Date Distributed:

THE NATIONAL BOARD
OF BOILER AND PRESSURE VESSEL INSPECTORS

NATIONAL BOARD INSPECTION CODE TASK GROUP LOCOMOTIVE BOILERS

MINUTES

Meeting of July 29-30, 2024
Columbus, OH

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The National Board of Boiler & Pressure Vessel Inspectors
1055 Crupper Avenue
Columbus, Ohio 43229-1183
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1. **Call to Order**
   Mr. Mark Ray, Chair of the Locomotive Task Group (TG), called the Locomotive TG meeting to order at 9:00 am (EST) on **July 29, 2024**.

2. **Introduction of Members and Visitors**
   All members and visitors, in person and online, stated their name and company. All members and visitors are noted on the attendance sheets. (**Attachment Page 1**)

3. **Check for a Quorum (51% - with 16 members, 9 must be present)**
   With 11 of 16 members present, both in person and online, a quorum was established.

4. **Announcements**
   Secretary, Ms. Metzmaier gave announcements to the TG (**Attachment Page 2**)

   Mr. Luis Ponce added additional comments regarding holding meetings at the National Board (NB). He stated it is harder to get these meetings scheduled at the NB due to a rise in training courses. He also added that the Historical TG created a draft course for training and brought up the idea of the Locomotive TG doing the same. He stated the TG must be involved with this as we do not have the technical knowledge in house to create this course.

   Jonathan Ellis added that the National Board will be moving from the NB file share Cloud to Microsoft SharePoint. He also stated Lunch will be provided at Noon.

   Mr. Ray spoke to the group discussing whether this group should start to meet twice a year and possibly one of those meetings during the main July NBIC meetings. He also spoke on how he would like to continue to get more information into the NBIC and get the word out to the industry about the NBIC.

5. **Adoption of the Agenda**
   - Add discussion item: Richard Stone's email.

   A motion was made to adopt the agenda with the above item added. The motion was seconded and **unanimously approved**.

   When the TG got to "Review of Roster" in the agenda, it was noticed that Tim Botti (General Interest) & Jeff Churchill (User) needed to be added to the agenda for Membership Nomination. The group chose to add them to the agenda for vote as a member.

   The original member who made the motion to adopt the revised agenda, revised his motion to include the above nominees. The motion was seconded and **unanimously approved**.

6. **Approval of the Minutes of the January 2024 Meeting -** The minutes are available for review on the NBIC Committee Information page under the NBIC tab on NBBI.org.

   A motion was made to approve the minutes from the January 2024 meeting. The motion was seconded and **unanimously approved**.

7. **Review of Rosters**
    a. **Membership Nomination -** Tim Botti (General Interest) & Jeff Churchill (User) would like to become members of the TG.

    Mr. Botti & Mr. Churchill spoke to the group regarding their background, why they would like to become a member of this TG, and how they would be an asset. Members of the TG spoke on behalf of each nominee discussing their interactions with them and talking on how they would be a good addition to the TG. The TG reviewed also reviewed the resumes of both nominees. A motion was made to accept both nominees to the TG. The motion was seconded and **unanimously approved**.

    b. **Membership Reappointments - NONE**

    c. **Officer Elections - NONE**

8. **Interpretations - NONE**

9. **Action Items**

Old Business:

Discussion on Fillet Welded Staybolts:

- **July 2024 Meeting Action:** Mr. Ray discussed this item with the TG. The TG reviewed Part 3, S1.2.5 & S1.2.5.1. Mr. Botti stated he wasn't sure where to go with this item and he would like some input from the TG. Mr. Moedinger stated he believes the TG decided nothing needed to be done with this due to the references already being mentioned in the NBIC. The TG discussed making sure the temperatures for hydro testing were clear in Part 2. **This discussion item may now be closed.**

  While reviewing this section of the NBIC Part 2 there were a few editorial things found that need to be corrected. Ms. Metzmaier will note these changes and they will be corrected by the NB staff.

Reviewing previously closed items to determine if any should be reinitiated:

- 17-145 - Clarify repair vs. alteration for locomotive boilers
    - **July 29, 2024, Meeting Action:** The TG decided to **close this item as a discussion** item because these items are listed on Mr. Ray's spreadsheet of items to open. Two new items will be open to address the issues from this discussion item.

- NB16-2501 - Change "radiographic" to "volumetric" to allow for ultrasonic
    - **July 29, 2024, Meeting Action:** The TG would like **to close this item** as they believe changing "Radiographic" to "volumetric" in Part 3, Supplement 1 is an **editorial change**. This change will be made by the NB staff. They would like to keep this item on the agenda as a reference for their next meeting so they can verify this change has been made in the 2025 edition. Ms. Metzmaier and Mr. Ellis discussed with the group that this information will also be shown in the Public Review document that will be released to the public at the end of August. Mr. Ellis will send out a committee wide email to remind everyone when then document is available to be viewed on the NB website.

New Business:

The accompanying spreadsheet contains details for potential new action items that the TG will need to review to see if action items need to be opened.

At this point in the meeting the TG began going through Mr. Ray's spreadsheet of items (**Attachment Page 3**). His spreadsheet was created based on the discussions from the January 2024 meeting. The Chair chose to have Secretary, Ms. Metzmaier go over the process of how to submit an action item through the business center. Mr. Ellis reviewed the vetting process of items submitted through the Business Center. Mr. Ray chose to review the

entire list of items and assign a PM to each item that needed to be opened. Each PM will then go into the Business Center to open the new items.

Mr. Ray discussed line item 1 with the TG**:** NB18-17 was an item that was previously closed and reevaluated. The issues with this item were covered in the first discussion item regarding Fillet Welded Staybolts above. No action item will be opened.

Mr. Ray discussed line item 2 with the TG**:** NB20-69 was added to Mr. Ray's spreadsheet to make sure it was taken care of correctly. The item had a drawing with the proposal; however, the drawing was not printed in the publication of the 2023 NBIC. The TG would like to keep this item on the agenda as a reference to make sure the drawing is included in Part 3, Section 6, S1.2.11.5 in the 2025 NBIC.

Mr. Ray discussed line item 3 with the TG. After a short discussion it was decided an action item needed to be opened. Mr. Ray will open this item and he will be the PM.

Mr. Ray discussed line item 4 with the TG. This item will be taken care of as an editorial change by NB Staff. No action item will be opened.

Mr. Ray discussed line item 5 with the TG. After a short discussion it was decided an action item needed to be opened. Mr. Bulter will open this item and he will be the PM.

Mr. Ray discussed line item 6 with the TG. Mr. Moedinger discussed how the NBIC is a code and not an instructions manual. He noted that the TG needs to keep this in mind when they are adding words to the NBIC. There was a lot of discussion over whether new line(s) need to be added or if anything can be added to the current line items to address anything that is missing. Mr. Zeigler will open a new action item and will be the PM.

Mr. Moedinger brought up the idea of bringing NB and FRA together to have training at the NB. Mr. Ray will reach out to Terry Koller, current president of the HeritageRail Alliance, to see if they can take the compilation of standard railroad practices and create PDF's to upload on their website.

Mr. Ray discussed line item 7 with the TG. During discussion of this item the TG reviewed the figures in ASME Code Section PWT-11 & PW-16.1. After review of these figures, the TG decided the information in question is covered and nothing needs to be added to the NBIC.

Mr. Ray discussed line item 8 with the TG. The TG review Part 3, TABLE S1.1.3.1. Mr. Franzen will open a new item and will be the PM.

Mr. Ray discussed line item 9 with the TG. He stated that he has already opened an item for this. After Mr. Ray explained his concern, Mr. Moedinger stated he will help to create a proposal for this. Mr. Ray will open the item, and he will be the PM.

Mr. Ray discussed line item 10 with the TG. The TG had a long discussion about people using the NBIC and the "R" Certificate and when it is required or not. There was a lot of discussion around how we cannot force people to use the "R" Certificate. At this time the TG chose not to open an item.

Mr. Ray discussed line item 11 with the TG. He asked the TG if they think there should be defined intervals for inspections and what needs to happen at each interval. Some of the conversation included leaving the intervals to the jurisdictions instead of defining them in the NBIC. The TG chose not to open a new open and leave this up to the jurisdiction.

Mr. Ray discussed line item 12 with the TG. Mr. Ray explained the change he would like to make to Part 3, S1.1.4a). Mr. Moedinger will open an item, and he will be the PM.

The group began discussing the items for discussion in Mr. Stone's email. They will continue their discussion on July 30, 2024.

Adjournment: A motion was made to adjourn for the day at 4:00 pm EST on July 29, 2024. The motion was seconded and **unanimously approved**.

LOCOMOTIVE TASK GROUP – DAY 2

Call to Order: Mr. Ray called the Locomotive TG meeting to order at 9:01 am (EST) on **July 30, 2024**.

Announcements: Mr. Luis Ponce shared information on how the Historical TG has been working with the NB training department to put together a training course on Historical Boilers. He also showed them where the course catalog can be found on the NB Business Center.

Announcements: There were no new announcements given.

Quorum: With 10 of 16 members present, both in person and online, a quorum was reestablished.

Adoption of the Agenda: Mr. Ray proposed the agenda be revised to add the items that were opened based on the July 29, 2024, discussion. The new items are all listed under the new items section below. A motion was made to adopt the revised agenda. The motion was seconded and **unanimously approved**.

The below items were opened after the above discussions of Mr. Ray's spreadsheet on July 29, 2024. Each of these items were discussed on day 2 of the Locomotive TG meeting.

Item Number: 24-77	**NBIC Location: Part 3, S1.2.3k)**	**No Attachment**
General Description: Clarify Alteration for transition from rigid to flexible bolts. **Subgroup:** TG Locomotive **Task Group:** None Assigned **Explanation of Need:** This is omission from the code.		
July 2024 Action: A TG was assigned. TASK GROUP: M. Ray (PM), W. Fengler, T. Botti, J. Churchill		

Item Number: 24-78	**NBIC Location: Part 2, S1.2.4.22**	**No Attachment**
General Description: Minimum Washout Plug Thread Engagement **Subgroup:** TG Locomotive **Task Group:** B. Zeigler (PM) **Explanation of Need:** Text should be changed to clarify how minimum thread engagement is quantified.		
July 2024 Action: A TG was assigned. TASK GROUP: B. Zeigler (PM), E. Armpriester, D. Domitrovich		

Item Number: 24-79	NBIC Location: Part 3, S1.1.1 b)	No Attachment

General Description: Value of Default Tensile Strength

Subgroup: TG Locomotive
Task Group: M. Ray (PM)

Explanation of Need: FRA mandates default of 50,000 psi but boilers built after 1921 have better than 55,000 psi steel.

July 2024 Action:
A TG was assigned.

TASK GROUP: M. Ray (PM)

Item Number: 24-80	NBIC Location: Part 3, S1.2.2	No Attachment

General Description: adding a paragraph m) to Part 3, S1.2.2

Subgroup: TG Locomotive
Task Group: S. Butler (PM)

Explanation of Need: It is a pasted practice used in locomotive boiler repair for stay bolts that could not be accessed from both sides.

July 2024 Action:
A TG was assigned.

TASK GROUP: S. Butler (PM), Dervin Lambert

Item Number: 24-81	NBIC Location: Part 3, Table S1.1.3.1	Attachment Page 4

General Description: Revise Table S1.1.3.1, Part 3, Section 6

Subgroup: TG Locomotive
Task Group: R. Franzen (PM), T. Botti

Explanation of Need:
1) Need alternate material for Hollow Cylindrical Pressure Retaining Parts. Propose SA-106-B which is hollow seamless pipe to be used for super heater ball end parts. The new line-item title in the table would be "SH Unit Ball Ends", material options would be SA-106-B, SA-675, SA-696.
2) Change first line item from Boiler Tubes & Flues, Arch Tubes, Superheater Units, change to Boiler Tubes & Flues, Arch Tubes, Superheater Units & Tubing.
3) See other changes in table in RED.

July 2024 Action:
Mr. Franzen presented a proposal to the TG. The group had a lot of discussion on the additions/changes to the table, and Mr. Franzen has stated that he is not necessarily an expert when it comes to this subject, and he would like to have someone join the TG that is more knowledgeable in this subject. Mr. Ray suggested the task group speak with Mr. George Galanes. It was questioned if this table should be removed and then have a reference to ASME Code for the list of materials. The feedback was that they did not want to do that because they didn't want to make the locomotive industry have to purchase another code. A motion was made to accept the proposal as presented. The motion was seconded, and then the group then had further discussion. The TG made many changes to the proposal, and the member who made the original motion revised his motion to accept the revised proposal. The seconder also revised his second to accept the revised proposal. The motion to accept the revised proposal was **unanimously approved**.

Item Number: 24-82	NBIC Location: Part 3, S1.1.4	Attachment Page 5
General Description: Rewrite Part 3, S1.1.4 **Subgroup:** TG Locomotive **Task Group:** L. Moedinger (PM) **Explanation of Need:** ASME Section I, Part PL superseded previous calculations such as the Calculation Compendium referenced in the current wording.		
July 2024 Action: Mr. Moedinger presented and reviewed a proposal to the TG. After review of the proposal a motion was made to accept the proposal as presented. The motion was seconded, and then the group then had further discussion. The TG made many changes to the proposal during discussion, and the member who made the original motion revised his motion to accept the revised proposal. The seconder also revised his second to accept the revised proposal. The motion to accept the revised proposal was **unanimously approved**.		

10. Discussion Items

A. Mr. Richard Stone submitted an email with 5 discussion items.

1) Add the diameter of the Flannery flexible staybolt sleeve clearance holes (the hole diameter machined into the wrapper sheet through which the flexible staybolt passes) as reference information to the wrapper sheet calculations listed in the ESC boiler calculation book.
    - The group chose not to discuss this item as this is under the Jurisdiction of the Engineering Standards Committee.
2) Discuss with the ASME B&PVC Section II Materials Group the use of SA-106 pipe for use in fireboxes and for fabrication of flanged firebox sheet parts that are exposed to radiant heat and combustion gas.
    - Mr. Ray stated this information was taken care of in Mr. Franzen new item (24-81) regarding Part 3, Table S1.1.3.1.
3) Discuss adding the minimum gasket width to the ASME steam dome cap calculation listed in the ESC boiler calculation book.
    - The group chose not to discuss this item as this is under the Jurisdiction of the Engineering Standards Committee.
4) Begin discussion with National Board to allow the build up by welding of corroded boiler rivet heads.
    - After discussion of this item the TG likes this idea, and they would like to move forward with this. Part 2, S2.10.2.2 addresses this and the TG would like to have this added to Supplement 1. During discussion on Day 2 of the Locomotive TG meeting, the TG reviewed Part 2, Figure S1.4.2.1 Riveted Seams and Rivet Heads, Part 2, S2.10.2.2 Inspection of Corroded Rivets, & Part 3, S1.2.12.1 Caulking Riveted Seam and Rivet Heads. After a lot of discussion, Mr. Ray proposed that we send this back to Mr. Stone and ask him to create a proposal to present to the TG.
5) Discuss with ASME B&PVC Section II Materials Group revising the NDE inspection requirements of the ASME SA-234 Carbon & Alloy Steel Pipe Fittings for Moderate & High Temperature Service specification for mass produced machined pressure parts (primarily flexible staybolt sleeves and caps) to allow for the sample inspection of these parts instead of mandatory inspection of all parts.
    - The TG reviewed SA-234, and they were unclear what Mr. Stone wanted the Locomotive TG to do with this discussion item, as they feel this needs to go to ASME.

B. The TG had a discussion regarding Part 3, S1.2.2. The discussion was to decide if this section needed to be revised for clarification. The TG agreed that this section could be updated. Mr. Franzen will open a new item and will try to have a proposal ready for the next meeting.

11. Future NBIC Committee Meetings

- January 13-16, 2025 –Charleston, SC
- July 2025 – TBD

Mr. Ray discussed the future meetings with the TG. The group also discussed times that would work for their next meeting. Mr. Ray will work with the NB to figure out a date for the next meeting.

12. Adjournment

A motion was made to adjourn the meeting at 12:54 pm EST on **July 30, 2024**. The motion was seconded and **unanimously approved**.

Respectfully submitted,

Jodi Metzmaier
Task Group Locomotive Secretary

Taskgroup Locomotive Member Attendees - July 2024

MEMBERS:	Interest Category	Email	Registered	In Person Attendance	Remote Attendance	Not In Attendance
G. Mark Ray	General Interest	gmray@tva.gov	In-Person	X		
Charlie Cross	User	cwcross40@gmail.com	Remote		X	
Jodi Metzmaier	NBIC Secretary	jmetzmaier@nbbi.org	In-Person	X		
Erich Armpriester	User	erich.armpriester@strasburgrailroad.com	In-Person	X		Not Present for 7/30/24 Meeting
Steven Butler	General Interest	greenchili@tds.net		X		
David Conrad	User	jdconrad@snet.net				X
David Domitrovich	User	ddomitrovich@eastbroadtop.com		X		
Wolfgang Fengler	General Interest	wfengler@fmwsolutions.com	In-Person	X		
Robert Franzen	General Interest	ssoa2001@aol.com		X		
David Griner	General Interest	dgriner@arizonamechanicalengineering.com				X
Mark Jordan	Jurisdictional Authorities	mark.jordan@ky.gov	Remote			X
Stephen Lee	User	emerilcat@aol.com	In-Person	X		
Kelly Lynch	General Interest	klynch@fmwsolutions.com				X
Linn Moedinger	User	linnwm@supernet.com	In-Person	X		
Timothy Sposato	General Interest	tsposato@ageofsteamroundhouse.org	In-Person	X		
Richard Stone	Manufacturers	richardbstone@verizon.net	Remote			X
Brendan Zeigler	User	brendan.zeigler@strasburgrailroad.com	In-Person	X		

Taskgroup Locomotive Visitor Attendees - July 2024

VISITORS:	Company/Title/Interest	Email	Registered	In Person Attendance	Remote Attendance
Jeff Churchill	Cargill, Inc - Sr. Asset Integrity Engineer	jeff_churchill@cargill.com	In-Person	X	
Lee Cochran	NBBI - Senior Editor	lcochran@nbbi.org	In-Person	X	
Matt Cunningham	Durango & Silverton Narrow Gauge Railroad	mcunningham@durangotrain.com	In-Person	X	
Matt Kiekintveld	Durango & Silverton Narrow Gauge Railroad	mkiekintveld@durangotrain.com	In-Person	X	
Max Casias	Cumbres & Toltech			X	
Tim Botti	Steam Service of America			X	
Riley Rosland	East Broadtop			X	
Luis Ponce	NBBI	lponce@nbbi.org		X	
Jonathan Ellis	NBBI	jellis@nbbi.org		X	

Announcements

- MS Teams Notes:
  - Please stay muted during the meeting. If you would like to speak, please use the "raise hand" feature, and then you can unmute as you are called on. Teams will note the order in which your hands were raised, and we will call on you in that order.
  - Any messages sent through chat **will be displayed for anyone in the meeting to see**. If you need to send me a private message, please send it to me directly and not through the meeting chat.

- The July NBIC meeting marked the end of Cycle D for the 2025 NBIC edition. Any items passed from this point on will be for the 2027 edition.

- There is a tutorial for submitting NBIC requests on the NBIC tab of the Business Center. The link is under the NBIC Requests section. If there are any other tutorials you think would be helpful, please let us know and we can do our best to add more.

- Remember to add any attachments that you'd like to show during the meeting (proposals, reference documents, power points, etc.) to the NBIC file share site (nbfileshare.org) **prior to the meeting**.
  - Note that access to the NBIC file share site is limited to committee members only.
  - ALL power point attachments/presentations must be sent to the NBIC Secretary prior to the meeting for approval.
  - Contact Jonathan Ellis (*nbicsecretary@nbbi.org*) for any questions regarding NBIC file share access.

- All proposals should be submitted in word with "strike through/underline" tracking.
  - Please contact me (jmetzmaier@nbbi.org) if you need any help with this.
  - Project Managers: please ensure any proposals containing text from a previous NBIC edition are updated to contain text from the current NBIC edition.

- If you'd like to open a new Interpretation or Action Item, this should be done through the National Board Business Center.
  - Anyone, member or not, can open a new item.

- As a reminder, anyone who would like to become a member of a group or committee:
  - Should attend at least 2 meetings prior to being put on the agenda for membership consideration. The nominee will be on the agenda for vote during their 3rd meeting, and they would become a voting member during their 4th meeting.
  - The nominee must submit the formal request along with their resume to the NBIC Secretary, Jonathan Ellis, **PRIOR TO** the meeting. *nbicsecretary@nbbi.org*
  - If needed, we can also create a ballot for voting of a new member between meetings.

- Thank you to everyone who registered online for this meeting. The online registration is very helpful for planning our reception, meals, the room set up, etc. Please continue to use the online registration for each meeting, whether you are attending in person or remote. It also is a good way to make sure we have the most up-to-date contact information.

#	Item Number	Subject of Request	Addition or Change	Applicable NBIC Location 1			Applicable NBIC Location 2			PM	Proposed Text	Statement of Need	Background Information	Status
				NBIC Part	Section	Paragraph Reference	NBIC Part	Section	Paragraph Reference					
1	NB18-17	Fillet Welded Staybolt Inspection Verbiage		2	6	S1.2.5.1				Franzen				CLOSED
2	NB20-69	Welds Across Riveted Lap Joint	Change	3	6	S1.2.11.5				Moedinger			Update Figure in 2025 Edition	KEEP FOR REFERENCE
3	New	Clarify Alteration for transition from rigid to flexible bolts.	Change	3	6	S1.2.3				Ray	The installation of a new flexible bolt pattern or the replacement of a rigid bolt with a flexible bolt shall be considered an alteration.	This is omission from the code.	Language Clarification	PM Assigned
~~4~~	~~New~~	~~Radiographic vs Volumetric~~	~~Change~~	~~3~~	~~6~~	~~S1.2.11.2b~~	~~3~~	~~S1.2.13.14.1~~	~~d~~	~~Franzen~~	~~change "rediographic examination" to "volumerric examination"~~	~~Use consistent language in the volume and align with ASME~~	~~Radiographic is used 7 time and volumetric is used 16 times. ASME transitioned to volumetric.~~	CLOSED - EDITORIAL
5	New	Repair of Blind Staybolts	Addition	3	6	S1.2.2				Butler			Add Language	PM Assigned
6	New	Washout Plug Inspections	Addition	2	6	S1.4.2.22				Zeigler			Add condeming Language	PM Assigned
~~7~~	~~New~~	~~Arch Tube Replacement~~	~~Addition~~	~~3~~	~~6~~	~~TBD~~				~~Franzen~~			~~Allowance for Welded Installation of Arch Tubes~~	CLOSED
8	New	Materials List	Change	3	6	S2.7.1				Franzen			Add Reference to ASME Section I and II-D	PM Assigned
9	New	Value of Default Tensile Strength	Addition	3	6	S1.1.1b				Ray	The use of Tensile Strength of 55,000 psi is acceptable for boilers built after 1921. For locomotives prior to 1921, validation of material specification is required to use a tensile strength value greater than 50,000 psi	FRA mandates default of 50,000 psi but boilers built after 1921 have better than 55,000 psi steel.	Add 55,000 psi for locomotives built after 1921. For locomotives prior to 1921, validation of material specification is required to use a value greater than 50,000 psi	PM Assigned
~~10~~	~~New~~	~~R Stamp Requirement for FRA Jurisdiction~~	~~Addition~~	~~2~~	~~6~~	~~S1.3~~	~~3~~	~~S1.1.1~~		~~Ray~~	~~TBD~~	~~Reduce burden on tourist railroads by providing an alternate means of boiler repair inspection (via FRA trained inspector)~~	~~Clarify need for R Stamp for Locomotives under FRA jurisdiction - Email dated 2/5/24~~	CLOSED
~~11~~	~~New~~	~~Periodic Inspection Requirements and Performance Intervals~~	~~Additon~~	~~2~~	~~6~~	~~S1.3.1~~				~~TBD~~	~~TBD~~	~~Goal is to provide an industry standard for inspections which can then be referenced by 49CFR230.~~	~~Add specific requirements for periodic inspections and the intervals for performance of those inspections~~	CLOSED
12	New	Update Calculation Guidance	Change	3	6	S1.1.4a				Moedinger	Delete "Rules for riveted construction were last published by ASME in Section I Code, 1971 Edition"	This statement is no longer valid with the reintroduction of Part PR to ASME Section I	Part PR was reintroduced into ASME Section I, 2015 Edition (?)	PM Assigned

Part 3
S1.1.3.1 MATERIAL LIST FOR STEAM LOCOMOTIVE BOILERS

Table S1.1.3.1 is intended as a basic guideline only and covers basic carbon steel and some alloy steel material specifications. Other alloy materials may be available for these applications if necessary.

a) SA-516 steel is recommended for firebox repairs. It is a fine grain steel that accepts flanging and bending with less tendency to crack than coarse grain steels such as SA-515 or SA-285 Grade C. Coarse grain steels have, on occasion, been found to crack or split after complicated flanging, bending, and forming.

b) SA-36 shall not be used to make any pressure-retaining part such as shells, staybolt sleeves, or caps.

c) When rivets are made from SA-675, the finished rivets must meet the physical requirements of the original rivet specification or SA-31 Grade A or B.

d) When staybolt material tensile strength is greater than that of the firebox sheets, the firebox sheets deflect instead of the staybolts, which can result in the sheets developing cracks and leaking staybolts. In addition, high tensile strength steels are difficult to drive. Maximum allowable tensile stress shall be 7,500 psi (51.71 MPa).

TABLE S1.1.3.1

Application	**Specification**
Boiler Tubes & Flues~~,~~, Arch Tubes ~~Superheater Units~~	SA-178 Grade A, SA-192, SA-210, SA-106-B
Boiler & Firebox Plate, Pressure Retaining Plate	SA-285 Grade C, SA-515, SA-516, SA-203, SA-204
Exterior & Internal Firebox Plate, Front Flue Sheet Corners & Flanges	SA-285 Grade C, SA-515, SA-516, SA-203, SA-204, SA-106-B
Welded Staybolts	SA-675, SA-36, SA-31
Threaded Staybolts and Patch Bolts	SA-31 Grade A, SA-675 ~~g~~Grade 45, 50, 55
Staybolt Sleeves and Caps	SA-105 ~~Forging~~, SA-675, SA-696, SA-216 WCA, SA-217 WC1
Boiler Braces	SA-675, SA-36
Rivets	SA-675, SA-31
Forged Parts & Fittings	SA-105, SA-181
Pressure-Retaining Steel Castings	SA-216, A-217
Hollow Cylindrical Pressure-Retaining Parts	SA-216, A-217, SA-178 Grade A, SA-192, SA-210, SA-106-B, SA-105 ~~Forgings~~, SA-675 ~~Bar Stock~~, SA-696
Superheater Units: ~~Bolts & Nuts~~	~~Bolts - SA-193, Nuts - SA-194~~
Bolts & Nuts	Bolts - SA-193, Nuts - SA-194
Pressure Retaining Parts & Tubing	SA-216, A-217, SA-178 Grade A, SA-192, SA-210, SA-106-B, SA-105, SA-675, SA-696
Pipe Flanges	SA-181, SA-105
Bolts & Studs	SA-307 Grades A&B, SA-675 ~~g~~Grade 60, 65, 70
Pipe	SA-106, SA-53 S~~s~~eamless
Bronze Castings~~, &~~ Washout Plugs	SB-61, SB-62, B-148. SA-696

24-82
L. Moedinger
7-30-24

Subject: Rewrite of Part 3, S1.1.4

Statement of Need: ASME Section I, Part PL superseded previous calculations such as the Calculation Compendium referenced in the current wording.

Background: The original wording referenced the ESC Calculation Compendium for locomotive boiler calculations. At the time, this was the only place where most locomotive boiler calculations were located. With the publication of Part PL in ASME Section I, Part PL, the Calculation Compendium is no longer needed.

PROPOSAL

Part 3
S1.1.4 FORMULA AND CALCULATIONS FOR STEAM LOCOMOTIVE BOILERS

a) Most steam locomotive boilers were manufactured in the first half of the 20th century or before. The calculations, formula, and shop practices used are now distant history and quite difficult to obtain. The original rules for riveted construction were last published by ASME in Section I Code, 1971 Edition. Currently, ASME, Section I, Part PR and Part PL, govern riveted construction and steam locomotive boiler construction, and these Parts may be referenced for repairs and alterations if appropriate for the boiler under repair/alteration.

~~b) This supplement herein, is based in part on the ASME Code, Section III, 1952 Edition, which was the last published edition of the Steam Locomotive Code. The railroad industry has attempted to collect the old formula and some shop practices. These have been published by The Engineering Standards Committee for Steam Locomotives, Inc. (ESC) as Compendium, Volume 1, Compilation of Calculations, which may be obtained from the Strasburg Rail Road, P.O. Box 96, Strasburg, PA 17579 (717) 687-7421.~~

b) This supplement herein, is based in part on the ASME Code, Section III, 1952 Edition, ASME Section I, Part PL, and Established Railroad Standards.

c) When the original code of construction is not known or is not available, the current edition of ASME Section I may be referenced for the majority of locomotive calculations. The original code of constructions may not have some calculations needed, in which case the current edition of ASME Section I, or the nearest applicable code which postdates the construction, may be used to augment the original code of construction.

d) Allowable stress values for materials are given in or referenced by ASME Section I, all editions. Care shall be taken to ensure the design margin used by a specific edition of the code is the same as that of the original code of construction, or the same as required by the jurisdiction in which the boiler will operate. When in doubt, divide the ultimate tensile strength given in the ASME Code for the material used by the design margin required.