		
261	5.6		69	2002	need comma before "which" to go with the one after "cross-frames"	add	Editorial		
262	5.6		69	2009	what is "dropping" conjoined with?	spell out "and" in 2 locations	Editorial		
263	5.6		69	2009	delete empty words "It is worthy of note that"	separate out the repair & retrofit into a different section from the inspection & maintenance information. I think it should go after.	Editorial		
264	5.6		70	2027	put comma before "LLC"	"added to"?	Editorial		
265	5.6		70	2043	don't use ampersands in text	add	Editorial		
266	5.6		70	2044	Repair & retrofit go beyond "maintenance"	add	Editorial		
267	5.7		70	2097	"installed to" sounds weird	fix	Editorial		

Table 6.6.1.2.3-1—Detail Categories for Load-Induced Fatigue

Section 7—Longitudinally Loaded Welded Attachments				
<p>7.1 Base metal in a longitudinally loaded component at a detail with a length L in the direction of the primary stress and a thickness t attached by groove or fillet welds parallel or transverse to the direction of primary stress where the detail incorporates no transition radius:</p> <p>$L < 2$ in.</p> <p>$2 \text{ in.} \leq L \leq \underline{12t \text{ or } 4 \text{ in.}}$</p> <p>$L > 12t \text{ or } 4 \text{ in.}$</p> <p>$t < 1.0$ in.</p> <p>$t \geq 1.0$ in.</p> <p>(Note: see Condition 7.2 for welded angle or T-section member connections to gusset or connection plates.)</p>	<p>C</p> <p>D</p> <p>E</p> <p>E'</p>	<p>44×10^8</p> <p>22×10^8</p> <p>11×10^8</p> <p>3.9×10^8</p>	<p>10</p> <p>7</p> <p>4.5</p> <p>2.6</p>	<p>In the primary member at the end of the weld at the weld toe</p> 

G14.1—2021 Maintenance Guidelines for Steel Bridges to Address Fatigue Cracking and Details at Risk of Constraint-Induced Fracture - Adobe Acrobat Pro DC (32-bit)

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Home Tools G 12.1 - Guidelines... G14.1—2021 Main... x AASHTO LRFD 9th ...

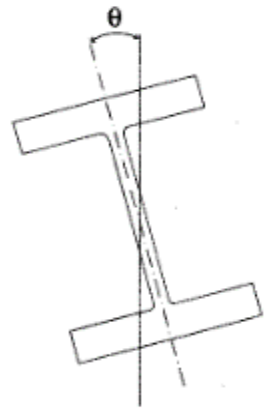
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Comment

requiring improved detaining techniques to avoid this phenomenon. This was a significant advancement for the industry because of the proliferation of this type of cracking, which was estimated to be about 90 percent of all fatigue cracks (Connor & Fisher, 2006).

The 1970s also brought the topic of redundancy to the forefront. This was primarily triggered by the collapse of the Silver Bridge near Point Pleasant, West Virginia, in 1967. Years following the Silver Bridge collapse, a few other fractures in non-load-path-redundant bridges, not resulting in collapse, also heightened the interest of industry leaders, resulting in more stringent requirements for bridges containing nonredundant “fracture critical” members (FCM). The 1978 AASHTO Fracture Control Plan (FCP) included reduced allowable fatigue stress ranges, more rigorous Charpy V-Notch (CVN) testing requirements, more thorough shop inspection, and the federal requirement for arms-length visual inspection of FCMs every 24 months (AASHTO, 1978; Fish et al., 2015).



$\tau_{\omega 1}$
 $\tau_{\omega 0}$ $\tau_{\omega 0}$
 $\tau_{\omega s} = -E \frac{S_{\omega s}}{t} \theta''$
 $\tau_{\omega 0}$ $\tau_{\omega 0}$
 $\tau_{\omega 1}$

Diagram illustrating the normal stress distribution in a beam cross-section. The top flange is in compression (C) and the bottom flange is in tension (T). The stress is zero at the neutral axis (N.A.). The formula $\sigma_{ws} = E W_{ns} \theta''$ is shown at the bottom.

$$\tau_t = \frac{T_u}{2b^2t}; \frac{b}{t} \geq 10$$

$$\tau_t = \frac{T_u}{2bht} \quad (t = t_1 \text{ or } t_2); \quad \frac{b}{t} \geq 10$$



Combined TG 1 Detailing, TG 15 Data Modeling for Interoperability

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: - Jon Stratton – Eastern Steel Works, Inc.

Secretary: John Hastings - NSBA

Notes not provided. See summary in Main Committee notes.

Main Committee

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, LLC

Vice Chair: Christina Freeman - FDOT

Secretary: Christopher Garrell - NSBA

1. Chairperson's Welcome (10 AM – 10:10 AM)
 - a. [AISC Antitrust Policy and Meeting Code of Conduct.](#)
 - b. [Approval of Previous Meeting Minutes.](#)

Previous meeting minutes were approved.

2. Task Group Reports - Approximately five minutes each (10:10 AM – 11:40 AM)
 - a. TG 1 - Randy Hasrrison (W&W|AFCO Steel)

The TG had a full agenda and primarily discussed updating G1.4 Guidelines for Design Details. Randy noted that a lot has changed in the industry since this was originally published. The current document makes refereces to many other documents. The TG needs to decide how much they should simply reference versus repeat. There will be a need to redraw many of the details. The group feels that they will need to increase the length of time for their next meeting or start having interim calls.

Main Points

- Full 2 hour meeting
- Continuation of spring meeting
- Updating G1.4
- Will do more referencing of other work

- b. TG 2 - Heather Gilmer (Pennoni)

Spent time talking about the newly approved AASHTO Fabrication specification which will be available late 2024 and 2025. Gilmer voiced concern with states adopting the new specification. It needs to be clear that states can take exception with specific sections and not feel the need to adopt the entire document. A webinar about the new specification should be considered (e.g., Gilmer and Bardow). The group needs to think about the next step which is marketing it. Part of what might affect the roll-out of the new fabrication specification is if D1.5 has

not been updated and removed. A date should be picked for when this transition will happen. The same has to happen with the AASHTO Bridge Construction specification too. Both of these may affect adoption of the new fabrication specification.

The TG is also faced with what to do about the term “Fracture Critical”. The NSBA Redundancy Task Force is working on the issue and so is FHWA. Develop a slide deck for both NSBA visits and steel bridge forums. One would likely be a few slides while the other will be a longer and more in-depth presentation. Camber tolerances stated in the document are thought to be confusing whether it only applies in cases where there are splices. There was a discussion on pin which will be deferred until someone coordinates with AREMA. Piece marking also came-up and the group will be surveying fabricators to determine what methods are being used today. G2.2 will be the focus of the next meeting. Heat related topics are still a point of contention that is needs to be address before moving forward with the next version.

Main Points

- Bigger picture issues
- AASHTO Fab Spec approved
 - Implementation is now key
 - T-17
 - Committee on Materials
 - Need to take it out of D1.5 – Heather will act]
 - Need to take it out of the construction specification – Heather will write to Alex and cc Ronnie
- FC deletion
- Addressed comments on the document that had come in on ballots
 - Camber tolerances / splice issue
 - Camber tolerance – too liberal
 - Pin discussion
 - Scribing / etching of marks
- G2.2
 - Need to wrap things up
 - Want to ask the community

c. TG 4 - Jamie Hilton (KTA-Tator, Inc.)

TG4 had aproductive meeting. Working on next G4.2 Qualifications for Bolting Expectors. It is targetting 2024 for consideration by AASHTO CBS. The TG is also working on better defining what owner should require of their 3rd party inspectors for the next G4.4.

Main Points

- G4.2 being updated bolting inspectors
- Archived G4.1 – requirements for owner QA inspectors

d. TG 8 - Paul Vinik (GPI)

Paul Vinik had about 20 people in attendance and the meeting lasted approximately 90 mins. The group discussed new uncoated weathering steel guide, which will be released sometime in November and the AISC Need for Speed initiative. The need for guidance on painting weathering steel was discussed. For example, best practices and recommendations for beam end coating. The group also was updated on the status of the NSBA synthesis study on SIOZ. The report will be issued soon. Johnnie Miller went over the NCHRP 12 117 on duplex. A recommendation was made to develop a joint specification from the NCHRP. Discuss this further with T14 to assess their need for a specification to standardize the practice. Reviewed the status of S8.1 which was originally a joint effort with SSPC which is now AMPP. Need to discuss this collaborative effort with AMPP to see how to move forward. Heather will address the task group coordination with AMPP and Paul will coordinate with AMPP board to work through relationship between NSBA, AMPP and AASHTO. Ronnie mentioned that TG12 is working on the next version of G12.1 which has a chapter on durability. He suggested that TG12 and TG8 coordinate on any updates to that chapter which basically recommends uncoated weathering steel. One suggestion is making more references across Collaboration documents. The group also talked about NTPEP a look towards some type of coordination and interaction. The group is also working on the new G8.4 detailing for coatings is ongoing.

Main Points

- Met
- 20 people
- Guide
- Need for speed
- TG8 – painting
- IOZ single coat
- NCHRP 12-117
 - Joint spec for duplex – will consider
- S8.1 – AAMP review; adapt for single coat IOZ
- Tie to G12.1
- NETPEP
 - Trying to get better alignment with them
- Detailing for coatings document – four groups
 - Is okay to reference

e. TG 10 - Brian Witte (Parsons)

S10.1 worked through comments that were received from recent ballots. Primary focus was on the transportation section. More time will be needed to address the remaining items outside of this meeting. While the ballot was specific to sections that changed between the previous version and this new one, reviewers commented on other areas of the document. There is potentially some overlap between content that is being considered in the new G14.2 and erection. The two groups will work on the best path forward. The TG will now target 2024 for the S10.1.

Main Points

- Discussing comments on the recent ballot
- New section on transportation
- Discussion on tolerances – revising to actually address the issues we are concerned about
- Issue with alignment with the certification – Brian with get with Jamie
- Alignment with TG14 – some good stuff in there that relates to erection
- Will have to punt to 2024

f. TG 11 - Brandon Chavel (Michael Baker)

Had a presentation on the new FHWA bridge geometry manual. The group then spent the remaining time reviewing comments on the new cross-frame guidelines. The TG is looking to have the new document finalized by the end of the year for one last review in January. They expect the document to be completed in February 2023. The plan is to initially publish this as a handbook chapter and then once the 10th edition AASHTO BDS is available, ballot the document and make it an official Collaboration document.

Main Points

- Presentation FHWA bridge highway geometry document
- Discussed CF doc
- Targeting completion this year; publish early 2023
 - First do as a handbook chapter to get out there
 - Later do collaboration and also align with 10th edition of LRFD

g. TG 12 - Christina Freeman (FDOT)

This group met for an hour prior to the combined meeting. The G12.1 was last published in 2020. Remaining comments from the last ballot have been incorporated along with some updates. The update topics included corrosion, wind loading, stability during construction, phased construction, plate availability tables, camber/deflection tables, incorporating improved tub girder recommendation based upon work Helwig completed and several others.

Main Points

- At a stopping point with G12.1 – just published; discussed topics for the next edition – corrosion protection, wind loading, plate availability; tub girder details
- Joint TG1/11/12 – steel bent caps; beyond first stage; now approaching final stage

h. TG 13 - Deanna Nevling (HDR)

Conference, TRB, AASHTO T14 and NSBA updates were given. Michael Roberts from HDR gave a presentation on parametric bridge design. The truss document about 99% complete and the TG plans on sharing it with AASHTO T14 before their January meeting. The group also is planning on developing a survey on bridge design survey which may be distributed through Modern Steel Construction. Luke Faulkner – AISC should be engaged in the discussion for how to work with software vendors. He may have some input on how best to go about this. Deanna plans on also reaching out to the prevailing software vendors to see if they can attend future meetings.

Main Points

- Updates
- Heard from Jamie re TRB; Tony Ream T14
- Michael Roberts of HDR
- Truss analysis doc is in good shape – should be able to make May 1
- Software validation – will do a survey via MSC; consider the AISC approach – can be like Luke Faulkner did it; be sure to include Aaron Costin
- Todd – need to validate the user as well
- Todd – get people together
- Deanna is compiling a list of vendors – can pull these together
- There is a TRB panel looking at this

i. TG 14 - Kyle Smith (GPI)

G14.2 was balloted and passed. The more challenging comments were discussed at the meeting. There was some discussion about removing or modification chapter 7. This will require a reballot of that section. The hope is to still make the 2023 AASHTO CBS timeline.

Main Points

- Recent ballot
- 290 comments
- Will do ballot strategy

j. TG 15 - Aaron Costin (University of Florida)

Aaron was not present at this meeting. Only the combined meeting took place.

Main Points

- Aaron become a parent; Jon ran the meeting and reported
- Aligning the TG with the AASHTO BIM effort
- Need help from owners and designers by next meeting
- Need to look at look Luke's work

k. TG 16 - Sougata Roy (Rutgers University)

Sougata was not present at this meeting. Frank Artmont chaired the TG16 meeting. Some time was spent discussing use of Orthotropic Steel Decks on rural roads. The issue of crash barriers was raised.

Main Points

- Frank reported for Sougata
- Jeff and Frank will work with Sougata to get their document moving
- Two big issues
 - Wearing surface
 - Railing
- Maybe do what grid deck does

l. TG 17 - Jennifer Pazdon (CAST CONNEX)

Spent time reviewing draft guide specification. Who used the document, responsibilities. Add preface with that information outlining who would use the specification and how. Including an example of contractual arrangements and flowchart of the workflow.

Main Points

- Starting review of guide spec document
- Discussion of workflow – important for the community to understand; will address in the doc preface or appendix

m. TG 18 - Jason Provines (VDOT)

Focused on duplex stainless steel; revisited the whys; will invite a fabricator who has worked with this to do a presentation. Discussed draft plate specification. Nancy led discuss on duplex design specification – key difference is different stress-strain relationship and not a well-defined yield point; need to consider, particularly for buckling behavior. Presentation by Matt of Stainless Structural – make shapes using laser welding. Discussed Stan's welding specification.

n. Joint TG 1 Detailing, TG 11 Design, TG 12 Constructability – Christina Freeman (FDOT)

The group did an informal public comment period, and they spent the meeting working through some of the more challenging comments from that. The remaining comments will be addressed through virtual meetings. The hope is to have it completed and ready for the balloting process by May 2023 for consideration at the 2024 AASHTO CBS meeting.

- o. Joint TG 1 Detailing, TG 15 Data Modeling for Interoperability – Aaron Costin (University of Florida)

Jon Stratton lead this meeting and the group had a working session. Owner and design input is going to be needed to help with the next stages of development. So, this will involve a joint effort with TG11 and TG13 for example. The previously created TG15 documents need to be revisited and determine what the future holds for these. For example, whether they are going to be AASHTO Collaboration documents, whitepapers, or ASIC document that align with the AISC BIM initiatives. This will require some coordination with Luke Faulkner.

- 3. Other Business (11:40 AM – Noon)
- 4. Adjourn

Appendix A – Attendee List

First Name	Last Name	Company
Devin	Altman	AISC
Frank	Armont	Modjeski & Masters, Inc.
Brian	Atkinson	HNTB
Nancy	Baddoo	The Steel Construction Institute
Vin	Bartucca	National Steel Bridge Alliance
Shane	Beabes	AECOM
Ted	Bush	HDR Engineering, Inc.
Travis	Butz	Burgess and Niple
Jeff	Carlson	AISC
Nicholas	Cervo	HDR Engineering, Inc.
Brandon	Chavel	Michael Baker International
Xiaohua "Hannah"	Cheng	New Jersey Department of Transportation
Bob	Cisneros	High Steel Structures
Gary	Coates	Nickel Institute
Matthew	Conso	KTA - Tator
Doug	Crampton	Wiss, Janney, Elstner Associates, Inc.
Carlos	de Oliveira	Cast Connex Corporation
Mattia	Del Giacco	Stainless Structural America
Brad	Dillman	High Steel Structures LLC
Robin	Dunlap	High Steel Structures LLC
Tom	Eberhardt	HDR Engineering, Inc.
Jon	Edwards	DOT Quality Services
David	Fish	TxDOT - Bridge Division
Karl	Frank	Attendee
Christina	Freeman	Florida Department of Transportation
Leroy	Gardner	Imperial College London
Chris	Garrell	National Steel Bridge Alliance
john	gast	Con Weld
Heather	Gilmer	Pennoni Associates Inc.
Stan	Gingrich	Amentum
Keith	Griesing	Hardesty & Hanover, LLC
Nick	HALTVICK	MN DOT - Bridge Office
Randall	Harrison	W&W AFco Steel
Greg	Hasbrouck	Parsons
John	Hastings	AISC
Todd	Helwig	University of Texas at Austin
Nate	Hicks	HDR
jamie	hilton	KTA-Tator, Inc.
Catherine	Houska	Catherine Houska Consulting LLC
Yuying	Hu	MN DOT - Bridge Office
Cathleen	Jacinto	FORSE Consulting, LLC
Russell	Jeck	Tutor Perini Corporation

First Name	Last Name	Company
David	Johnson	Industrial Steel Construction, Inc.
Karl	Johnson	MN DOT - Bridge Office
Mike	Johnson	Idaho Transportation Department
William	Johnson	Idaho Transportation Department
Zane	Keniston	QMC Contract Auditors
Sri	Kotha	PGH Wong Engineering, Inc.
Lawrence	Kruth	American Institute of Steel Construction
Kris	Lark	North American Stainless
Jihshya	Lin	MnDOT
Jason	Lloyd	Nucor Corporation
Kara	Lorenz	High Steel Structures
Natalie	McCombs	HNTB
Ronnie	Medlock	High Steel Structures LLC
Francisco	Meza	Steel Construction Institute
Teresa	Michalk	TX DOT
Johnnie	Miller	KTA-Tator, Inc.
Kent	Nelson	DOT Quality Services
Deanna	Nevling	HDR Engineering, Inc.
Todd	Niemann	Fickett Structural Solutions
Dusten	Olds	HDR Engineering, Inc.
Joshua	Orton	Brasfield & Gorrie, LLC
Duncan	Paterson	Alfred Benesch & Company
Jennifer	Pazdon	Cast Connex Corporation
Stephen	Percassi	Genesis Structures
Andy	Personett	New Castle Stainless Plate, LLC
Anthony	Peterson	American Institute of Steel Construction
Jason	Provines	Virginia Transportation Research Council
Christopher	Raebel	American Institute of Steel Construction
Rich	Raffin	Collins Engineers, Inc.
Eric	Rau	HDR
Tony	Ream	HDR
Michael	Roberts	0
francesco	russo	Russo Structural Services
Ken	Sandell	KGS Foundry Consulting, LLC
Phil	Sauser	UH Services Group
Grant	Schmitz	HDR Engineering, Inc.
Thomas	Shaw	Stainless Structural America
Kyle	Smith	Greenman-Pedersen, Inc.
Dan	Snyder	American Iron and Steel Institute
Gerard	Sova	Hardesty & Hanover, LLC
Jason	Stith	Michael Baker International, LLC
David	Stoddard	SSAB Americans
Jonathan	Stratton	Eastern Steel Works, Inc.

First Name	Last Name	Company
Jeff	Svatora	HDR
Paul	Vinik	GPI
Brian	Watson	HDR Engineering, Inc.
Don	White	Georgia Institute of Technology
Gary	Wisch	DeLong's, Inc.
Brian	Witte	Parsons

Appendix B – Document Release Schedule and Status

Document	Status	Year Completed/Targeted	Task 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
G4.4.2006	Released	2006	4	QC/QA	Sample Owners Quality Assurance Manual
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
G4.2.2021	Released	2021	4	QC/QA	Guidelines for the Qualification of Structural Bolting Inspectors
G4.2	Update - In-Progress	2024	4	QC/QA	Guidelines for the Qualification of Structural Bolting Inspectors
G4.4	Update - In-Progress	2024	4	QC/QA	Sample Owners Quality Assurance Manual

Document	Status	Year Completed/Targeted	Task Group	Task Group Name	Document Title
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	Submitted to AASHTO Publishing	2022	8	Coatings	Galvanizing Guide Specification
G8.4	New - In-Progress	Unknown	8	Coatings	Detailing for Coatings and Weathering Steel
G9.1.2004	Released	2004	9	Bearings	Steel Bridge Bearing Design and Detailing Guidelines
G9.1	Submitted to AASHTO Publishing	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	2024	10	Erection	Steel Bridge Erection Guide Specification
G11.1	New - In-Progress	2022	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

Document	Status	Year Completed/Targeted	Task Group	Task Group Name	Document Title
G13.2	New - In-Progress	2024	13	Analysis of Steel Bridges	Guidelines for the Analysis of Trusses
G14.1.2021	Submitted to AASHTO Publishing	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	2023	16	Orthotropic Deck Panels	Cost Effective Orthotropic Decks

Appendix C – Meeting Attachments

TG 2 Fabrication and Repair – Updated Meeting Notes from Spring 2022 Meeting

TG 2 Fabrication and Repair

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 - TUV Rheinland

Vice Chair: Duncan Paterson - HDR Engineering Inc.

Secretary: Christopher Garrell - NSBA

1. Chairperson's Welcome

- a. AISC Antitrust Policy and Meeting Code of Conduct.
- b. Approval of Previous Meeting Minutes.

Previous meeting minutes were approved.

- c. Reminder of documents currently under the task group's scope
- d. AASHTO steel fabrication specification status update: F3148 & "combined method"

2. G2.2, Guidelines for Resolution of Steel Bridge Fabrication Errors

Task Group has two documents, S2.1 and G2.2, it has been maintaining. S2.1 will be turned into a formal AASHTO specification and the TG2 will remain in a strong advisory role. In the future, any changes would have to be accepted by AASHTO T-17. So any comments from TG2 would then filter up to T-17. Future Collaboration meeting will attempt to maintain the relationship with T-17 by co-hosting meetings once they return back to in-person meetings.

At this time the only document that TG2 maintains is G2.2. Maintaining the existing documents has required a lot of time, so creating new document was not always pursued.

a. Improper preheat

Addressing this issue has been challenging. (We are not referring about to cases where fabricator did it preheat but the preheat was not witnessed. This topic will assume that preheat was not performed, or done improperly and not trust issues between fabricator and inspector.) Alternative preheat annex in D1.5 might be a good reference for fillet welds however-but has been more challenging for groove welds and defining testing procedures. This is a common shop issue that would be valuable to have guidance on. The issue needs to be defined by weld type and may even extend to particular situations (e.g., fillet weld for a stiffener). As long as you have access to the weld, hardness values are easier to obtain.

The primary purpose of preheat is to avoid hydrogen and hard microstructure. The TG should consider defining what the concerns are in instance where preheat was not performed and then address those concerns individually. A side question raised was how effective is post weld heating while the weld is warm or hot versus starting with a cold weld in driving out hydrogen? Next, if performing hardness tests, where are the best places (easy to access and representative of the weld condition) to perform this? Karl Frank felt that hardness testing should be the primary focus (ultrasonic hardness testing). [Reference AWS Annex H alternative preheat annex.](#) [He mentioned that there is an NCHRP study coming out soon about HAZ toughness.](#) Ronnie Medlock suggested making mock-ups and running hardness trials; [Karl Frank said he would draft a protocol.](#) Part of this should be the use and results of ultrasonic hardness testing equipment. Possibly contacting one of the equipment manufacturers might be a good idea. They may be willing to help with the mock-up testing.

[ad hoc task group: Ronnie Medlock, Jason Gramlick, Todd Niemann, Karl Frank, Justin Ocel, David Stoddard](#)

b. Framing members too short

Addressing geometry is fairly straight-forward but may still need approval by the engineer. However, [for this is more complex with a](#) more complex section (e.g., box sections) where the entire member is too short. For example, lengthening a floorbeam member. The range [of instances](#) where members are too short is broad. This section would provide guidance on what to put into an NCR since everything would be subject to review.

Fillers are a [reasonable](#) approach to but would have to be welded as opposed to a [loose](#) filler where it is prone to loss of shear capacity. Add common sense approach for small adjustments in cases where a member is too short so that project timelines are less likely to be impacted. This section (and the guide [as a whole](#)) provide a point for mutual discussion and agreement between the engineer and fabricator to facilitate the discussion and solution. If something is designed to the limits, any change (big or small) would be significant. So degree of difficulty might be affected by how the design was performed (e.g., performance ratio of 1.001). The concern was raised with fillers where they could lead to issues with pack rust. It would be useful if the guide included examples (for common issues). Also, it would be preferred if the fabricator was the first person to suggest resolution since they would be in the best position to suggest the most expedient solution.

Given that the guide is example based, the TG2 members should be surveyed for issues they have run into along with solutions, [specifically](#) for this new section on members that are too short. They should also look back through the existing examples and suggest alternatives or additions. Dan Beck reminded

the ~~the~~ group that realistically the guide will never capture all scenarios and that the owner will still need to make a final decision. However, the example will help facilitate the solution and negotiations that result.

Suggest sending out an email to fabricators asking for examples of repairs for past projects. However, would fabricators be willing to provide these and what format would they need to be in? Two areas lacking coverage in the guide, in general, are tub girders and box beams.

ad hoc task group to identify cases, remediation and commentary for members too short: Jon Edwards, Ronnie Medlock, Jason Gramlick, Duncan, Kyle Smith

c. Exceeding maximum interpass temperature

~~New topic. Looking for input from group.~~

Is it appropriate to note that the welding code is a bit conservative? Karl Frank said that should be welding code commentary. Issues are retempering and softening of HAZ. Robin Dunlap said High Steel has some test data on higher interpass temperatures.

d. Hydrogen diffusion postheat not performed

~~New topic. Looking for input from group.~~

Better to do it after the fact than not at all. Reestablish NDT waiting period after the postheat.

3. AASHTO fabrication specification (formerly S2.1)

- a. Continuing work on slip coefficients, especially regarding metallizing and combination of different coatings in same connection

There is existing research from Canada on combined metalized and galvanized connections. Example, metalizing girder and galvanizing the cross-frames. Feel there is enough information for commentary on this class of connections. In the last edition of 2.1 contains commentary that unsealed thermal spray should pass Class D slip. This includes reference to paper with supporting information. The Canadian specification had language proposed, however Heather is uncertain if that was ever accepted. Metalizing specification require masking of connecting surfaces. Karl Frank recommended this would be better suited for the design specification rather than the fabrication specification. It was suggested that it be add it to the existing slip table rather than commentary. The interface is highly dependent on the roughness of the surface of the galvanizing resulting from the base metal.

- b. Scribing/etching of layout marks

Primary concern is with scribe mark if transverse to primary tensile stress unless it is welded over.

Karl Frank stated that the Hirschfeld study showed that the fatigue strength was not affected in instance of scribe marking, especially if the material is blasted afterwards. Letters and numbers were tested,

however what affect would lines have in cases where they were used for stiffener layout. The research is does not necessarily support the position against scribing and the topic should be revisited so that it is not misrepresented and ~~an~~ issues is-are not created ~~where it is not~~unnecessarily. Scribes are typically no deeper than what is already allowed in undercut thickness limits and tolerances. The proper way to approach this may be to correlate this to undercut requirements and make reference to that. Machine versus human scribes could result in different depths. Karl Frank suggested that the group focus on plasma scribing rather than mechanical scribing. The group probably needs to better define what can and should be classified as scribing and etching.

Remaining items ~~w~~here not covered during this meeting.

- c. Allowable gap at girder bolted splices
- d. Reaming allowances & bolt hole tolerances
- e. Unifying requirements for repair by grinding for various situations & combining the sections.
Deferred until publication of fabrication specification
- f. Applying A6 Table X4.2 (the old radii we used to have) to the 1.5t case for bending connection plates. Or maybe no $\frac{3}{4}$ " limit? Compare AREMA. Deferred until after consideration by AASHTO T-14
- g. Transverse members in assembly for skewed as well as curved—currently not in S2.1 or current fabrication specification draft. Deferred until after consideration by AASHTO T-14 issue first

4. Additional Topics

Karl Frank noted that castings are coming and we need to start thinking about how to integrate them.

During the TG12 meeting, the question came up about appropriate means and methods for cambering rolled beams and this seemed like a good topic for either Fab Spec or its commentary.

5. Adjourn

TG 13 Analysis of Steel Bridges – Meeting Presentations

Welcome to the AASHTO/NSBA Joint Collaboration Committee Meeting

Task Group 13 Analysis of Steel Structures

2022 Fall Meeting
Minneapolis, MN



1

TG 13 Mission and Documents

The development of guidance on issues related to steel bridge analysis and to educate Engineers so that they can better make decisions for their own project.

Published document:

**Guidelines for
Steel Girder Bridge Analysis**
G13.1-2019

Currently working on: Guidelines for Steel Truss
Bridge Analysis

2

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- 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.

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- 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 judgment on an issue before this group.

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**Smarter.
Stronger.
Steel.**

3

TG 13 Introductions

- Chair: Deanna Nevling, HDR Engineering, Inc.
- Vice Chair: Frank Russo, Russo Structural Services
- Secretary: Chris Garrell, NSBA
- Attendees

4

Agenda



AASHTO/NSBA Steel Bridge Collaboration

TG 13 Analysis of Steel Bridges
Millennium Minneapolis
Minneapolis, MN
Room Name: South Grand

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: [Zoom Link](#)

Zoom Meeting ID: 811 2934 9340

Meeting Agenda: 10/11/2022 (1:00 PM - 3:00 PM CT)

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 - 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)
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 - 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

5

Meeting Minutes – St. Louis April 7, 2022

- 50 people in attendance
- Meeting minutes from Fall 2021 were reviewed and approved
- Industry updates provided
- “Evaluation and Retrofit for the Second Widening of the P.R. Olgiati Bridge” Frank Artmont
- “Design and Construction of the Olentangy Trail Arena District Connector Bridge” Travis Butz
- G13.2 – High level comment review
- Software validation initiative was discussed
- Outstanding items for discussion?

6

Agenda



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7

Latest Industry Updates

- Virtual Accelerated Bridge Construction Conference
December 7-9 | Miami, FL
- TRB Annual Meeting
January 8-12 | Washington, D.C
- NASCC – The Steel Conference
April 12-14 | Charlotte, NC
- WTS International Conference
May 10 -12 | Atlanta, Georgia
- AASHTO Committee on Bridges & Structures Annual Meeting
May 22 -25 | Kansas City, Missouri
- International Bridge Conference
June 12-14 | National Harbor, MD

8

Latest Industry Updates

- **NSBA** – Chris Garrell



9

Latest Industry Updates

- **FHWA Update** - Dayi Wang, FHWA Specialist



10

Latest Industry Updates

- **TRB AKB20 (Steel Bridges Committee)**

Jamie Farris



11



AKB20 Steel Bridge Committee Update

OCTOBER 2022



12

12

2023 TRB Annual Meeting

- Committee meeting
- Subcommittee meeting
- 2 Lectern Sessions

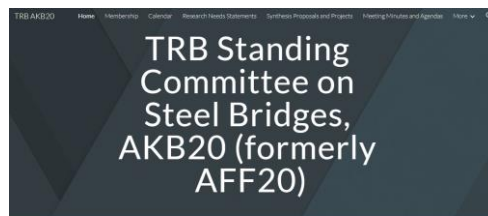


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13

2022 TRB Annual Meeting

- Agenda, Presentations, and Meeting Notes at: <https://sites.google.com/view/trbakb20>




14

14

TRB Webinars

- Please consider submitting a Webinar topic
- Submittal due dates:

Webinar forms submitted between	Have webinars scheduled between
March 16 – July 15	September 1 – December 31
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- Webinar can be 90 or 120 minutes
- Please contact Jamie Farris if you have an idea for a topic



15

15

Future Activities

- AKB20 Mid-Year Virtual Meeting
 - June or July 2023 - TBA



16

16

Let's Be Friends!

- How do I become a **Friend** of the Committee?
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 - Log in or create an account
 - Click on the Committees tab, then Become a Friend of a Committee



17

17



Contact Info:
 Jamie Farris
 Jamie.Farris@TxDOT.gov



18

18

Latest Industry Updates

- **AASHTO Update – T-14 Structural Steel Design**

Tony Ream



19

AASHTO COBS Meeting

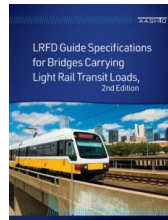
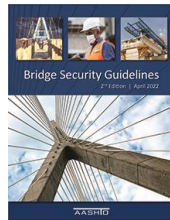
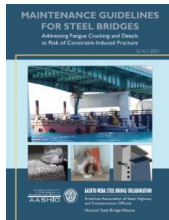
- AASHTO Committee on Bridges and Structures (COBS) Annual Meeting
- Kansas City, MO | May 22-25, 2023
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 - 2022 not up yet

20

AASHTO New 2020 Publications

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- Bridge Security Guidelines, 2nd Edition
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21

AASHTO 2022 Non-BDS Interims

- Interim Revisions (COBS Website):

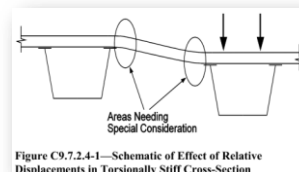
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22

AASHTO T-14: 2022 Approved Ballots

• 6.6.2.1 – Primary/Secondary Members

- Specify tub girders and components separately from I-girders
- I-girders: If AASHTO permits line girder analysis, CF are secondary
- Tub Girders:
 - Secondary: intermediate internal CF; intermediate internal diaphragms not provided for continuity; intermediate external diaphragms and CF (except as noted); internal support diaphragms in “straight” girders
 - Primary: Intermediate diaphragms providing continuity (i.e., SRM); external support diaphragm or CF; internal support diaphragm or CF in curved or skewed girders; intermediate external diaphragm or CF used to resist lateral deck bending in design



23

AASHTO T-14: 2022 Approved Ballots

• 6.13.2.1.1 – Required Slip Resistance

- Clarify when connections need to be designed for slip
- Relax requirements based on experience
 - Required: bolted field splices in flexural members; joints in shear with oversized holes; joints in shear with slotted holes in direction force (i.e., bracing); combined welded/bolted faying surface; axial tension or combined shear/tension; compression splices (not milled to bear); *and where Engineer (or Owner) deems necessary on contract documents*
 - Not Required: **diaphragms, cross frames, and lateral bracing connections with HS pre-tensioned bolts and standard holes**; shop installed top flange lateral bracing in tub girders
- Clarify that slip check during construction should be based on factored loads during deck placement per 6.10.3.1 (not for inactive winds). Final condition slip is still Service-II
- Lateral bracing not required to meet slip for construction (i.e., bottom lateral bracing with oversized holes)
- Primary/Secondary **not related** to Bearing/Slip requirements

24

AASHTO T-14: 2022 Approved Ballots

• Lateral Torsional Buckling of Nonprismatic I-Girders

- 6.10.8.2.3, A6.3.3, D6.6 (new)
- Method for determining lateral torsional buckling capacity of nonprismatic compression flanges or compact girders with noncomposite flanges in compression. Nonprismatic: change in compression flange between brace points (especially greater than 20%) and variation in web depth.
- More precise than approximate conservative methods. Useful for web variations near piers and erection with minimal CF installed.
- 3 methods in new appendix to determine C_b , F_e and r_t , which feed back into 6.10.8.2.3 or A6.3.3:
 - Method A: Elastic lateral-torsional buckling ratio, Υ_e (AISC DG 25)
 - Method B: Equivalent braced-length cross-section
 - Method C: Refined analysis.
- Standard equation for C_b updated to match AISC:

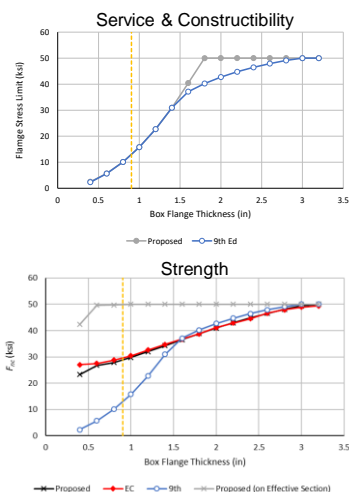
$$C_b = \frac{12.5M_{\max}}{2.5M_{\max} + 3M_A + 4M_B + 3M_C}$$

25

AASHTO T-14: 2022 Approved Ballots

• 6.11 – Box (Tub) Girder Compression Flange Capacity

- Align with updated noncomposite box provisions (6.12.2.2.2)
- Increased capacity for slender unstiffened flanges
- Rational formulation for stiffened flanges with reasonable stiffener sizes (Appendix E6)
- Minimum plate thickness and slenderness requirements
- Recognition that stiffened flanges in new designs are usually not efficient



26

AASHTO T-14: 2022 Approved Ballots

- C4.6.2.7.3 – Construction wind forces in bracing
 - Clarification/Guidance
 - Discussion of wind forces in noncomposite girders
 - Point to *AASHTO Guide Specifications for Wind Loads on Bridges During Construction*
- 6.12.2.2.4b – WT moment resistance
 - Clarifications
 - Align with AISC
- C6.13.2.7 – Bolt threads in shear planes
 - Must consider bolt/plate arrangement – not automatic
 - Suggested procedure

27

AASHTO T-14: 2022 Approved Ballots

- 6.10.1.8 – Tension flange holes (clarification)
- 6.13.28 – Slip coefficient
 - Class D slip is galvanized and mixed faying surfaces
- 6.4.3.1.1 – Bolts
 - Add F3148 bolts
- C6.7.8 – Bent plate radius
 - Remove 1.5x increase in minimum plate bending radius for direction of rolling (5.0t), except for permitted reduction in cross-frame and diaphragm connection plates up to 0.75" thick
- Various
 - Change applicable references from Construction Spec to new Fabrication Spec.

28

AASHTO T-14: Future Ballot Items

- FCM ► NSTM
- Minimum % negative reinforcement for deck with precast SIP
- Include reinforcement (max 1%) for design of field splices in negative moment regions – if needed.
- Reduced field splice demand for tub girders with slender compression flanges?
- Tub girder improvements/clarification based on UT research:
 - Intermediate CF every other point with struts between
 - Partial length top flange lateral bracing (TLB) for “straight” tubs
 - 5% offset of TLB work point from CF line
 - Increase allowable web inclination from 1:4 to 1:2.5, if needed
 - Offset top flanges to web centerline for bracing connections
- Remove “flange-connected” for WT connection stiffness reduction

29

Agenda

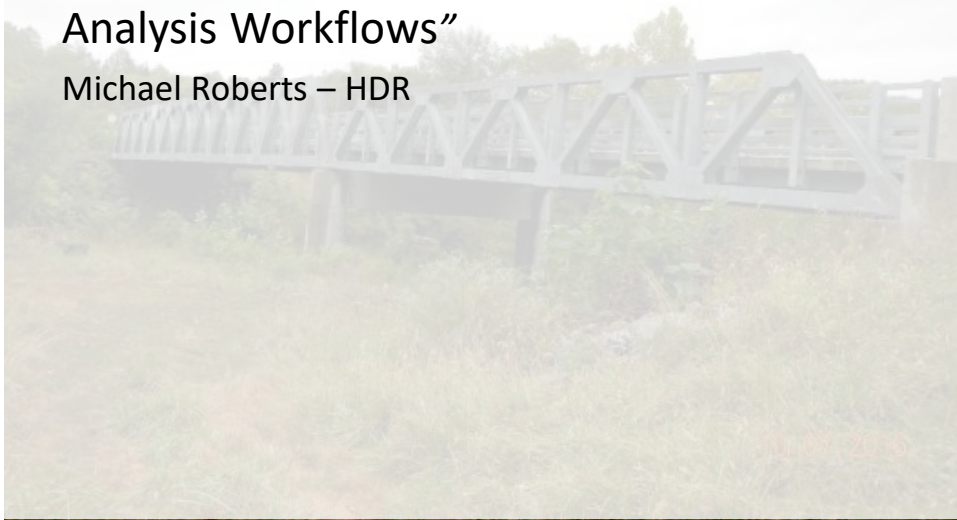
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4. G13.2 Guidelines for Steel Truss Bridge Analysis (2:10 PM – 2:30 PM)
 - a. Volunteers
 - b. Schedule
5. Software Validation and Checking Complex Models (2:30 PM – 3:00 PM)
 - a. Progress update
 - b. Volunteers
6. Adjourn

30

Presentation

“Parametric Paradigms Improving Bridge Analysis Workflows”

Michael Roberts – HDR



31

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G13.2 Truss Analysis Document

- **Purpose Statement:** *The Guidelines for Steel Truss Bridge Analysis provides engineers with guidance on methods of analysis for steel trusses and can be used for analyzing the trusses for design, erection, rehabilitation, or load rating.*
- Thank you to the small group authors and reviewers!
- Volunteer Reviewers
Figures: 2.3.1, 3.1.1, 3.5, 4.5.6, 4.5.9
Text: 2.3.1, 3.1.1,
- Reviews due October 31st
- Draft going to AASHTO before Thanksgiving

33

TG 13 Commercial Software Validation

- Review survey questions



34

**Thank You for Attending the
AASHTO/NSBA Joint Collaboration
Committee Meeting**

**Task Group 13
Analysis of Steel Structures**

2022 Fall Meeting
Minneapolis, MN





AKB20 Steel Bridge Committee Update

OCTOBER 2022



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Contact Info:

Jamie Farris

Jamie.Farris@TxDOT.gov



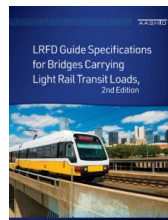
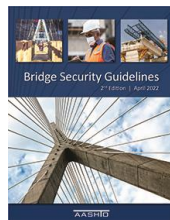
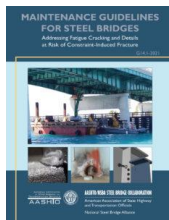
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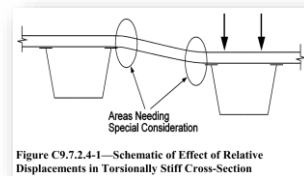
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AASHTO T-14: 2022 Approved Ballots

- 6.13.2.1.1 – Required Slip Resistance
 - Clarify when connections need to be designed for slip
 - Relax requirements based on experience
 - Required: bolted field splices in flexural members; joints in shear with oversized holes; joints in shear with slotted holes in direction force (i.e., bracing); combined welded/bolted faying surface; axial tension or combined shear/tension; compression splices (not milled to bear); *and where Engineer (or Owner) deems necessary on contract documents*
 - Not Required: **diaphragms, cross frames, and lateral bracing connections with HS pre-tensioned bolts and standard holes**; shop installed top flange lateral bracing in tub girders
 - Clarify that slip check during construction should be based on factored loads during deck placement per 6.10.3.1 (not for inactive winds). Final condition slip is still Service-II
 - Lateral bracing not required to meet slip for construction (i.e., bottom lateral bracing with oversized holes)
 - Primary/Secondary **not related** to Bearing/Slip requirements

24

AASHTO T-14: 2022 Approved Ballots

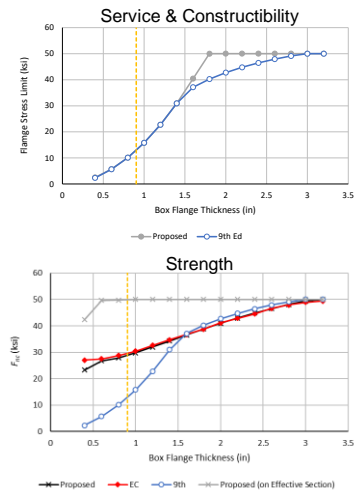
- Lateral Torsional Buckling of Nonprismatic I-Girders
 - 6.10.8.2.3, A6.3.3, D6.6 (new)
 - Method for determining lateral torsional buckling capacity of nonprismatic compression flanges or compact girders with noncomposite flanges in compression. Nonprismatic: change in compression flange between brace points (especially greater than 20%) and variation in web depth.
 - More precise than approximate conservative methods. Useful for web variations near piers and erection with minimal CF installed.
 - 3 methods in new appendix to determine C_b , F_e and r_t , which feed back into 6.10.8.2.3 or A6.3.3:
 - Method A: Elastic lateral-torsional buckling ratio, ν_e (AISC DG 25)
 - Method B: Equivalent braced-length cross-section
 - Method C: Refined analysis.
 - Standard equation for C_b updated to match AISC:

$$C_b = \frac{12.5M_{\max}}{2.5M_{\max} + 3M_A + 4M_B + 3M_C}$$

25

AASHTO T-14: 2022 Approved Ballots

- 6.11 – Box (Tub) Girder Compression Flange Capacity
 - Align with updated noncomposite box provisions (6.12.2.2.2)
 - Increased capacity for slender unstiffened flanges
 - Rational formulation for stiffened flanges with reasonable stiffener sizes (Appendix E6)
 - Minimum plate thickness and slenderness requirements
 - Recognition that stiffened flanges in new designs are usually not efficient



26

AASHTO T-14: 2022 Approved Ballots

- C4.6.2.7.3 – Construction wind forces in bracing
 - Clarification/Guidance
 - Discussion of wind forces in noncomposite girders
 - Point to *AASHTO Guide Specifications for Wind Loads on Bridges During Construction*
- 6.12.2.2.4b – WT moment resistance
 - Clarifications
 - Align with AISC
- C6.13.2.7 – Bolt threads in shear planes
 - Must consider bolt/plate arrangement – not automatic
 - Suggested procedure

27

AASHTO T-14: 2022 Approved Ballots

- 6.10.1.8 – Tension flange holes (clarification)
- 6.13.28 – Slip coefficient
 - Class D slip is galvanized and mixed faying surfaces
- 6.4.3.1.1 – Bolts
 - Add F3148 bolts
- C6.7.8 – Bent plate radius
 - Remove 1.5x increase in minimum plate bending radius for direction of rolling (5.0t), except for permitted reduction in cross-frame and diaphragm connection plates up to 0.75" thick
- Various
 - Change applicable references from Construction Spec to new Fabrication Spec.

28

AASHTO T-14: Future Ballot Items

- FCM ► NSTM
- Minimum % negative reinforcement for deck with precast SIP
- Include reinforcement (max 1%) for design of field splices in negative moment regions – if needed.
- Reduced field splice demand for tub girders with slender compression flanges?
- Tub girder improvements/clarification based on UT research:
 - Intermediate CF every other point with struts between
 - Partial length top flange lateral bracing (TLB) for "straight" tubs
 - 5% offset of TLB work point from CF line
 - Increase allowable web inclination from 1:4 to 1:2.5, if needed
 - Offset top flanges to web centerline for bracing connections
- Remove "flange-connected" for WT connection stiffness reduction

29

TG 13 Analysis of Steel Bridges – Draft Software Survey

SOFTWARE VALIDATION SURVEY QUESTIONS

As a steel bridge analysis and/or *design* software user rank the following components of a **software user manual** as not important (1) to extremely important (5)

- Input definitions and descriptions
- Input variables match AASHTO LRFD BDS
- Include state-specific input definitions and descriptions
- Clear definitions of how things should be input and what that changes, including examples
- Appropriate graphics/illustrations showing what is being input
- How input is being used in analysis
- Index/ table of contents/bookmarks
- Well defined outputs (description of what exactly is given at the conclusion of the run)
- Application Programming Interface (API) access documentation and availability for input and output

Commented [ND1]: Add separate category for third party software interaction for input and output

As a steel bridge analysis and/or *design* software user rank the following components of an **example manual** as not important (1) to extremely important (5)

- Example files are provided listing both input and output
- Manual to show user how to replicate the example and perform the analysis
- Results for the examples for comparison purposes
- Provide examples for different types of bridges with different loading types such as vehicles, earthquake, creep and shrinkage, etc.
- Provide standard examples (maybe a FHWA example)

Commented [ND2]: What do we need? Issue to TG 13 first?

Commented [ND3]: Change to must be included. What changes would you like to see?

Commented [ND4]: Sample size?

Commented [ND5]: What would make you switch vendors?

As a steel bridge analysis and/or *design* software user rank the following components of the **analysis theory manual** as not important (1) to extremely important (5)

- Theory manual is provided
- Describe the analytic theory employed to sufficient detail that the analysis results can be replicated. For example, how are variable depth members analyzed?
- Provide hand calculations demonstrating the analysis method where practical.
- Benchmark models
- Output – How results are computed

As a steel bridge analysis and/or *design* software user rank the following items related **to software upgrade documentation** as not important (1) to extremely important (5)

- List of changes made to the software
- Clear, specific descriptions of each change made to the software
- Reason for changes
- Quality process followed to validate all features, including existing and new, and ensure nothing else inadvertently changed
- Frequency of upgrades limited to 6 months or greater
- Publication of benchmark models used for validation

- Documentation of AASHTO edition for which software is updated to (design related)
- For bug-fix upgrades, detail the ramifications of the bug that was fixed. How and to what degree do results for the fixed version differ from the previous version.

As a steel bridge analysis and/or *design* software user rank the following items related to **verification, validation, and QC** as not important (1) to **extremely** important (5)

- Provide a suite of sample problems that exercise every aspect of every program option.
- Provide new runs of the sample problem suite for each program version and highlight the differences in the output.
- When a new version (or bug patch) of the program is released, provide a list of the revised (patched) software routines and what program options the user needs to test to exercise these new (or patched) routines.
- Define which suite of program options need to be run to fully exercise the software. For example, to test distributed dead load analysis, does running a problem with variable dead load also validate the program for uniform dead load? Or are uniform dead loads and variable dead loads handled by different routines within the software.
- Example showing fundamentals for FEA's such as meshing and loading simulations.
- Transparency of the functionality of the live loader. What is the program doing to determine the critical loading location?
- Visual/graphical representation of controlling live load
- Clearly link the software documentation and sample problem runs to the associated program version.
- Vendor supplied tools for regression testing
- Maintain a library of past software versions so users have access to them.
- Current list of known bugs, made available to all users
- List of previous bugs and how they were solved and in what version
- Provide input and output for a standard example that all software vendors compare to (maybe an FHWA example?)

Commented [ND6]: List of processes used by consultants to validate software

As a steel bridge analysis and/or *design* software user rank the following items related to **Tech Support**

- Quick response time to tech support questions
- Easy to find contact info.
- Ability to help if you need project specific items
- Experience bridge engineer on staff who is available to consult with users
- Thoroughness and accuracy of answers

Please select software you commonly use for bridge analysis

- AASHTOWare BrR
- AASHTOWare BrDr
- MDX Software
- LEAP Bridge Steel

- LRFD Simon
- Descus
- Midas
- LARSA
- LUSAS
- Bentley STAAD
- CSiBridge
- Adina
- Sap2000
- RMBridge
- Risa
- Ansys Civil FEM
- Abaqus
- Robot Structural Analysis
- Other – Please specify

Commented [NB7]: I think SAP2000 and CSiBridge are one in the same now

Commented [ND8R7]: I checked CSI website and they offer SAP2000 and CSiBridge as products.

Engage design task group at some point in the future.

- For design:
 - Describe the specification being used including year, edition, and addendums.
 - List which specification sections are used (or omitted).
 - When the specification permits different procedures, define the procedure employed. For example, r_t can be calculated by AASHTO C6.19.8.2.3-1 or AASHTO 6.10.8.2.3-9. And AASHTO Table 4.6.2.2.1-3 allows simplified values for some live load distribution terms.
 - Provide hand calculations demonstrating how the program performs the design.
 - Design check validations: bending, shear, compression for both service and strength.

Appendix D – Meeting Schedule

Schedule Overview

NOTE: All times are shown as Central Time Zone

Tuesday, October 11

Meeting	Chair	Vice Chair	Start (CT)	End (CT)
Combined TG 2 Fabrication and Repair and AASHTO T17	Heather Gilmer	Duncan Paterson	8:00 AM	Noon
Combined TG 1 Detailing, TG 15 Data Modeling for Interoperability	Aaron Costin	Jonathan Stratton	10:00 AM	Noon
TG 1 Detailing	Randy Harrison	Gary Wisch	1:00 PM	3:00 PM
TG 13 Analysis of Steel Bridges	Deanna Nevling	Francesco Russo	1:00 PM	3:00 PM
TG 10 Erection	Brian Witte	Jason Stith	3:00 PM	6:00 PM
TG 16 Orthotropic Deck Panels	Sougata Roy	Frank Artmont	3:00 PM	6:00 PM

Wednesday, October 12

Meeting	Chair	Vice Chair	Start (CT)	End (CT)
TG 14 Field Repairs and Retrofits	Kyle Smith	Jonathan Stratton	8:00 AM	Noon
TG 18 Duplex Stainless Steel	Jason Provines	Nancy Baddoo	8:00 AM	Noon
TG 8 Coatings	Paul Vinik	Johnnie Miller	1:00 PM	3:00 PM
TG 12 Design for Constructability and Fabrication	Christina Freeman	Russell Jeck	1:00 PM	2:00 PM
Combined TG 1 Detailing, TG 11 Steel Bridge Handbook, TG 12 Design for Constructability and Fabrication	Christina Freeman		2:00 PM	5:00 PM
TG 4 QC/QA	Jamie Hilton	Robin Dunlap	3:00 PM	5:00 PM

Thursday, October 13

Meeting	Chair	Vice Chair	Start (CT)	End (CT)
TG 11 Design	Brandon Chavel	Domenic Coletti	8:00 AM	10:00 AM
TG 17 Steel Castings	Jennifer Pazdon	Jason Stith	8:00 AM	10:00 AM
MC Main Committee	Ronnie Medlock	Christina Freeman	10:00 AM	Noon