AAR Quality Assurance

AAR Quality Assurance Auditor and Industry Conference

May 11-12, 2021 Webinar

FMEA – The Next Tool in the Corrective Action Toolbox

Lisa Stabler, President

TTCI

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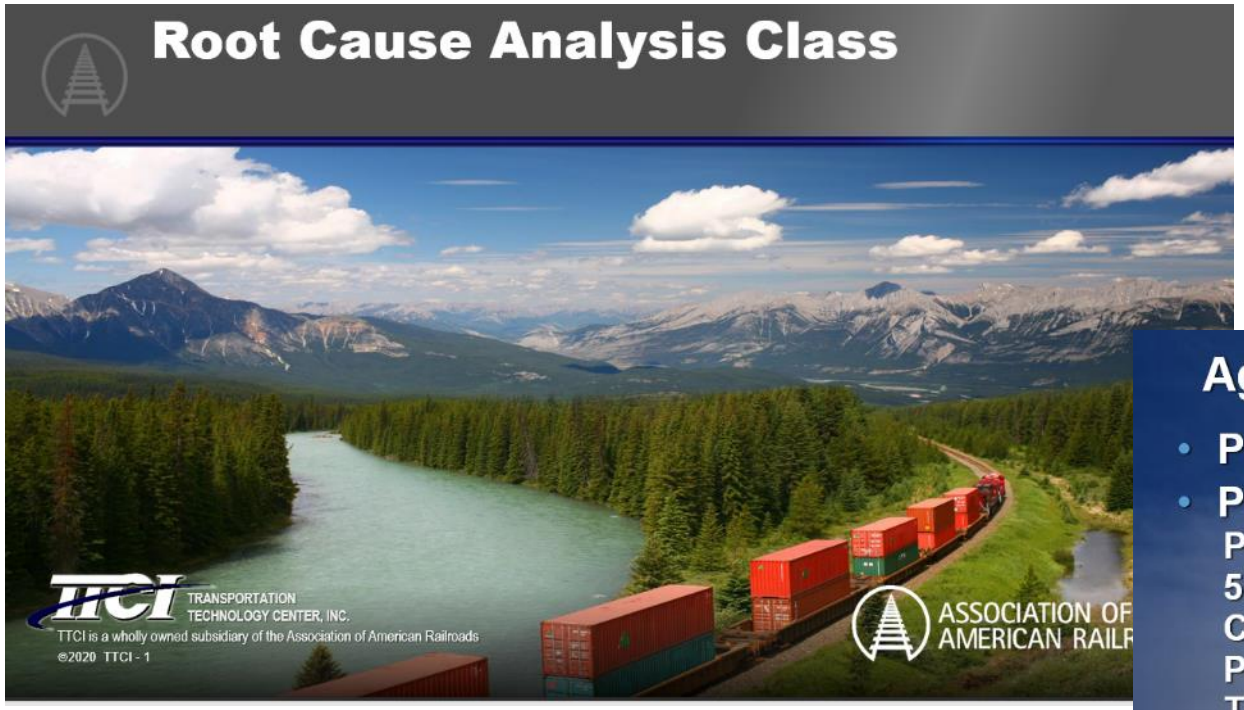
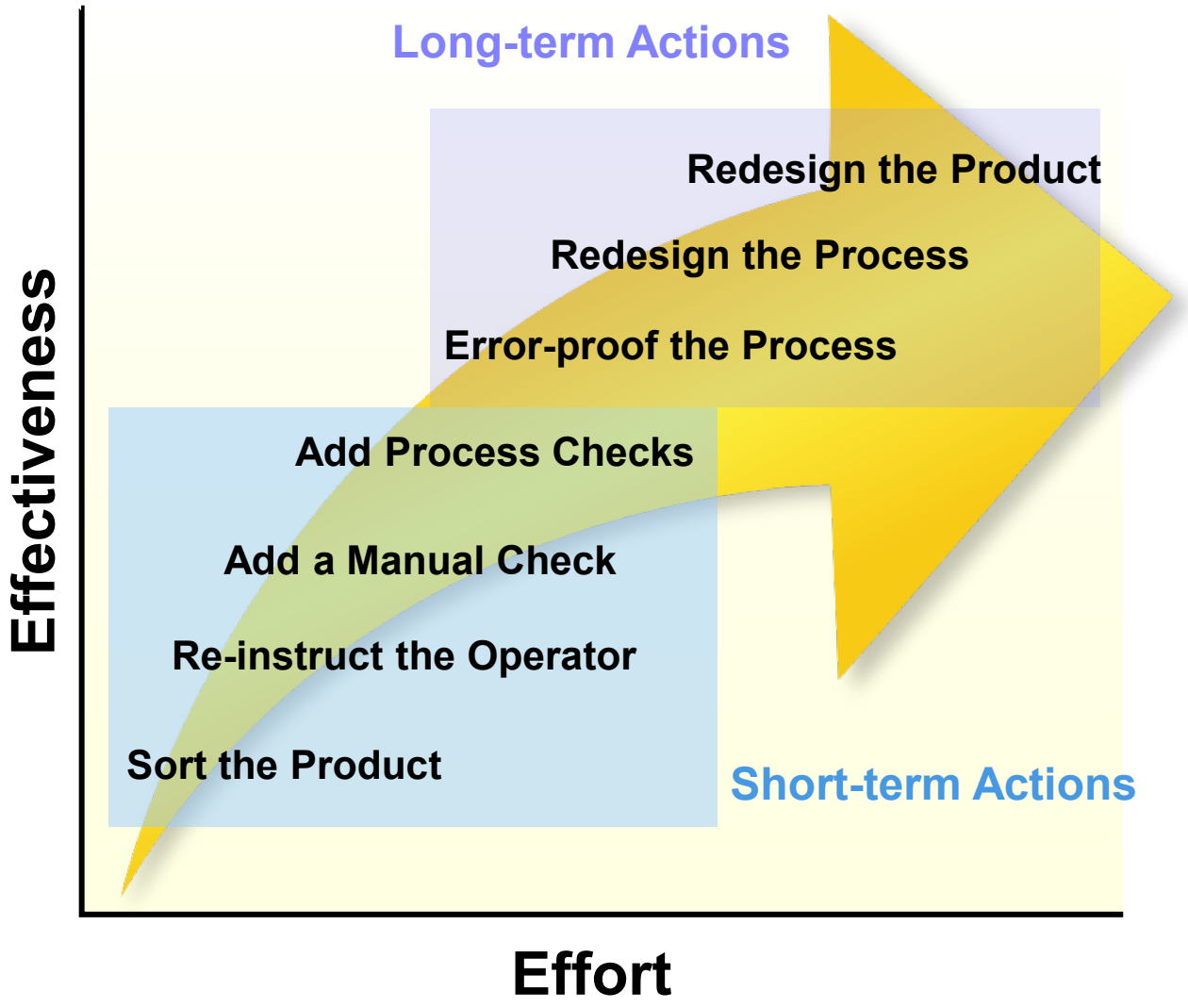
Last Year's Discussion



Corrective Action

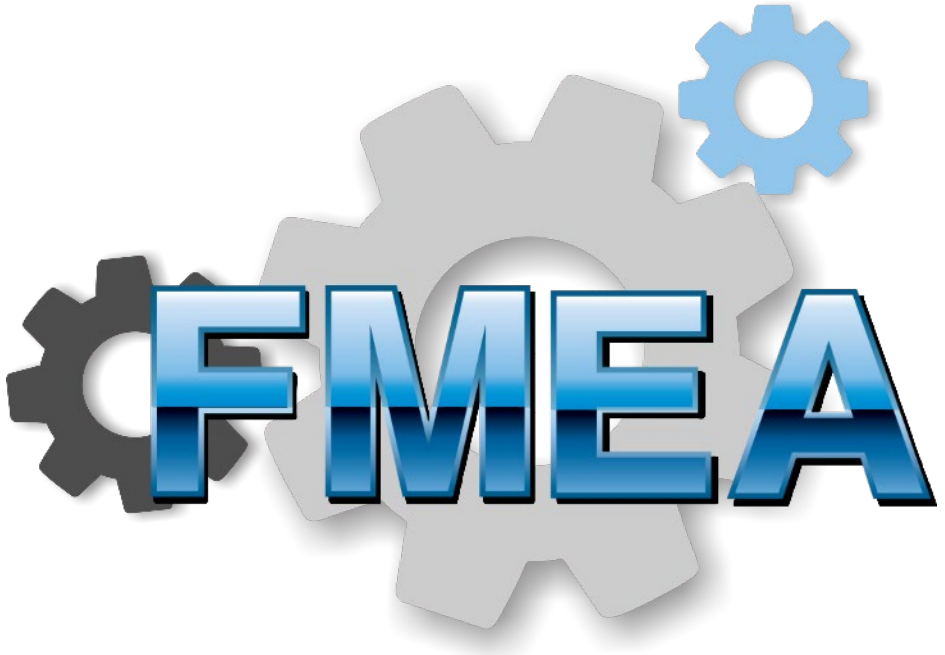
- **Corrective action can be categorized by the amount of effort and the potential effectiveness**
  - In general, the more effective corrective actions require more effort (time, investment, personnel, cost).
  - Short-term actions are generally not as effective, especially over the course of time.
- **A thorough analysis of risk, severity, and detection of defects during the product/process planning process is the most efficient means of avoiding the need for corrective action after production has started.**
  - DFMEA and PFMEA
- **Plan for correcting mistakes, not willful errors**
  - A disgruntled employee can always outsmart process controls.
  - Make it harder to make a mistake than to make a good decision.



What is FMEA?

- **Standard way to assess a product or process**
- **Looks at a system and assesses overall potential negative impact to a business from a system level**
- **Sufficient detail to allow for individual actions to reduce the overall negative impact**
- **Prioritizes work "Biggest Bang for your Buck"**
- **Used to develop initial process controls**
- **Living document**
  - Add new areas for assessment
  - Update controls
  - Update risks as more info becomes available
- **Recognize "Garbage In = Garbage Out"**
- **Continually updated as the product/process changes or new information is received**

FAILURE MODES AND EFFECTS ANALYSIS



Two Types of FMEAs

DFMEA: Design Failure Mode and Effects Analysis

- Assume that the process makes good parts…
- What is the overall impact of design flaws on the product?

PFMEA: Process Failure Mode and Effects Analysis

- Assume that the design is good….
- Start with a Process Flow Diagram!!!
- What are the overall impact of process errors on the product?

Risk Priority Number (RPN)

- **RPN is used to prioritize how much each area can impact negatively impact the system**
- **Composed of three elements:**
  - **Severity**: What is the worst that can happen? Could this cause bodily harm without warning? Or would only a discerning customer even notice?
  - **Occurrence**: How often can this problem occur? One in 10 events, one in 1,000, one in a million?
  - **Detection**: If the problem happens, how likely is the current system to catch and contain it? 99% or better? 50%-50%? Never or close to never?
- **RPN is typically ranges from 1 to 1,000**
  - 1,000 is very, very bad.
    - Can cause bodily harm
    - Happens quite frequently
    - No chance of detection
  - 1 is no problem exists, and if it did, we would always find it
  - The goal is to have a range of values
    - Find the “worst of the worst”

Basic Steps

- **Develop measurement system for severity, occurrence, and detection**
  - Ensure there will be a spread of results
    - Not everything can be the worst ever
    - Not everything can be no problem or concern
- **Develop plan to address:**
  - Any RPN over 500
  - Top 10 RPN
  - Any severity of 8 or greater
  - Identify Key Product or Process Characteristics
- **Start at the product or process level**
  - DFMEA: Break the product down to systems, subsystems, and components
  - PFMEA: Break the process down to systems, subsystems, individual pieces of equipment, and processing steps in the process
    - Remember to use your Process Flow Diagram
- **Evaluate each step using data whenever possible**
- **Rank the RPN**
  - Look at the results— do they make sense?
- **Carry out your plan to address**
  - Re-calculate RPN as needed

Basic FMEA Form

Basic FMEA Form

Product/Process Under Study_____

Prepared by_____

FMEA Number_____

Page _____ of _____

Date_____

Number	Description	Requirement	Potential Problem	Potential Effect	Severity	Occurance	Control(s) in Place	Detection	RPN	Corrective Action	Assigned To	Due Date	Completed Date	Revised Occurance	Revised Detection	Revised RPN

Basic Form Explained

Basic FMEA Form

Product/Process Under Study_____

Prepared by_____

FMEA Number_____

Page _____ of _____

Date_____

Number	Description	Requirement	Potential Problem	Potential Effect	Severity	Occurance	Control(s) in Place	Detection	RPN	Corrective Action	Assigned To	Due Date	Completed Date	Revised Occurance	Revised Detection	Revised RPN

- **Number** — Method of identifying different parts of the process
- **Description** — Part or process step under analysis
- **Requirement** — Per the print or spec
- **Potential Problem** — What can go wrong?
- **Potential Effect** — What happens to the user?
- **Severity** — How severe can the problem be?
- **Occurance** — How often does the problem occur?
- **Control(s) in Place** — Current controls in place
- **Detection** — Chance of process detecting The problem
- **RPN** — Risk Priority Number
- **Corrective Action** — Proposed corrective action
- **Revised Occurance** — New Occurrence Rating
- **Revised Detection** — New detection rating
- **Revised RPN** — Recalculated with new occurrence, detection values

FMEA Form Explained

- **Number:** Have some scheme to number the parts or the processes. You will thank me later.
- **Description:** A subsystem or part name, or a part of the process.
- **Requirement:** The correct action or tolerance.
- **Potential problem:** All of the things that can go wrong with that requirement. You can have many, many lines here.
- **Potential effect**: All of the ways someone could get hurt, be inconvenienced, or be dissatisfied with the product. You can have multiple items here.
- **Severity:** The impact on the user or customer. Use a consistent scale.

FMEA Form Explained

- **Occurrence:** How often that defect causing that level of severity can happen
- **Controls in Place:** Controls currently in place to prevent the problem from happening or detect it once it has happened.
- **Detection:** How likely the process will detect the problem and contain it properly?
- **RPN:** Risk Priority Number
  - Severity x Occurrence x Detection
- **Corrective Action:** Changes to the product or process to reduce overall risk.

FMEA Form Explained

- **Revised Occurrence:** Does the corrective action make the problem happen more or less frequently?
- **Revised Detection:** Does the corrective action make it more or less likely that defective product will escape the process?
- **Revised RPN:** Recalculated with new occurrence and detection ratings:
  - Notice, with rare exceptions, the severity does not change

Let's Talk About Measurement Systems

- **Decide them in advance**
- **Plenty of examples on the internet**
  - My examples are provided
- **Try to set your measurement systems to ensure a spread of values:**
  - To the maximum extent possible, use real data to set severity, occurrence and detection rankings.
  - Don't rate everything a 9 or 10.
  - If you start applying the measurement system and you don't have enough spread, stop and examine the measurement system you selected.

Descriptor	Severity or Effect on Customer	Rank
Hazardous	Product fails without warning, with potential for bodily harm.	10
Serious	Product fails with warning. May not meet federal guidelines. May cause bodily harm.	9
Extreme	Product does not function. Customer is very dissatisfied	8
Major	Product functions at a reduced level of performance resulting in customer dissatisfaction	7
Significant	Product functions at a reduced level of performance resulting in customer discomfort	6
Moderate	Inconvenience – product will function, but not at expected level of performance	5
Minor	Slight inconvenience that will be noticed by some customers and cause minor dissatisfaction	4
Slight	Slight inconvenience that will be noticed by some customers	3
Very Slight	Very slight inconvenience that may be noticed by very discriminating customers	2
None	No discernable effect	1

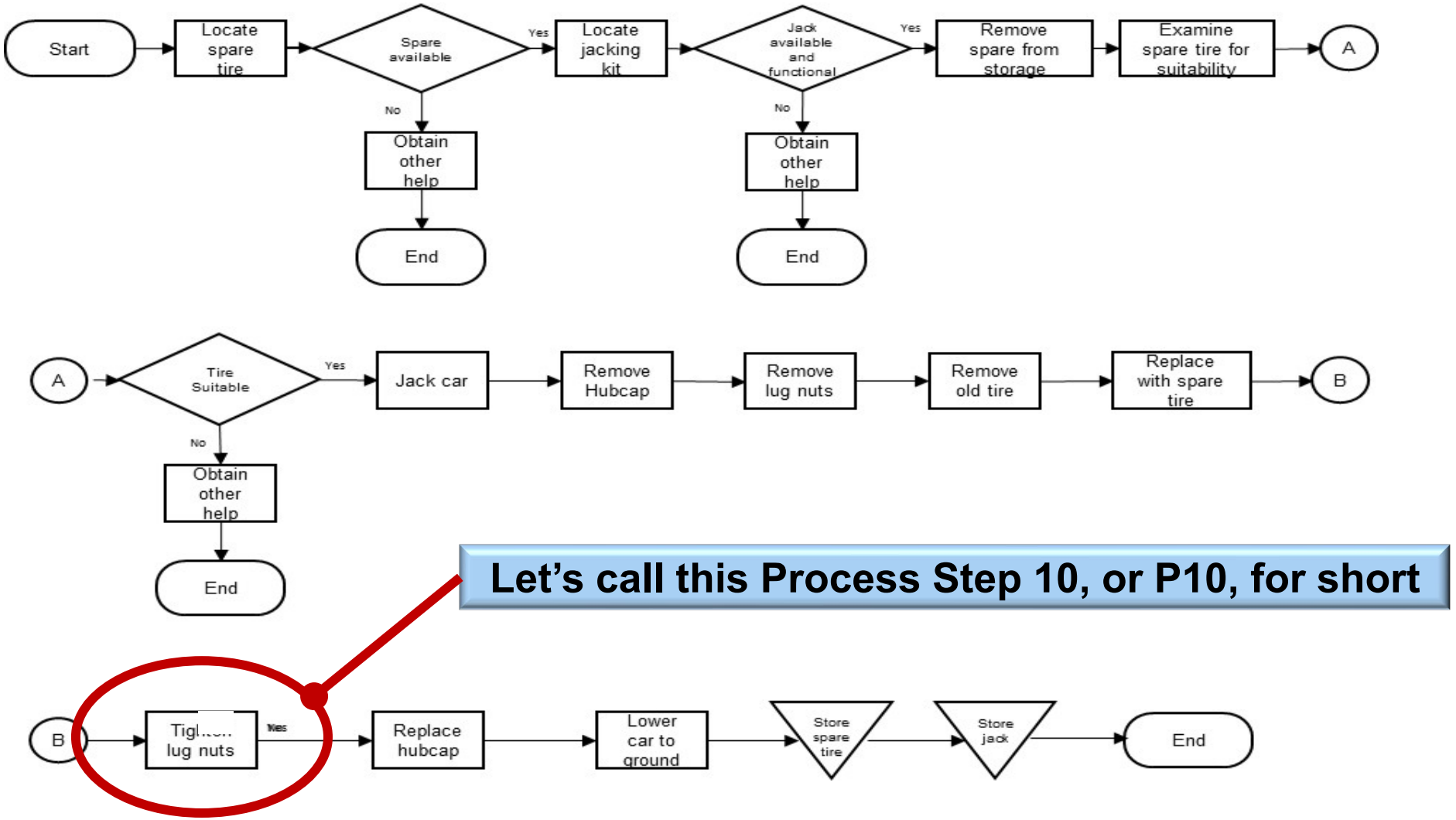
Occurrence	Rank
Higher than One per 10	10
One per 10	9
One per 50	8
One per 100	7
One per 1,000	6
One per 5,000	5
One per 10,000	4
One per 100,000	3
One per 1,000,000	2
Failure does not occur	1

Detection Rate	Probability of Detection	Rank
5% or lower	Little or no way for defect to be detected	10
10 % or lower	Extremely remote chance that defect will be detected	9
20 % or higher	Very remove chance that defect will be detected	8
30% or higher	Remote chance that defect will be detected	7
40% or higher	Very low chance that defect will be detected	6
50% or higher	Low chance that defect will be detected	5
75% or higher	Some chance of detection	4
90% or higher	Good chance of detection	3
95% or higher	Very high chance of detection	2
99 % or higher	Almost certain to be detected	1

Class Example – FMEA for “Changing a Tire”

- **We will look at one process step:**
  - Tighten the lug nuts

Changing a Tire Process Flow Diagram



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FMEA Example

- **Number: P10**
- **Description: Tighten lug nuts**
- **Requirement:**
  - Using a star pattern, tighten each nut to 100 ft.-lbs. torque
- **Potential Problem**
  - Star pattern not used
  - Under torque
  - Over torque
  - Cross-thread
- **Potential effect: All of the ways someone could experience bodily harm, be dissatisfied, or inconvenienced with the product. You can have multiple items here.**

Basic FMEA Form

Basic FMEA Form

Product/Process Under Study_____Changing a Tire_____

Prepared by_____Lisa Stabler_____

FMEA Number_CTB-2021-18_
Page___47_of__243___
Date__5/11/2020___

Number	Description	Requirement	Potential Problem	Potential Effect	Severity	Occurance	Control(s) in Place	Detection	RPN	Corrective Action	Assigned To	Due Date	Completed Date	Revised Occurance	Revised Detection	Revised RPN
P10	Tighten lug nuts	Use a star pattern	Don't tighten in a star patter													
		Tighten to 100 ft lbs torque	Undertorque													
			Overtorque													
			Cross Thread													

Basic FMEA Form

Product/Process Under Study Changing a Tire

Prepared by Lisa Stabler

FMEA Number CTB-2021-18

Date 5/11/2020

Number	Description	Requirement	Potential Problem	Potential Effect	Severity	Occurance	Control(s) in Place	Detection	RPN	Corrective Action	Assigned To	Due Date	Completed Date	Revised Occurance	Revised Detection	Revised RPN
P10	Tighten lug nuts	Use a star pattern	Don't tighten in a star patter	Brake Pulsation												
				Rotor Damage												
		Tighten to 100 ft lbs torque	Undertorque	Insufficient clamp load - wheels fall off												
				Insufficient clamp load - wheels wobble and reduce ability to control the car												
			Overtorque	Break the studs, resulting in having insufficient studs to carry the load- wheel could fall off												
				Break the studs, with expense to replace broken stud												
				Elongate the studs and cause pre-mature failure- reuslting in insufficient studs to carry the load- wheel could fall off												
				Break the studs, with expense to replace broken stud												
			Cross Thread	Insufficient clamp load - wheels fall off												
				Insufficient clamp load - wheels wobble and reduce ability to control the car												

Basic FMEA Form

Product/Process Under Study Changing a Tire

Prepared by Lisa Stabler

Date 5/11/2020

Number	Description	Requirement	Potential Problem	Potential Effect	Severity	Occurance	Control(s) in Place	Detection	RPN	Corrective Action	Assigned To	Due Date	Completed Date	Revised Occurance	Revised Detection	Revised RPN
P10	Tighten lug nuts	Use a star pattern	Don't tighten in a star patter	Brake Pulsation	6											
				Rotor Damage	6											
		Tighten to 100 ft lbs torque	Undertorque	Insufficient clamp load - wheels fall off	10											
				Insufficient clamp load - wheels wobble and reduce ability to control the car	9											
			Overtorque	Break the studs, resulting in having insufficient studs to carry the load-wheel could fall off	10											
				Break the studs, with expense to replace broken stud	5											
				Elongate the studs and cause pre-mature failure-reuslting in insufficient studs to carry the load-wheel could fall off	10											
				Break the studs, with expense to replace broken stud	5											
			Cross Thread	Insufficient clamp load - wheels fall off	10											
				Insufficient clamp load - wheels wobble and reduce ability to control the car	9											

Basic FMEA Form

Product/Process Under Study Changing a Tire

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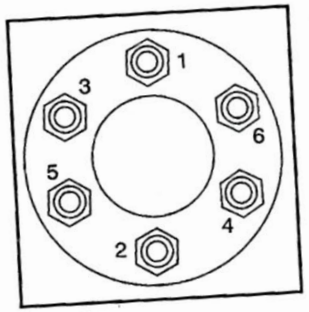
Number	Description	Requirement	Potential Problem	Potential Effect	Severity	Occurance	Control(s) in Place	Detection	RPN	Corrective Action	Assigned To	Due Date	Completed Date	Revised Occurance	Revised Detection	Revised RPN
P10	Tighten lug nuts	Use a star pattern	Don't tighten in a star patter	Brake Pulsation	6	7										
				Rotor Damage	6	7										
		Tighten to 100 ft lbs torque	Undertorque	Insufficient clamp load - wheels fall off	10	2										
				Insufficient clamp load - wheels wobble and reduce ability to control the car	9	5										
			Overtorque	Break the studs, resulting in having insufficient studs to carry the load-wheel could fall off	10	3										
				Break the studs, with expense to replace broken stud	5	3										
				Elongate the studs and cause pre-mature failure-reuslting in insufficient studs to carry the load-wheel could fall off	10	2										
				Elongate the studs, with expense to replace damaged stud	5	2										
			Cross Thread	Insufficient clamp load - wheels fall off	10	2										
				Insufficient clamp load - wheels wobble and reduce ability to control the car	9	5										

From My Trailblazer's User Manual

⚠ CAUTION:

Incorrect wheel nuts or improperly tightened wheel nuts can cause the wheel to come loose and even come off. This could lead to an accident. Be sure to use the correct wheel nuts. If you have to replace them, be sure to get new original equipment wheel nuts. Stop somewhere as soon as you can and have the nuts tightened with a torque wrench to the proper torque specification. See *Capacities and Specifications on page 5-121* for wheel nut torque specification.

Notice: Improperly tightened wheel nuts can lead to brake pulsation and rotor damage. To avoid expensive brake repairs, evenly tighten the wheel nuts in the proper sequence and to the proper torque specification. See *Capacities and Specifications on page 5-121* for the wheel nut torque specification.



14. Use the wrench to tighten the wheel nuts firmly in a crisscross sequence as shown.

Basic FMEA Form

Product/Process Under Study Changing a Tire

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Number	Description	Requirement	Potential Problem	Potential Effect	Severity	Occurance	Control(s) in Place	Detection	RPN	Corrective Action	Assigned To	Due Date	Completed Date	Revised Occurance	Revised Detection	Revised RPN
P10	Tighten lug nuts	Use a star pattern	Don't tighten in a star patter	Brake Pulsation	6	7	Note in user manual	5								
				Rotor Damage	6	7	Note in user manual	5								
		Tighten to 100 ft lbs torque	Undertorque	Insufficient clamp load - wheels fall off	10	2	Note in user manual	10								
				Insufficient clamp load - wheels wobble and reduce ability to control the car	9	5	Note in user manual	10								
			Overtorque	Break the studs, resulting in having insufficient studs to carry the load-wheel could fall off	10	3	Note in user manual	1								
				Break the studs, with expense to replace broken stud	5	3	Note in user manual	1								
				Elongate the studs and cause pre-mature failure-reuslting in insufficient studs to carry the load-wheel could fall off	10	2	Note in user manual	10								
				Elongate the studs, with expense to replace damaged stud	5	2	Note in user manual	10								
			Cross Thread	Insufficient clamp load - wheels fall off	10	2	Note in user manual	1								
				Insufficient clamp load - wheels wobble and reduce ability to control the car	9	5	Note in user manual	1								

Basic FMEA Form

Product/Process Under Study Changing a Tire

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Number	Description	Requirement	Potential Problem	Potential Effect	Severity	Occurance	Control(s) in Place	Detection	RPN	Corrective Action	Assigned To	Due Date	Completed Date	Revised Occurance	Revised Detection	Revised RPN
P10	Tighten lug nuts	Use a star pattern	Don't tighten in a star patter	Brake Pulsation	6	7	Note in user manual	5	210							
				Rotor Damage	6	7	Note in user manual	5	210							
		Tighten to 100 ft lbs torque	Undertorque	Insufficient clamp load - wheels fall off	10	2	Note in user manual	10	200							
				Insufficient clamp load - wheels wobble and reduce ability to control the car	9	5	Note in user manual	10	450							
			Overtorque	Break the studs, resulting in having insufficient studs to carry the load- wheel could fall off	10	3	Note in user manual	1	30							
				Break the studs, with expense to replace broken stud	5	3	Note in user manual	1	15							
				Elongate the studs and cause pre- mature failure- reuslting in insufficient studs to carry the load- wheel could fall off	10	2	Note in user manual	10	200							
				Elongate the studs, with expense to replace damaged stud	5	2	Note in user manual	10	100							
			Cross Thread	Insufficient clamp load - wheels fall off	10	2	Note in user manual	1	20							
				Insufficient clamp load - wheels wobble and reduce ability to control the car	9	5	Note in user manual	1	45							

Corrective Actions

- **Corrective actions can be proposed for**
  - Top issues
  - All RPN over a certain value
  - Goal of having a maximum RPN of no more than a certain value
- **Whatever the team decides – decide it in advance and be consistent!**
  - Consistent use of the measurement system
  - Consistent plan of action
- **Note: FMEA does not include cost**
  - Cost could be another factor to consider

Basic FMEA Form

Product/Process Under Study Changing a Tire

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FMEA Number CTB-2021-18

Date 5/11/2020

Number	Description	Requirement	Potential Problem	Potential Effect	Severity	Occurance	Control(s) in Place	Detection	RPN	Corrective Action	Assigned To	Due Date	Completed Date	Revised Occurance	Revised Detection	Revised RPN
P10	Tighten lug nuts	Use a star pattern	Don't tighten in a star patter	Brake Pulsation	6	7	Note in user manual	5	210	Add label in jacking kit to remind of star pattern				6	5	180
				Rotor Damage	6	7	Note in user manual	5	210	Add label in jacking kit to remind of star pattern				6	5	180
		Tighten to 100 ft lbs torque	Undertorque	Insufficient clamp load - wheels fall off	10	2		10	200	Supply clicker wrench pre-set to proper torque with jacking kit				2	1	20
				Insufficient clamp load - wheels wobble and reduce ability to control the car	9	5		10	450	Supply clicker wrench pre-set to proper torque with jacking kit				2	1	18
			Overtorque	Break the studs, resulting in having insufficient studs to carry the load-wheel could fall off	10	3		1	30	Supply clicker wrench pre-set to proper torque with jacking kit				2	1	20
				Break the studs, with expense to replace broken stud	5	3		1	15	Supply clicker wrench pre-set to proper torque with jacking kit				2	1	10
				Elongate the studs and cause pre-mature failure-reuslting in insufficient studs to carry the load-wheel could fall off	10	2		10	200	Supply clicker wrench pre-set to proper torque with jacking kit				2	1	20
				Elongate the studs, with expense to replace damaged stud	5	2		10	100	Supply clicker wrench pre-set to proper torque with jacking kit				2	1	10
			Cross Thread	Insufficient clamp load - wheels fall off	10	2		1	20							
				Insufficient clamp load - wheels wobble and reduce ability to control the car	9	5		1	45							

A Good Reference

AIAG store

SOFTWARE/CYBER SELF-ASSESSMENTS PUBLICA

AIAG & VDA FMEA Handbook

Product Code: FMEAAV-1 Pricing

The AIAG & VDA FMEA Handbook is the new automotive industry reference manual for Failure Mode and Effects Analysis, it is to be used as a guide to assist suppliers in the development of Design FMEA, Process FMEA, and Supplemental FMEA for Monitoring and System Response. Developed with a global team of OEM and Tier 1 Subject Matter Experts (SME's) it incorporates best practices from both AIAG and VDA methodologies into a harmonized, structured approach.

FMEA Final Thoughts

- **FMEA is a very useful tool for evaluating potential corrective actions.**
- **Output will be as good as the effort that is input.**
- **FMEA is most effective when performed before the design of the product and process are finalized.**
  - Least expensive time to make changes to the product or process
- **FMEA can encompass many pages of information for a product or process.**
  - Have a system in place for keeping everything in order
- **You can perform an FMEA for just one part of the process.**
- **Does not consider the costs for corrective action, just the impact.**
- **Decide in advance and stay consistent!**

Thank you!

AAR Quality Assurance
55500 DOT Road
Pueblo, Colorado 81001
www.aar.com

AAR Quality Auditors and Industry Conference

May 11-12, 2021

Webinar

Health of the M-1003 Program

Sanjay Varma
Director-Supplier Quality
Union Pacific Railroad

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Agenda

- QAC Committee roles and responsibilities
- M-1003 training courses
- M-1003 program update
- Review of audits performed in 2020
- 2021 mandatory elements
- Access to M-1003 information

Roles & Responsibilities of AAR QAC

- Maintain MSRP Section J, M-1003
- Evaluate, train and certify AAR accredited auditors
- Attend monthly QAC meetings
- Review audit reports and vote on the QAC ballot
- Review and approve Chapter 7 nonconformance reports
- Observe auditors in practice
- Update the AAR Accredited Auditors Handbook
- Provide AAR M-1003 training courses

M-1003 Training Courses

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M-1003 Training Courses

- AAR M-1003 Training Courses
  - Basic Auditor training
  - Advanced Auditor training
  - Root Cause and Corrective Action

- 2020 M-1003 Training Courses
  - Four Basic Auditor training (170)
  - Two Advanced Auditor training (27)*
  - Two Root Cause & Corrective Action (68)

*One held in Mexico

Remaining 2021 Training Classes

2021 AAR M-1003 Quality Assurance Training Schedule			
Course	**Date**	**Location**	**Registration**
Basic Auditor Training Class	June 15-16	Webinar	Open
	September 14-15	Webinar	Open
	November 16-17	Webinar	Open
Advanced Auditor Training Class	July 20-22	TBD	Pending
	August 17-19	TBD	Pending
	September 21-23	TBD	Pending
	October 26-28	TBD	Pending
	December 7-9	TBD	Pending
Root Cause & Corrective Action Class	August 24-25	Webinar	Open

For the latest training dates and classes refer to our training website.

https://aar.com/standards/QA_training.html

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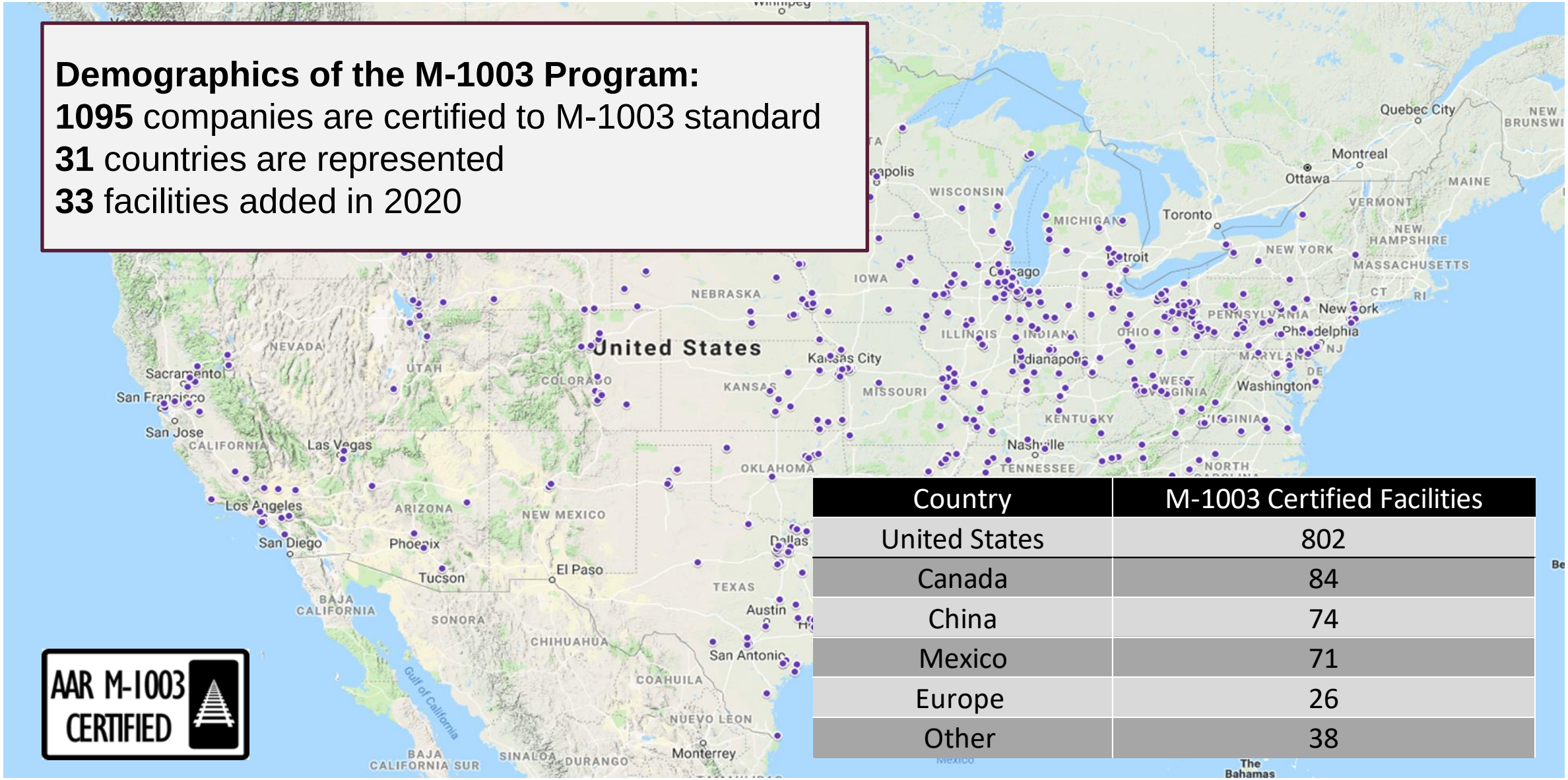
M-1003 Program Update

Demographics of the M-1003 Program:
1095 companies are certified to M-1003 standard
31 countries are represented
33 facilities added in 2020



Country	M-1003 Certified Facilities
United States	802
Canada	84
China	74
Mexico	71
Europe	26
Other	38

AAR M-1003 CERTIFIED

2020 Audit Results

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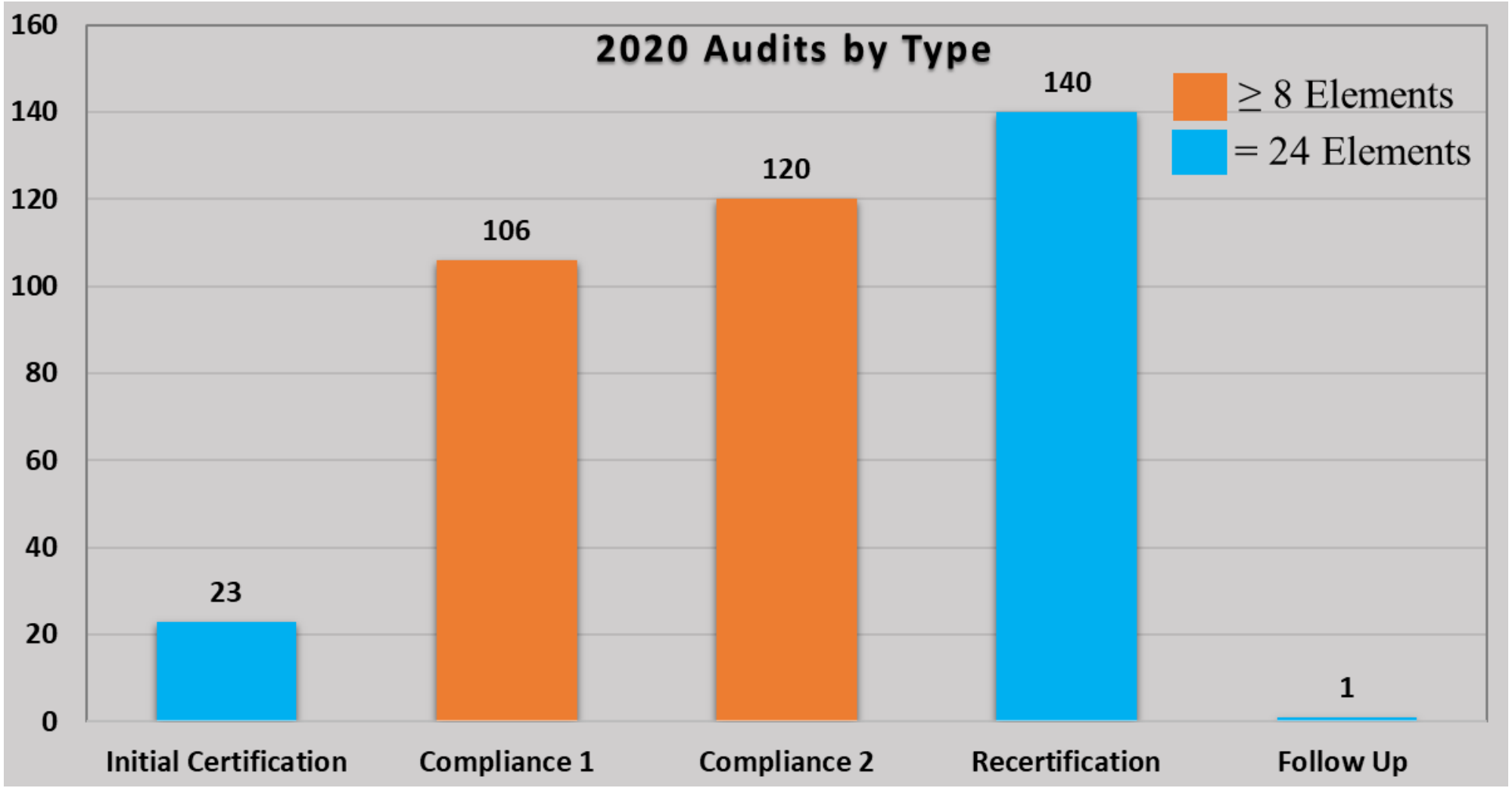
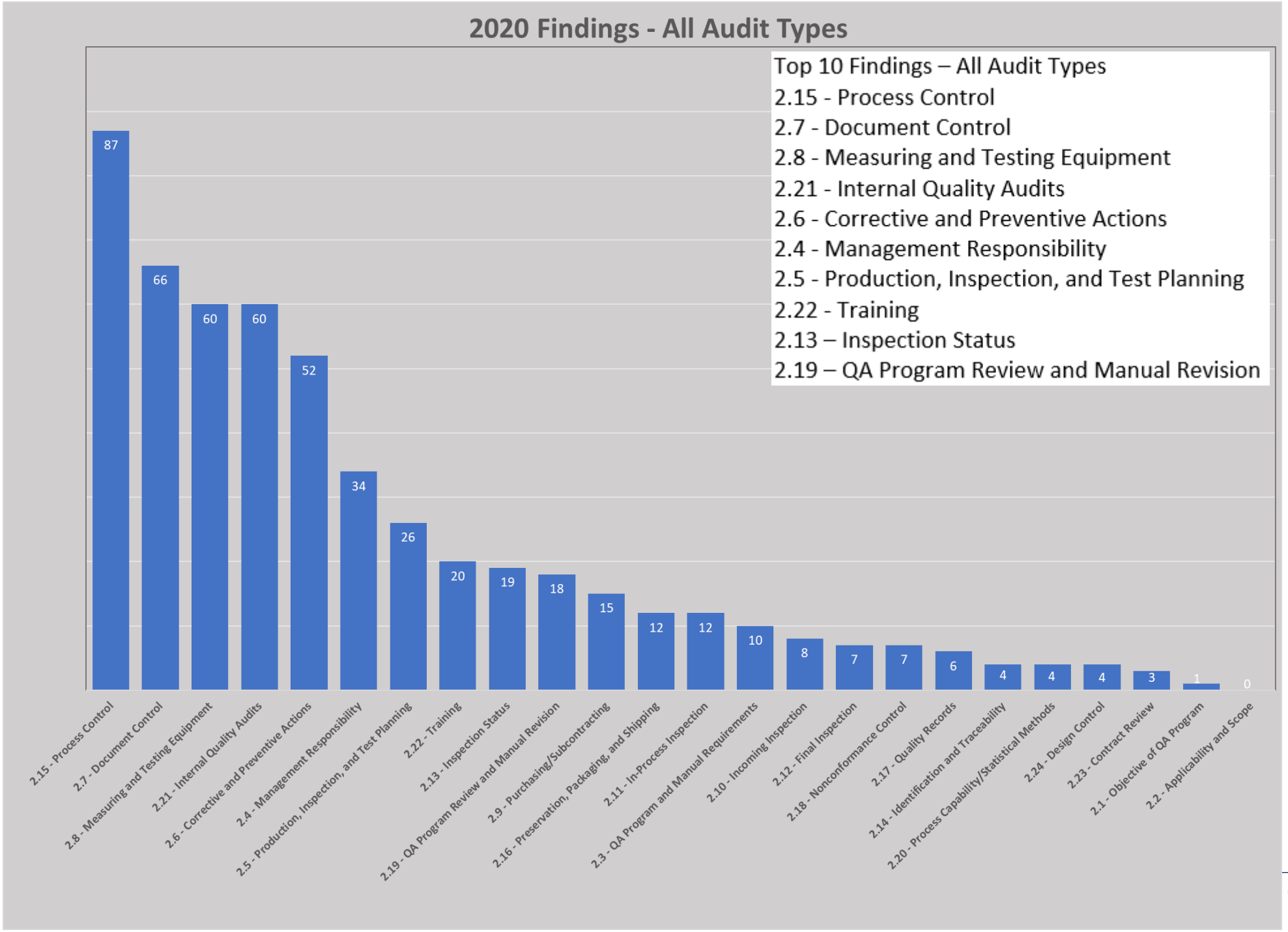
Total AAR Accredited Auditors: 59




2020 Findings - All Audit Types
Top 10 Findings – All Audit Types
2.15 - Process Control
2.7 - Document Control
2.8 - Measuring and Testing Equipment
2.21 - Internal Quality Audits
2.6 - Corrective and Preventive Actions
2.4 - Management Responsibility
2.5 - Production, Inspection, and Test Planning
2.22 - Training
2.13 – Inspection Status
2.19 – QA Program Review and Manual Revision
87
66
60
60
52
34
26
20
19
18
15
12
12
10
8
7
7
6
4
4
4
3
1
0
2.15 - Process Control
2.7 - Document Control
2.8 - Measuring and Testing Equipment
2.21 - Internal Quality Audits
2.6 - Corrective and Preventive Actions
2.4 - Management Responsibility
2.5 - Production, Inspection, and Test Planning
2.22 - Training
2.13 - Inspection Status
2.19 - QA Program Review and Manual Revision
2.9 - Purchasing/Subcontracting
2.16 - Preservation, Packaging, and Shipping
2.11 - In-Process Inspection
2.3 - QA Program and Manual Requirements
2.10 - Incoming Inspection
2.12 - Final Inspection
2.18 - Nonconformance Control
2.17 - Quality Records
2.14 - Identification and Traceability
2.20 - Process Capability/Statistical Methods
2.24 - Design Control
2.23 - Contract Review
2.1 - Objective of QA Program
2.2 - Applicability and Scope

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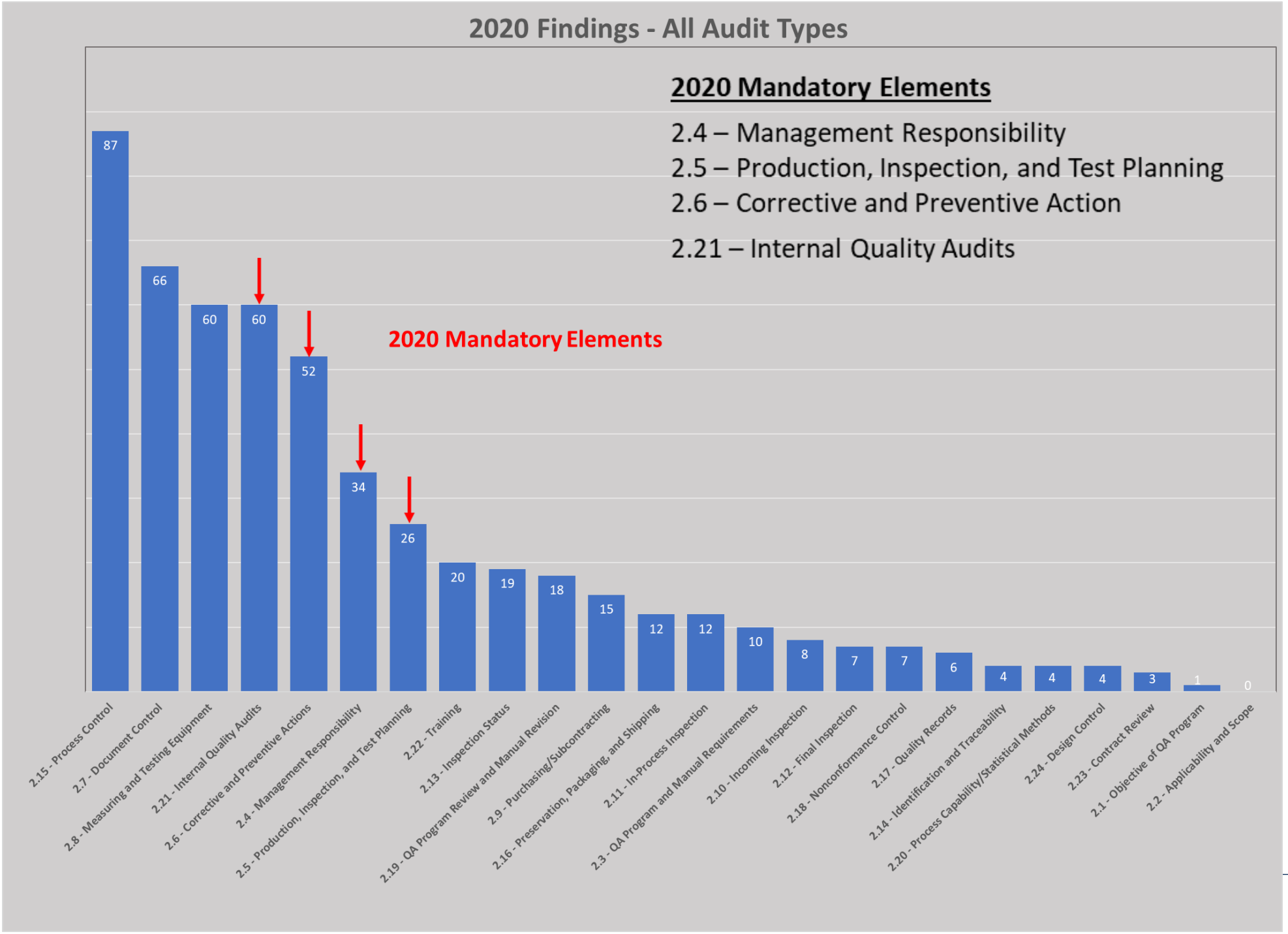
2020 Findings - All Audit Types
2020 Mandatory Elements
2.4 – Management Responsibility
2.5 – Production, Inspection, and Test Planning
2.6 – Corrective and Preventive Action
2.21 – Internal Quality Audits
2020 Mandatory Elements
87
66
60
60
52
34
26
20
19
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2.15 - Process Control
2.7 - Document Control
2.8 - Measuring and Testing Equipment
2.21 - Internal Quality Audits
2.6 - Corrective and Preventive Actions
2.4 - Management Responsibility
2.5 - Production, Inspection, and Test Planning
2.22 - Training
2.13 - Inspection Status
2.19 - QA Program Review and Manual Revision
2.9 - Purchasing/Subcontracting
2.16 - Preservation, Packaging, and Shipping
2.11 - In-Process Inspection
2.3 - QA Program and Manual Requirements
2.10 - Incoming Inspection
2.12 - Final Inspection
2.18 - Nonconformance Control
2.17 - Quality Records
2.14 - Identification and Traceability
2.20 - Process Capability/Statistical Methods
2.24 - Design Control
2.23 - Contract Review
2.1 - Objective of QA Program
2.2 - Applicability and Scope

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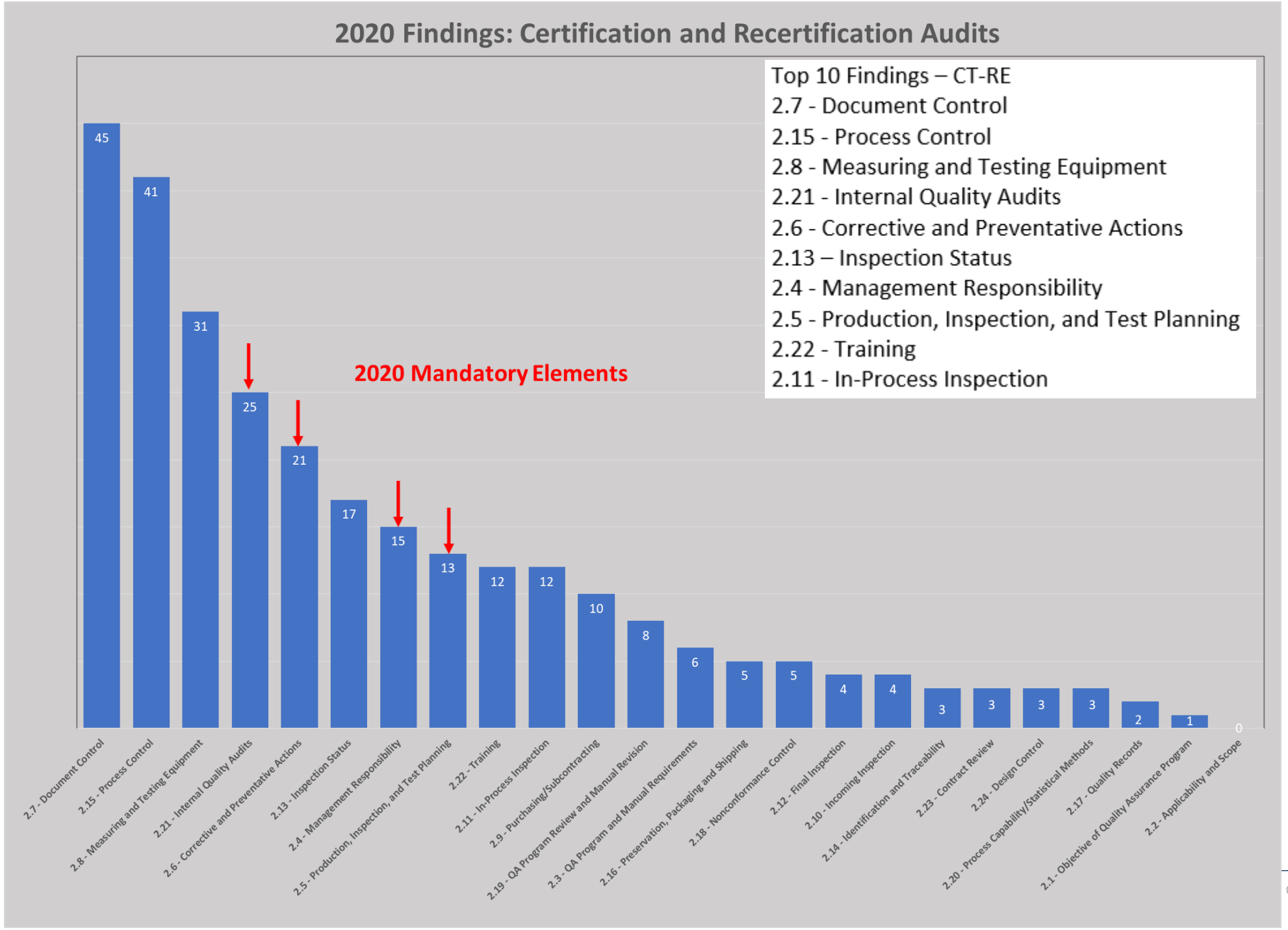
2020 Findings: Certification and Recertification Audits
Top 10 Findings – CT-RE
2.7 - Document Control
2.15 - Process Control
2.8 - Measuring and Testing Equipment
2.21 - Internal Quality Audits
2.6 - Corrective and Preventative Actions
2.13 – Inspection Status
2.4 - Management Responsibility
2.5 - Production, Inspection, and Test Planning
2.22 - Training
2.11 - In-Process Inspection
2020 Mandatory Elements
45
41
31
25
21
17
15
13
12
12
10
8
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5
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3
3
3
2
1
0
2.7 - Document Control
2.15 - Process Control
2.8 - Measuring and Testing Equipment
2.21 - Internal Quality Audits
2.6 - Corrective and Preventative Actions
2.13 - Inspection Status
2.4 - Management Responsibility
2.5 - Production, Inspection, and Test Planning
2.22 - Training
2.11 - In-Process Inspection
2.9 - Purchasing/Subcontracting
2.19 - QA Program Review and Manual Revision
2.3 - QA Program and Manual Requirements
2.16 - Preservation, Packaging and Shipping
2.18 - Nonconformance Control
2.12 - Final Inspection
2.10 - Incoming Inspection
2.14 - Identification and Traceability
2.23 - Contract Review
2.24 - Design Control
2.20 - Process Capability/Statistical Methods
2.17 - Quality Records
2.1 - Objective of Quality Assurance Program
2.2 - Applicability and Scope

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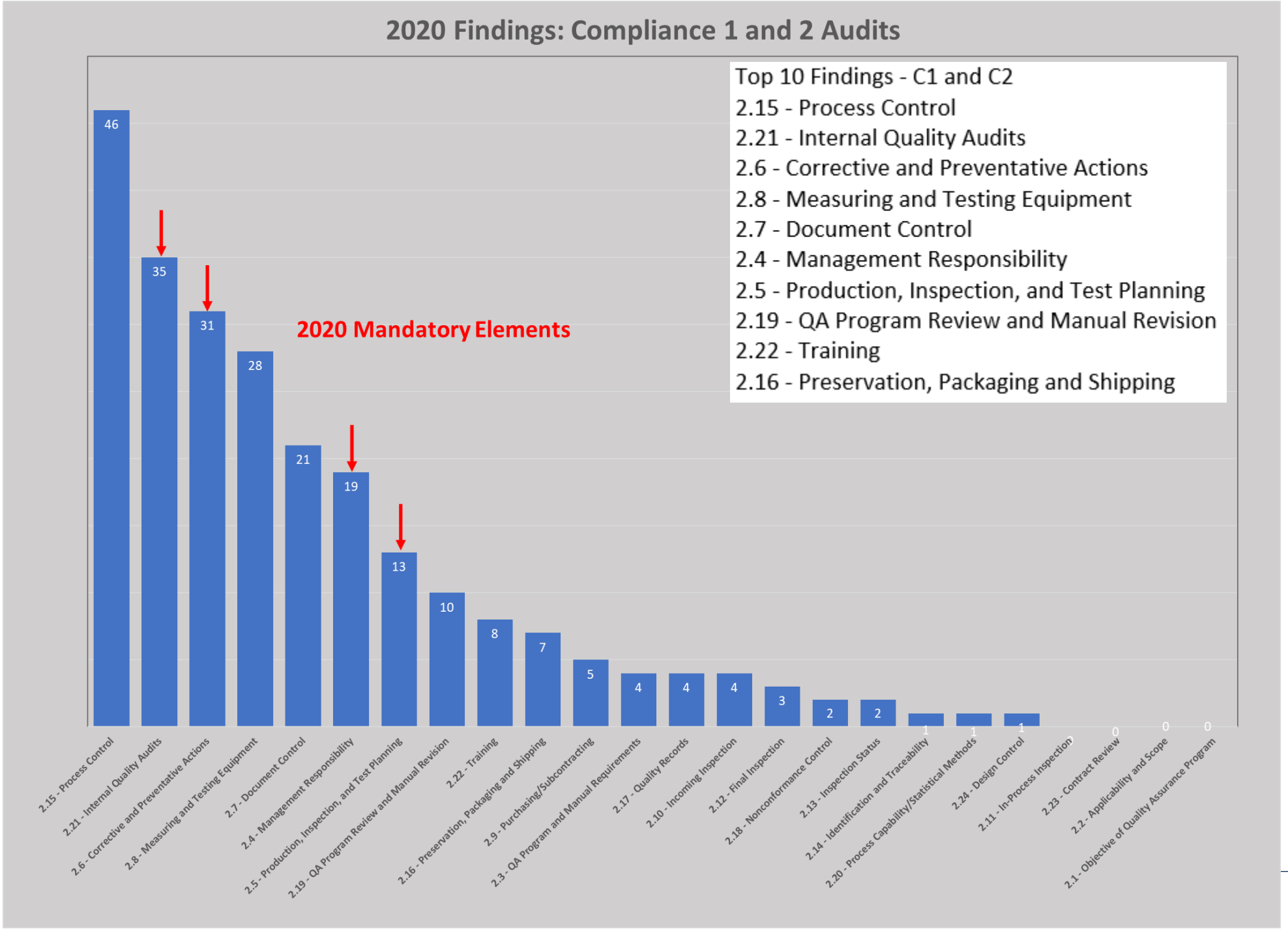
2020 Findings: Compliance 1 and 2 Audits
Top 10 Findings - C1 and C2
2.15 - Process Control
2.21 - Internal Quality Audits
2.6 - Corrective and Preventative Actions
2.8 - Measuring and Testing Equipment
2.7 - Document Control
2.4 - Management Responsibility
2.5 - Production, Inspection, and Test Planning
2.19 - QA Program Review and Manual Revision
2.22 - Training
2.16 - Preservation, Packaging and Shipping
2.9 - Purchasing/Subcontracting
2.3 - QA Program and Manual Requirements
2.17 - Quality Records
2.10 - Incoming Inspection
2.12 - Final Inspection
2.18 - Nonconformance Control
2.13 - Inspection Status
2.14 - Identification and Traceability
2.20 - Process Capability/Statistical Methods
2.24 - Design Control
2.11 - In-Process Inspection
2.23 - Contract Review
2.2 - Applicability and Scope
2.1 - Objective of Quality Assurance Program
2020 Mandatory Elements
46
35
31
28
21
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13
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2
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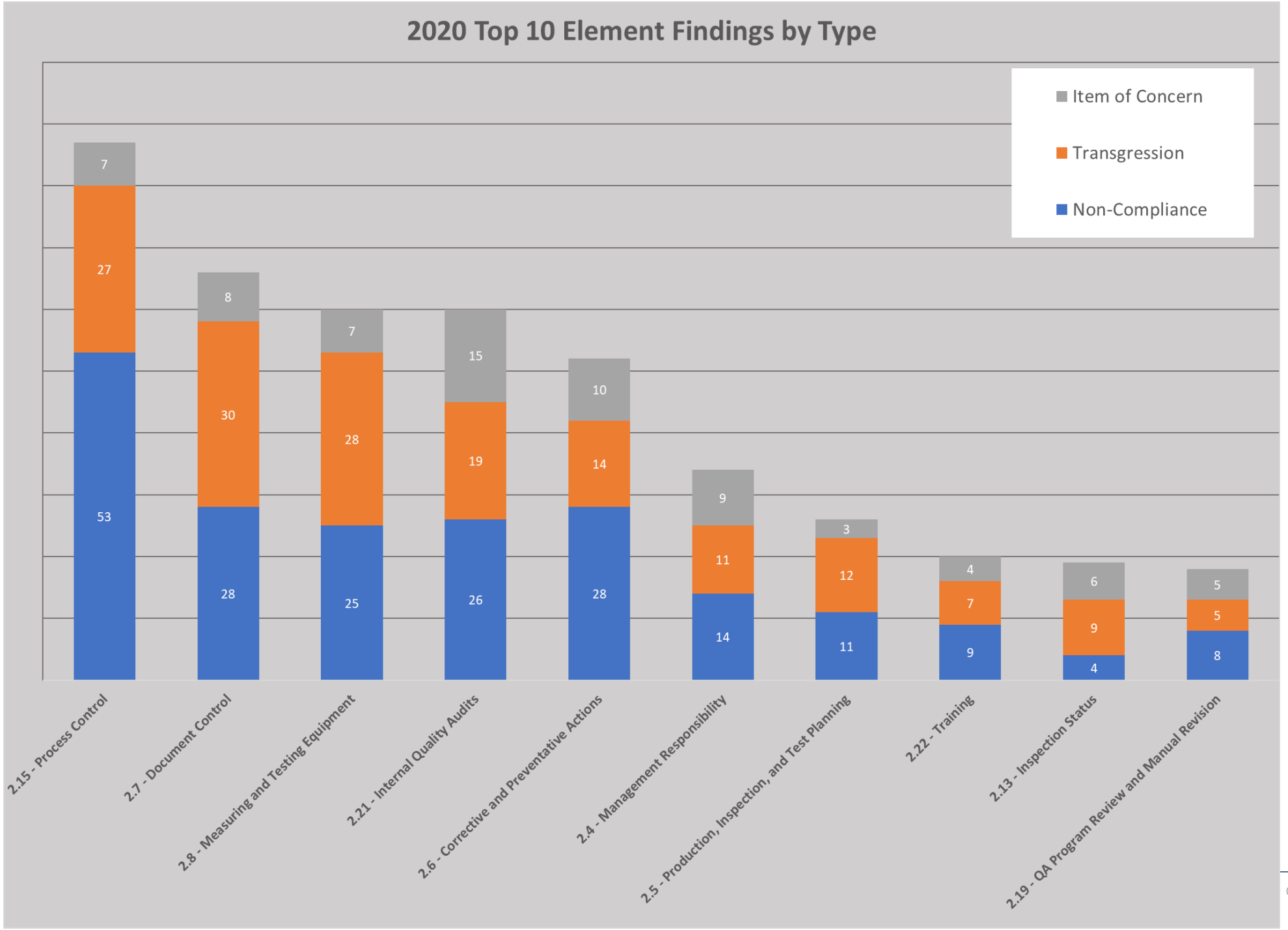
2020 Top 10 Element Findings by Type
Item of Concern
Transgression
Non-Compliance
7
27
53
8
30
28
7
28
25
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19
26
10
14
28
9
11
14
3
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9
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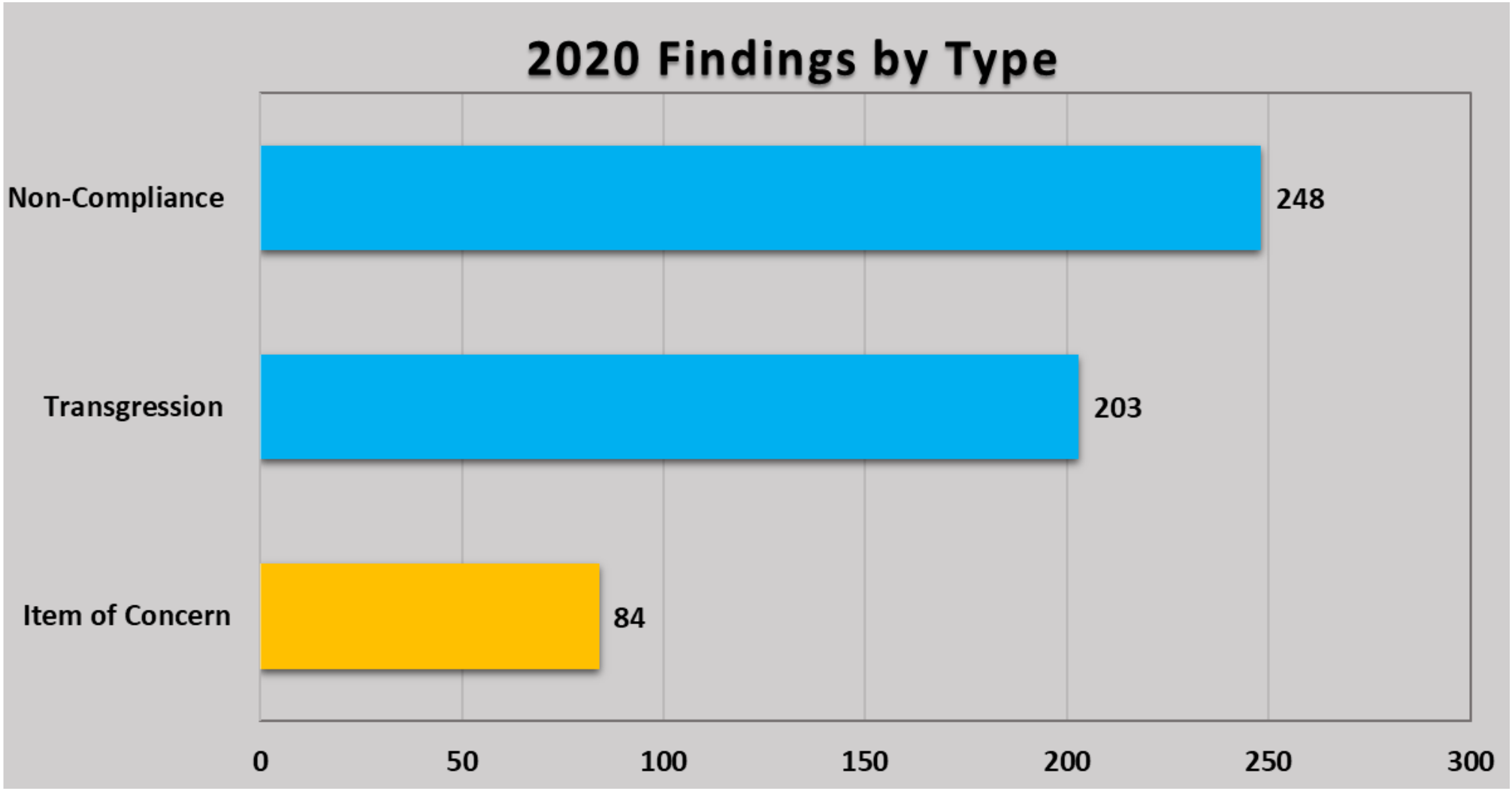
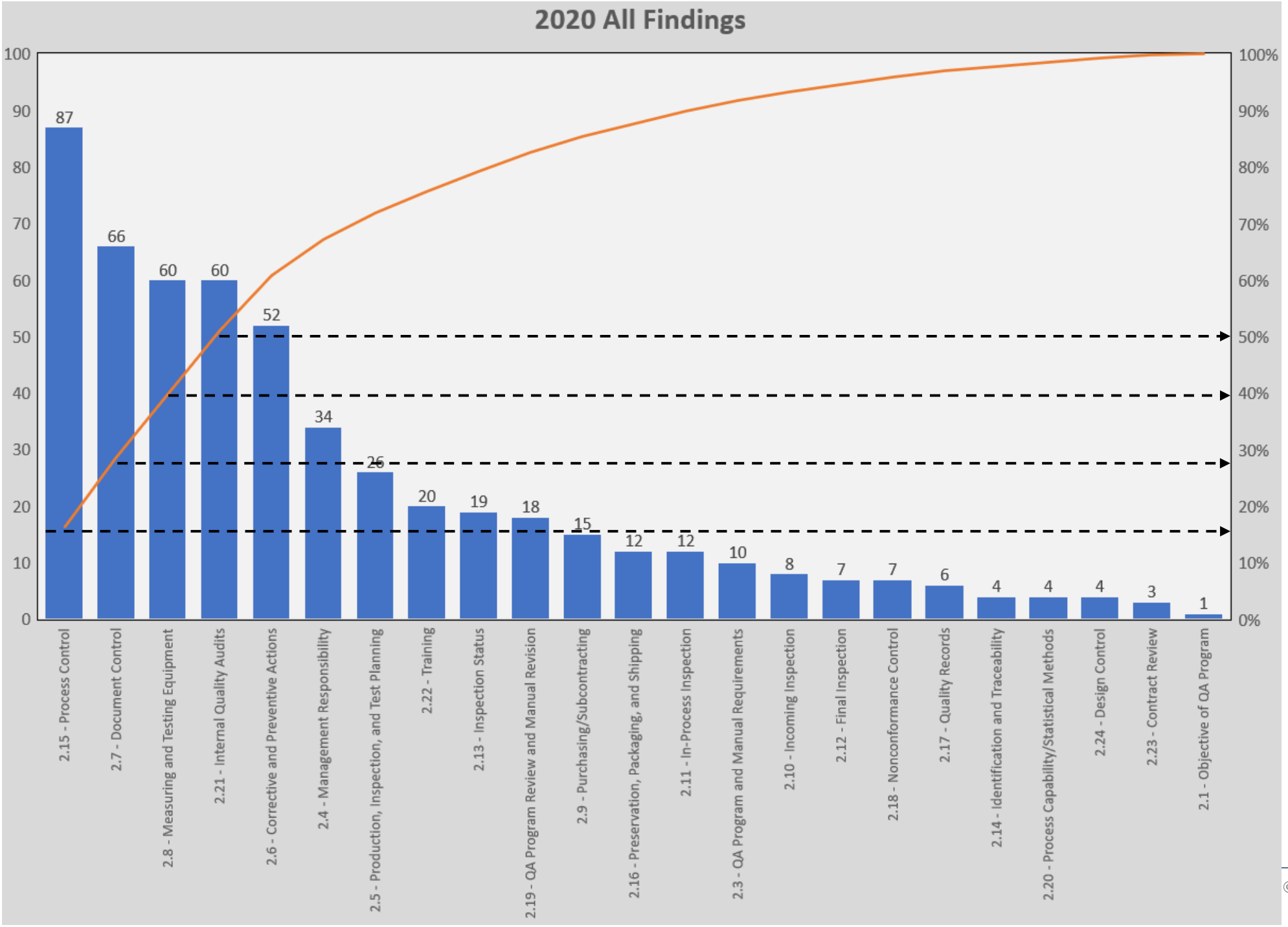
5
8
2.15 - Process Control
2.7 - Document Control
2.8 - Measuring and Testing Equipment
2.21 - Internal Quality Audits
2.6 - Corrective and Preventative Actions
2.4 - Management Responsibility
2.5 - Production, Inspection, and Test Planning
2.22 - Training
2.13 - Inspection Status
2.19 - QA Program Review and Manual Revision



Noncompliance - 30 day written response
Transgression - 30 day written response
Item of concern - no written response


2020 All Findings
100
90
80
70
60
50
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30
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10
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100%
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80%
70%
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50%
40%
30%
20%
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2.15 - Process Control
2.7 - Document Control
2.8 - Measuring and Testing Equipment
2.21 - Internal Quality Audits
2.6 - Corrective and Preventive Actions
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2.16 - Preservation, Packaging, and Shipping
2.11 - In-Process Inspection
2.3 - QA Program and Manual Requirements
2.10 - Incoming Inspection
2.12 - Final Inspection
2.18 - Nonconformance Control
2.17 - Quality Records
2.14 - Identification and Traceability
2.20 - Process Capability/Statistical Methods
2.24 - Design Control
2.23 - Contract Review
2.1 - Objective of QA Program

2021 Mandatory Elements

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2021 Mandatory Elements

- 2.6 – Corrective and Preventive Action
- 2.13 – Inspection Status
- 2.18 – Nonconformance Control
- 2.21 – Internal Quality Audits

The QAC has also requested that the following are verified at every audit.

1) Current subscription to AAR Circular Letters (2.3.5)
2) Latest revision of Section J (2.3.6)
3) Any applicable technical approvals are current (2.15.12)
4) Chapter 7 nonconformance reporting contact (2.18.3)

Access to M-1003 Information

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Looking for M-1003 Information?

- Please Visit: http://aar.com/standards/qa.html
- Access the Frequently Asked Questions (FAQ) link
  - Applying for M-1003 certification
  - Latest version of the Quality Assurance Program Evaluation (QAPE)
  - Latest version of the facility profile data sheet
  - Training schedule
  - Training registration links for open classes
  - M-1003 Appendix A Circular Letters
  - Info on Chapter 7 nonconformance reporting
  - Other general questions

Thank you!

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55500 DOT Road
Pueblo, Colorado 81001
www.aar.com

AAR Quality Assurance Auditor and Industry Conference

May 11-12, 2021

Webinar

2021 M-1003 Revisions

Chad Mowery
VP, Operations / QAC Member
Katahdin Rail Services

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Docket Item QA-11: Revisions to M-1003 and QAPE

Docket item opened August 28, 2012 to address correction, revisions and improvements to both M-1003 specification and QAPE.

			Meeting Dates									
Affiliation	Name	Company	12-Mar	15-Mar	19-Mar	22-Mar	23-Mar	25-Mar	26-Mar	29-Mar	30-Mar	1-Apr	8-Apr
			Day		Fri.	Mon.	Tue.	Thu.	Fri.	Mon.	Tue.	Thu.	Thu.
			Time (mst)		11-1	9-11	12-2	8-10	11-1	9-11	12-2	10-12	10-12
QAC Manager	Don Guillen	AAR / TTCI	X	X									
RSI Member	Dave Ronazani	Alltranstek	X										
RSI Member	Donna Jacobi	Amsted	X	X									
RSI Member	Michael Ruby	Trinity	X	X									
AAR QAC Member	Mark Lumadue	Standard Steel	X	X									
AAR QAC Member	Michael Anderson	BNSF	X	X									
AAR QAC Member	Tracy Ulm	New Orleans Gulf Coast RR	X	X									
AAR QAC Member	Bob Wolbert	Progress Rail		X									
QAC Manager	Mark Rusovick	AAR / TTCI	X										

2021 Section J Revision Timeline

2021 Section J Revision Timeline		
Item	**Date**	**Task**
1	March 8, 2021	Joint QAC/RSI task force start revisions recommendations for QAC
2	April 9, 2021	QAC Reviews / Approves task force revisions
3	April 15, 2021	Review approved revisions with editor
4	May 6, 2021	Editor completes draft revision for Circular Letter for industry
5	May 13, 2021	Send 30-day solicitation for comments Circular Letter to industry
6	June 14, 2021	Review and compile industry comments
7	July 1, 2021	QAC reviews and approves industry comments
8	July 22, 2021	Final version in to editor
9	August 5, 2021	Complete "Page turn" final approval
10	August 19, 2021	Editor completes final revision for Circular Letter (industry)
11	August 30, 2021	Send 6-month implementation Circular Letter announcing 2021 Section-J now available to purchase
12	January 28-30, 2022	Train AAR auditors / industry at 2022 QA conference
13	February 28, 2022	AAR auditors begin auditing to new 2021 standard (revisions must be implemented by M-1003 certified facilit

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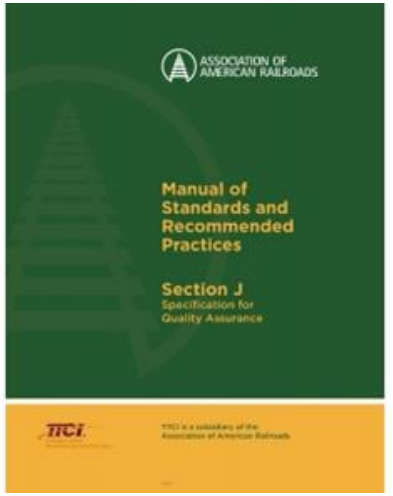
Joint RSI / AAR Task Force

- **Revision Process:**
  - Start by reviewing proposed **2019** changes that were “Not Accepted” by the AAR QAC
  - Review current **definitions** list
  - All **new 2021** proposed revisions
  - Chapter 7 revisions (as this chapter has not been reviewed in recent past)
- **Once completed all task force revisions will be proposed to the QAC for their final approval**



Solicitation for Comment Circular Letter to Industry

- Comment Received Date
- Commenter Company Name
- Full Name
- Contact Number
- Email Address
- M-1003 Referenced Page
- M-1003 Referenced Para #
- Current Verbiage
- Proposed Change
- Reasoning/Justification
- QAC Reviewed / Accepted
- QAC Reason
- Commenter Contacted
- Insert into M-1003?
- AAR Legal Review

Task Force Proposed Changes to QAC

- Current Verbiage:

3.9 Procedure for Change Notification This section outlines the process a facility is to follow regarding notifications related to changes in ownership, changes in location, adding activity code(s), and removing activity code(s). QA codes established at initial certification are permanent.

- Proposed Revision:

3.9 Procedure for Change Notification This section outlines the process a facility is to follow regarding notifications related to changes in ownership, changes in location, adding activity code(s), and removing activity code(s). QA codes established at initial certification are permanent. **All correspondence must be directed to AAR QAC manager at QA@AAR.com.**

Task Force Proposed Changes to QAC

- Current Verbiage:

1.2 Scope

The objective of this specification is to describe the Quality Assurance Program requirements that must be met for AAR certification. This is accomplished through evaluation by an AAR Audit Agency of the effective implementation of the facility's Quality Assurance Program and integration of each activity code.

- Proposed Revision:

1.2 Scope

The objective of this specification is to describe the Quality Assurance Program requirements that must be met for AAR **facility** certification. This is accomplished through evaluation by an AAR Audit Agency of the effective implementation of the facility's Quality Assurance Program and integration of **the facility's activity codes.**

Task Force Proposed Changes to QAC

- Current Verbiage:

2.3.2.6 Identify the characteristics to be inspected, examined, and tested at each point and specify acceptance criteria to be used.

- Proposed Revision:

2.3.2.6 Include or reference a facility's production, inspection and test plan (see element 2.5). **The production, inspection and test plan shall describe the facility's overall process and is not required to include each Activity or product line.**

Task Force Proposed Changes to QAC

- Current Verbiage:

2.5.2.2 Identify the characteristics to be inspected, examined, and tested at each point and specify acceptance criteria to be used.

- Proposed Revision:

2.5.2.2 Identify or make reference to the characteristics to be inspected, examined, and tested at each point and specify acceptance criteria to be used. **The production, inspection and test plan is not required to list every potential document used.**

Task Force Proposed Changes to QAC

- Current Verbiage:

N/A

- Proposed Revision:

Remove transgression finding type and keep only two types of findings: noncompliance and Item of Concern

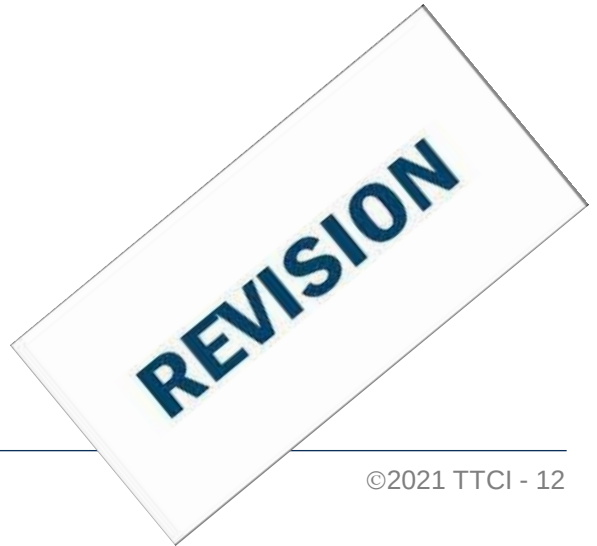
Task Force Proposed Changes to QAC

- Current Verbiage:

2.2.1 The facility's Quality Assurance Program shall apply to all aspects of an activity, including, as appropriate, the procurement, identification, stocking, inspection, and issuing of material; the entire process of manufacture including design control, fabrication, processing, inspection, and assembly; the packaging, storing, and shipping of material; and the maintenance of equipment that affects quality.

- Proposed Revision:

2.2.1 The facility's Quality Assurance Program shall apply to all aspects of their Activity.



Task Force Proposed Changes to QAC

- Current Verbiage:

2.5.1.1 Plan the production activities.

- Proposed Revision:

2.5.1.1 Plan the requirements for production.

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Task Force Proposed Changes to QAC

- Current Verbiage:

See element 2.20 Process Capability/Statistical Methods

All of 2.20 have been replace with

- Proposed Revision:

2.20 Statistical Methods

2.20.1 The facility shall:

2.20.1.1 Maintain documented procedures to implement, analyze, and control the use of statistical methods for process control and continuous improvement.

2.20.1.2 Determine the applicable use of statistical methods and identify where used.

2.20.1.3 Use statistical methods to evaluate and control the variability of processes and key quality characteristics.

2.20.2 The facility should use statistical methods such as statistical process control, process capability studies, and analysis of measurement variability.

M-1003 Revision Timeline - Target Dates

- **May 13** – The industry will be notified through the Circular Letter system of a 30-day solicitation for comments for the new proposed revision.
- **August 30** – Target date to send a 6-month implementation Circular Letter announcing the 2021 Section-J is now available to purchase
- **January 28 week, 2022** – the QAC plans on training the AAR accredited auditors and industry at 2022 QA conference
- **February 28 week** - the auditors will begin auditing to new 2021 standard (all new revisions must be implemented by M-1003 certified facilities)

REVISION

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Thank you!

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M-1003 Remote Auditing Update

Tracy Ulm
Chief Mechanical Officer / QAC Member
New Orleans and Gulf Coast Railroad

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Docket Item: QA-3 QAC Strategic Planning

- Remote or Virtual Auditing
- The QAC believes that remote auditing is not as good as an on-site face to face audit but remote auditing will give the QAC some oversite of the facilities QA program and is better than nothing
- QAC developed / approved procedure QAMP-24 for remote auditing for international M-1003 certified facilities
- QAC sent procedure to technical committee managers to review with their committees
  - Technical committees determined how to manage their technical inspection and approvals
- AAR continues to monitor the COVID-19 situation and will resume auditing / inspections as permitted and will adhere to all PPE, applicable state and CDC guidelines

Remote Auditing Advantages

- A remote audit allows the auditor to engage with a facility through web-based platforms like Skype and Zoom
- Auditor avoids traveling to difficult locations where COVID-19 risk is higher
- Auditors have more time to focus on the audit itself instead of their personal travel logistics
- Audit still covers the review of documentation, records, facility tour and the interviewing of facility staff
- Allows for presentation of findings at the closing meeting
- Mitigates COVID-19 risk by reducing exposure to the auditor and the facility's employees (Social Distancing)
- Reduction of required facility resources like conference rooms, staff interruptions and auditor accommodations

Remote Auditing Disadvantages

- **Issues with technology**
  - Network connections can be lost
  - Interviews and meetings can be interrupted
- **Lack of involvement**
  - Process owners become unavailable due to scheduling conflicts
  - Lack of attention from the auditees (possibly since they are performing other tasks while the audit is being conducted)
- **Trusting the audit**
  - Some auditors want to perform on-site audits because they believe they can trust the audit only if auditors have physical access to objective evidence.
  - Easier for the auditee to hide issues and nonconformities
- **Direct interaction is lost**
  - Lack of ability to read body language which can be crucial in investigating audit issues and/or audit trails during the audit process

Circular Letter on Remote Auditing to Industry

- AAR M-1003 Quality Assurance Audit Requirements During the COVID-19 Pandemic
- The following guidance is issued and will remain in place until further notice is made by Circular Letter announcement (C-13737)
- For International (Outside of the USA, Canada, and Mexico):
- “The AAR Quality Assurance Committee has **temporarily** approved remote M-1003 Quality Assurance Audits in-place of face to face/onsite audits for facilities in countries that have travel restrictions associated with COVID-19“
- Remote auditing for M-1003 Quality Assurance certification will be **halted immediately** after COVID-19 travel restrictions are lifted

Remote Auditing Questionnaire

- Does facility have sufficient infrastructure to support a remote audit?
- Reliable internet connection throughout the facility?
- Management system documentation in digital format?
- Access to a video conferencing service?
- Technical support available to both the auditor / auditees?
- Are Activities being audited on-site during audit?
- Do Activities require Technical approvals?
- Other outstanding issues? (7.1 nonconformances, management personnel availability, etc.)

Remote Auditing Procedure

	Remote Auditing	**ID: QAMP-24** **ISSUE DATE: 10/07/2020** **REV. LEVEL: Original** **REV. DATE:**

1. PURPOSE

1.1 This procedure provides written instructions for AAR auditors to temporarily conduct M-1003 audits remotely (i.e., Virtual Audits) due to travel restrictions preventing on-site audits. Examples: COVID-19 pandemic

2. SCOPE

2.1 This procedure applies to all International facilities in the M-1003 Registry of Certified Facilities or where travel or governmental restrictions prevent an on-site audit.

Is the Remote Audit process working?

- **MID, CRQS, and IQC have completed some remote audits**
- **Auditor's Comments:**
  - **Remote auditing is better than nothing**
  - **Cumbersome**
  - **Cannot read the auditee's ?????????**
  - **Good overview of auditee QMS**
  - **Can provide a lot of details i.e., records & documentation**
  - **Easy to acquire documentation from correct area**
  - **Easy to talk to the correct person via video conferencing**

Is the Remote Audit process working?

The AAR QAC:

- Receives and processes a remote audit report the same as a face-to-face audit report – No difference
- Believes remote auditing is going as well as expected
- Believes some aspects of remote auditing are here to stay
  - Example: design control & purchasing are performed at the facility's headquarters and not at the facility
  - Design control & purchasing can now be completed with the right people via video conferencing
- Will require remote auditing to be halted immediately after COVID-19 travel restrictions are lifted

Thank you!

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Quality Assurance Program Evaluation (QAPE)

Alan Keneipp

Watco

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Quality Assurance Program Evaluation

Purpose of the QAPE

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What is the Quality Assurance Program Evaluation Checklist's Purpose?

- M-1003 Definition:

Quality Assurance Program Evaluation Checklist	A document used by the facility to identify the corresponding line item from the facility's quality assurance manual and procedures that address each element requirement in Chapter 2 of this specification.

- In plain English:
  - A checklist that you use to show where your Quality Assurance Manual and Procedures address M-1003 Chapter 2 Requirements.

What is the Quality Assurance Program Evaluation Checklist's Purpose?

- Another use for the QAPE Checklist is to serve as an M-1003 Audit Checklist:
  - From M-1003 Element 2.21 – Internal Quality Audits:

> **2.21.3** The internal audits shall be performed in accordance with documented procedures (using appropriate checklists) by trained personnel who have the organizational freedom to document results.

- **NOTE:**
  - The specification requires the use of an "appropriate checklist". This does not require a facility to use the QAPE.
    - However, the facility's checklist must address all M-1003 requirements.

Quality Assurance Program Evaluation

How to Access the Current Revision of the QAPE

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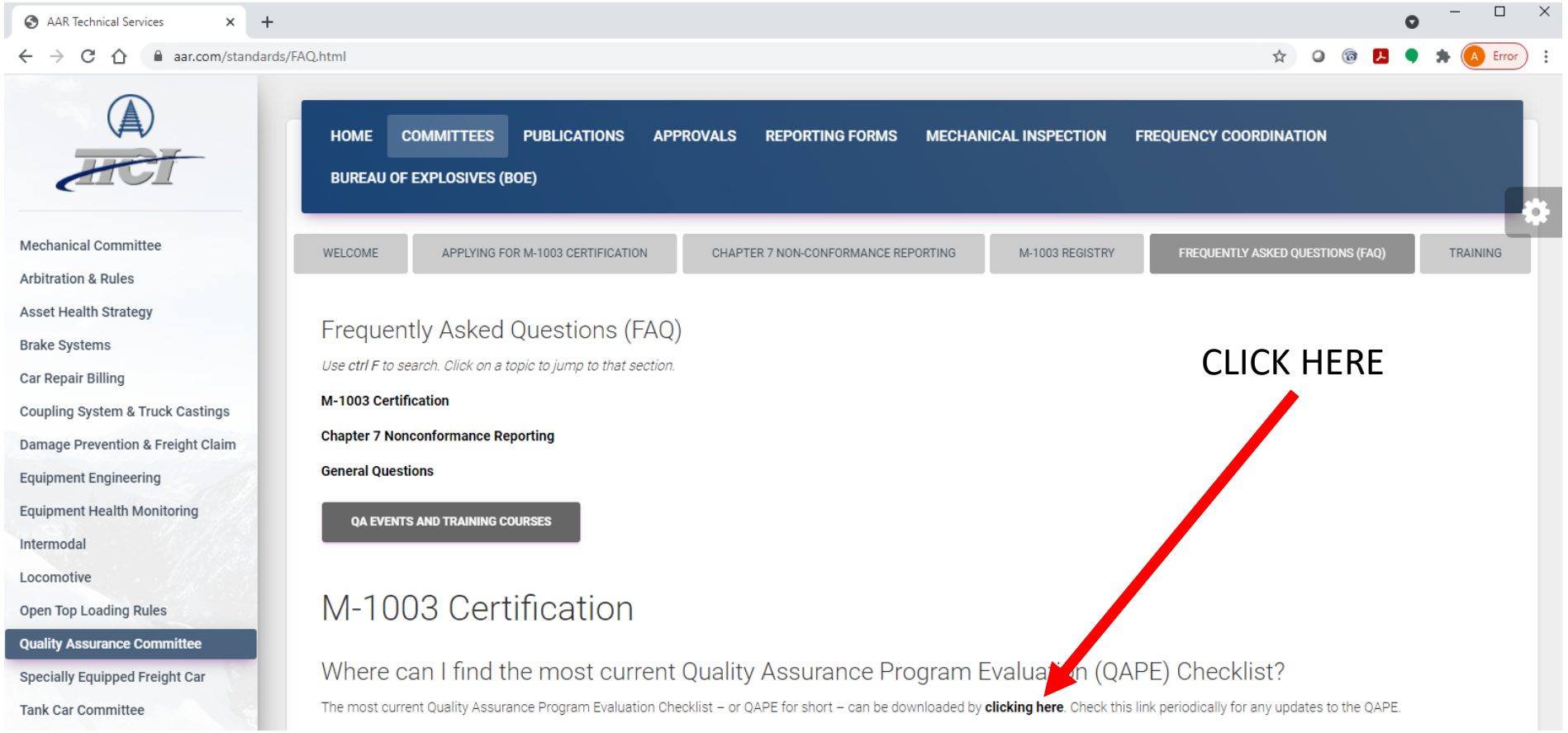
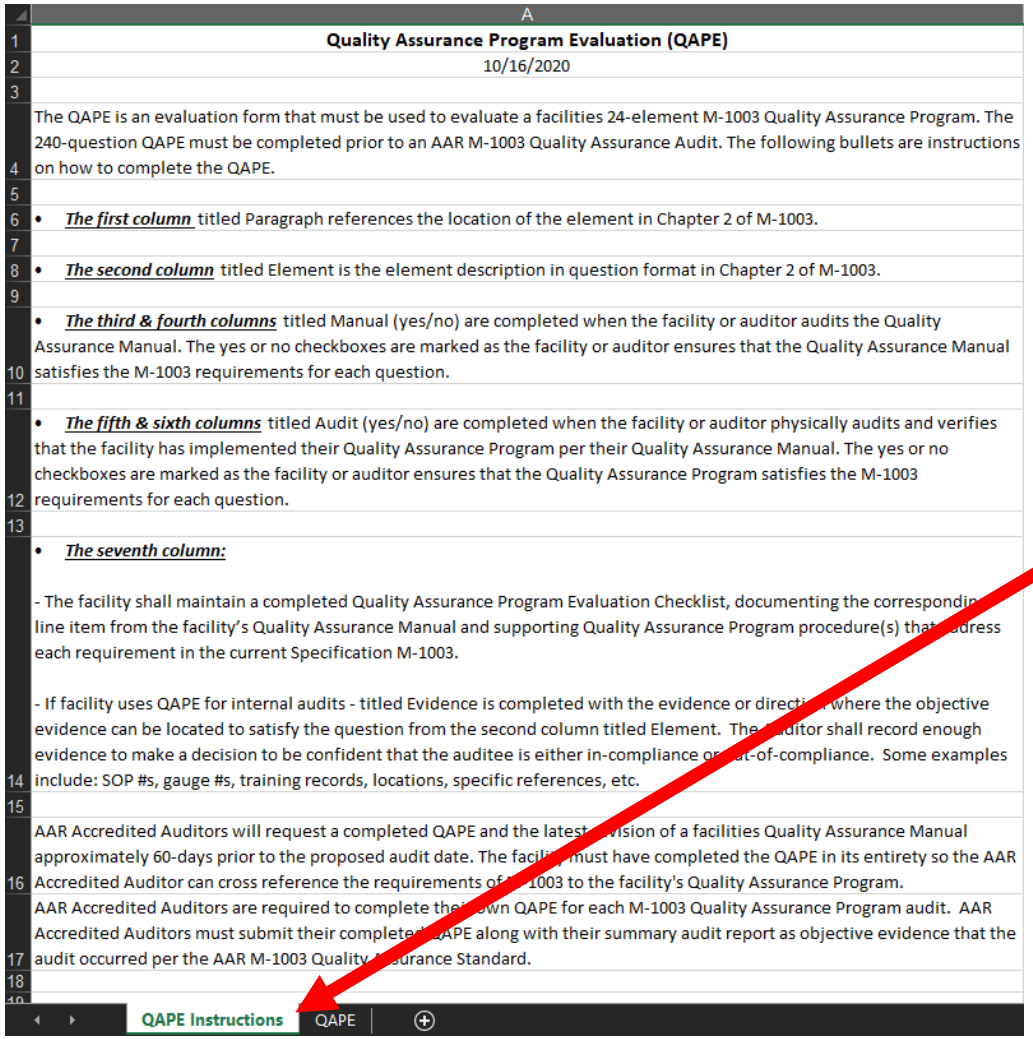
QAPE Checklist

- Where can you get the current QAPE?



QAPE Checklist - Instructions



	A
1	**Quality Assurance Program Evaluation (QAPE)**
2	10/16/2020
3	
4	The QAPE is an evaluation form that must be used to evaluate a facilities 24-element M-1003 Quality Assurance Program. The 240-question QAPE must be completed prior to an AAR M-1003 Quality Assurance Audit. The following bullets are instructions on how to complete the QAPE.
5	
6	• ***The first column*** titled Paragraph references the location of the element in Chapter 2 of M-1003.
7	
8	• ***The second column*** titled Element is the element description in question format in Chapter 2 of M-1003.
9	
10	• ***The third & fourth columns*** titled Manual (yes/no) are completed when the facility or auditor audits the Quality Assurance Manual. The yes or no checkboxes are marked as the facility or auditor ensures that the Quality Assurance Manual satisfies the M-1003 requirements for each question.
11	
12	• ***The fifth & sixth columns*** titled Audit (yes/no) are completed when the facility or auditor physically audits and verifies that the facility has implemented their Quality Assurance Program per their Quality Assurance Manual. The yes or no checkboxes are marked as the facility or auditor ensures that the Quality Assurance Program satisfies the M-1003 requirements for each question.
13	
14	• ***The seventh column:*** - The facility shall maintain a completed Quality Assurance Program Evaluation Checklist, documenting the correspondin line item from the facility's Quality Assurance Manual and supporting Quality Assurance Program procedure(s) tha dress each requirement in the current Specification M-1003. - If facility uses QAPE for internal audits - titled Evidence is completed with the evidence or direct where the objective evidence can be located to satisfy the question from the second column titled Element. The uditor shall record enough evidence to make a decision to be confident that the auditee is either in-compliance or t-of-compliance. Some examples include: SOP #s, gauge #s, training records, locations, specific references, etc.
15	
16	AAR Accredited Auditors will request a completed QAPE and the latest vision of a facilities Quality Assurance Manual approximately 60-days prior to the proposed audit date. The facili must have completed the QAPE in its entirety so the AAR Accredited Auditor can cross reference the requirements of 1003 to the facility's Quality Assurance Program.
17	AAR Accredited Auditors are required to complete thei own QAPE for each M-1003 Quality Assurance Program audit. AAR Accredited Auditors must submit their complete QAPE along with their summary audit report as objective evidence that the audit occurred per the AAR M-1003 Quality surance Standard.
18	

QAPE Instructions | QAPE

When the QAPE is retrieved from the web site, the excel file has a tab with instructions.

Quality Assurance Program Evaluation

Using the QAPE to Ensure Your Quality Assurance Manual and Supporting Procedures Address All M-1003 Requirements

QAPE Checklist - Instructions

Quality Assurance Program Evaluation (QAPE)

10/16/2020

The QAPE is an evaluation form that must be used to evaluate a facilities 24-element M-1003 Quality Assurance Program. The 240-question QAPE must be completed prior to an AAR M-1003 Quality Assurance Audit. The following bullets are instructions on how to complete the QAPE.

- ***The first column*** titled Paragraph references the location of the element in Chapter 2 of M-1003.
- ***The second column*** titled Element is the element description in question format in Chapter 2 of M-1003.
- ***The third & fourth columns*** titled Manual (yes/no) are completed when the facility or auditor audits the Quality Assurance Manual. The yes or no checkboxes are marked as the facility or auditor ensures that the Quality Assurance Manual satisfies the M-1003 requirements for each question.

2.12	FINAL INSPECTION	Manual		Audit		Objective Evidence
		Yes	No	Yes	No	
2.12.1	Does the facility inspect, test, and identify the final activity as required by the inspection and test plan?					
2.12.2	Does the facility review all inspection and test records and verify that the activity has been inspected at all points shown in the inspection and test plan and that these records are complete?					
2.12.3	Does the facility retain all inspection records as specified in paragraph 2.17?					

QAPE Checklist - Instructions

- ***The seventh column:***

- The facility shall maintain a completed Quality Assurance Program Evaluation Checklist, documenting the corresponding line item from the facility's Quality Assurance Manual and supporting Quality Assurance Program procedure(s) that address each requirement in the current Specification M-1003.

These instructions are for a facility to show where their Quality Assurance Manual and supporting procedures fulfill the requirements specified in M-1003

2.12	FINAL INSPECTION	Manual		Audit		Objective Evidence
		Yes	No	Yes	No	
2.12.1	Does the facility inspect, test, and identify the final activity as required by the inspection and test plan?					
2.12.2	Does the facility review all inspection and test records and verify that the activity has been inspected at all points shown in the inspection and test plan and that these records are complete?					
2.12.3	Does the facility retain all inspection records as specified in paragraph 2.17?					

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QAPE Checklist - Instructions

These instructions are for a facility to show where their Quality Assurance Manual and supporting procedures fulfill the requirements specified in M-1003

- ***The seventh column:***

- The facility shall maintain a completed Quality Assurance Program Evaluation Checklist, documenting the corresponding line item from the facility's Quality Assurance Manual and supporting Quality Assurance Program procedure(s) that address each requirement in the current Specification M-1003.

2.12.1	Does the facility inspect, test, and identify the final activity as required by the inspection and test plan?	X				QAM 2.12.1, SOP-2.12
2.12.2	Does the facility review all inspection and test records and verify that the activity has been inspected at all points shown in the inspection and test plan and that these records are complete?	X				QAM 2.12.2, SOP-2.12
2.12.3	Does the facility retain all inspection records as specified in paragraph 2.17?	X				QAM 2.12.3, SOP-2.12

QAPE Checklist - Instructions

- AAR Accredited Auditors will request a completed QAPE and the latest revision of the facility's Quality Assurance Manual approximately 60 days prior to the proposed audit date. The facility must have completed the QAPE in its entirety so the AAR Accredited Auditor can cross reference the requirements of M-1003 to the facility's Quality Assurance Program.

QAPE Checklist - Instructions

- The QAPE the auditor requests is the one the shows where a facility's Quality Assurance Manual and supporting procedures address M-1003 requirements, not a QAPE completed as an internal audit checklist.
- **NOTE:** The QAPE must reflect the most current revision to the facility's Quality Assurance Manual.

Quality Assurance Program Evaluation

Using the QAPE as Your Internal Quality Assurance Program Audit Checklist

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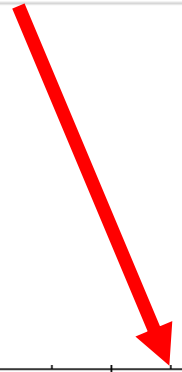
QAPE Checklist - Instructions

- ***The fifth & sixth columns*** titled Audit (yes/no) are completed when the facility or auditor physically audits and verifies that the facility has implemented their Quality Assurance Program per their Quality Assurance Manual. The yes or no checkboxes are marked as the facility or auditor ensures that the Quality Assurance Program satisfies the M-1003 requirements for each question.



2.12	FINAL INSPECTION	Manual		Audit		Objective Evidence
		Yes	No	Yes	No	
2.12.1	Does the facility inspect, test, and identify the final activity as required by the inspection and test plan?					
2.12.2	Does the facility review all inspection and test records and verify that the activity has been inspected at all points shown in the inspection and test plan and that these records are complete?					
2.12.3	Does the facility retain all inspection records as specified in paragraph 2.17?					

QAPE Checklist - Instructions

- ***The seventh column:***

- If facility uses QAPE for internal audits - titled Evidence is completed with the evidence or direction where the objective evidence can be located to satisfy the question from the second column titled Element. The Auditor shall record enough evidence to make a decision to be confident that the auditee is either in-compliance or out-of-compliance. Some examples include: SOP #s, gauge #s, training records, locations, specific references, etc.

These instructions are for a facility to document evidence that the auditor uses to determine compliance or noncompliance to a requirement

2.12	FINAL INSPECTION	Manual		Audit		Objective Evidence
		Yes	No	Yes	No	
2.12.1	Does the facility inspect, test, and identify the final activity as required by the inspection and test plan?					
2.12.2	Does the facility review all inspection and test records and verify that the activity has been inspected at all points shown in the inspection and test plan and that these records are complete?					
2.12.3	Does the facility retain all inspection records as specified in paragraph 2.17?					

QAPE Checklist - Instructions

- ***The seventh column:***

- If facility uses QAPE for internal audits - titled Evidence is completed with the evidence or direction where the objective evidence can be located to satisfy the question from the second column titled Element. The Auditor shall record enough evidence to make a decision to be confident that the auditee is either in-compliance or out-of-compliance. Some examples include: SOP #s, gauge #s, training records, locations, specific references, etc.

These instructions are for a facility to document evidence that the auditor uses to determine conformance or nonconformance to a requirement

2.17.1.2	Personnel, procedures, and equipment for special processes are qualified as required by paragraph 2.15.10?	X			X	QAM 2.17.1.2, welders only weld they do not get moved to a different position. They weld every day. Reviewed weld qualifications for the people that are listed below. A couple of employees we could not find qualification records.

*****In this example, the auditor had a separate list of qualification records reviewed they kept in their notes. The notes were attached to the QAPE for reference.**

Thank you!

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55500 DOT Road
Pueblo, Colorado 81001
www.aar.com

AAR Quality Assurance Conference

What is Objective Evidence and Examples by Element

Presented by:
Bob Wolbert
Progress Rail / QAC member

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Definitions

M-1003 does not define the term "**Objective Evidence**" nor does Merriam – Webster Dictionary so let us look at them separately.

Objective is defined as expressing or dealing with facts or conditions as perceived without distortion by personal feelings, prejudices, or interpretations

Evidence is the available body of facts or information indicating whether a belief or proposition if true or valid

ISO 9000:2015 defines **Objective Evidence** as "Data supporting the existence or *verity of something and notes the Objective Evidence may be obtained through observation, measurement, test, or other means." **a true principle or belief…*

ISIXSIGMA defines **Objective Evidence** as "Physical evidence that someone, when reviewing an audit report, can inspect and evaluate for themselves. It provides compelling evidence that the review or audit was actually performed as indicated, and that the criteria for the audit/review was upheld."

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Where do we find the term “Objective Evidence” or “Evidence” in M-1003 documents

- AAR M-1003 Specification and AAR QAPE

8 instances each (if you don’t count the requirement for objective evidence for every *QAPE line item)

*223 requirements for Objective Evidence entry on QAPE for all elements

- Quality Auditor’s Handbook

1 instance (Section 5, #5, third bullet on corrective action verification)

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M-1003 QAPE Evidence References

2.1.2.3 Is there **evidence** of continuous improvement of materials, products, and services, and the processes producing them?
2.10.2 Check the **evidence** provided by subcontractors and suppliers as a means of verifying quality per the requirements of paragraph 2.10.1.
2.17.1 Does the facility maintain quality records as **evidence** of the following:
2.17.1.1 The activities (materials, products, and services) meet this specification and contractual requirements?
2.17.1.2 Personnel, procedures, and equipment for special processes are qualified as required by paragraph 2.15.10?
2.17.1.3 Selection and surveillance of subcontractors are met as required by paragraph 2.9.1?

2.18.5 Does the facility maintain records identifying nonconforming materials, products, and services (activities), the nature and extent of nonconformance, its disposition, and **evidence** that repaired and reworked materials, products, and services (activities) have been inspected or tested in accordance with applicable documented procedures?
2.21.4 Are internal audit results documented and do they include **evidence** of conformance and/or nonconformance of materials, products, and services (activities) to specified requirements?

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M-1003 Specification Evidence References

2.9 Purchasing/Subcontracting	2.9.1.2.4 **Evidence**, such as certificates of compliance.
2.17 Quality Records	2.17.1 The facility shall maintain quality records as **evidence** of the following:
2.17 Quality Records	2.17.1.1 The activities (materials, products, and services) meet this specification and contractual requirements.
2.17 Quality Records	2.17.1.2 Personnel, procedures, and equipment for special processes are qualified as required by paragraph 2.15.10.
2.17 Quality Records	2.17.1.3 Selection and surveillance of subcontractors are met as required by paragraph 2.9.1.

2.18 Nonconformance Control	2.18.5 The facility shall maintain records identifying nonconforming materials, products, and services (activities), the nature and extent of nonconformance, its disposition, and **evidence** that repaired and reworked materials, products, and services (activities) have been inspected or tested in accordance with applicable documented procedures.
2.21 Internal Quality Audits	2.21.4 Internal audit results shall be documented and include **evidence** of conformance and/or nonconformance of materials, products, and services (activities) to specified requirements.

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2.1 Objective of the Quality Assurance Program

Objective Evidence:

1. Quality Assurance Program (QAM, Procedures, etc.) addressing all elements of AAR M-1003
2. Identified required or voluntary Activity(s) for certification
3. Technical certifications, if required
4. Nonconformance avoidance, detection, handling / disposal procedures, records, FMEA's, ITP's, etc.
5. Continuous Improvement process addressing materials, products and processes
6. Documents supporting contract, statutory and regulatory requirements are met.

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2.2 Applicability and Scope

Objective Evidence:

1. Quality Program documents reflecting oversight of procurement, identification, stocking, inspection and issuance of material
   - Vendor approval / oversight procedure and approved vendors list record
   - Part identification procedure
   - Inspection procedure and records
   - Material control procedure identifying how materials are moved and controlled within the plant
2. Procedure(s) and exhibits that describe the manufacturing plan from design control through shipment.
3. Procedure(s) and records in support of the maintenance of equipment that affects quality.
4. DFMEA, PFMEA, PPAP, ITP's, Quality Gates, etc. that indicates work has been planned to prevent defects
5. Records that identify nonconformance(s) and a corrective actions addressing the causes and potential for reoccurrence as early as possible.

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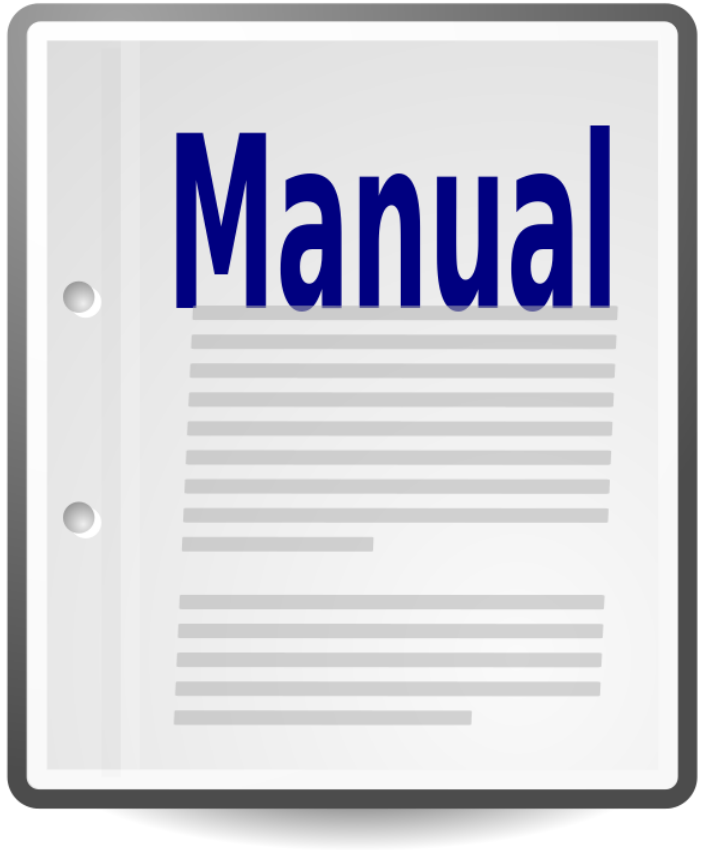
2.3 Quality Assurance Program and Manual Requirements

Objective Evidence:

1. Same as 2.1 and 2.2 for QA program (QAM / Procedures) , plus
2. QAM approved by senior management
3. Current access to Circular Letters
4. Current Section J MSRP



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2.4 Management Responsibility

"If you can't explain it simply, You don't understand it well enough"

- Albert Einstein

Objective Evidence:

1. Quality Policy documented with objectives, implemented and understood
2. Org chart / job descriptions / other written evidence
3. Management Representative appointed and utilized for:
    - Management reviews with senior management focused on improvement
    - Actions taken to prevent nonconformance
    - Identification of problems
    - Solutions initiated or recommended
    - Solutions implemented
    - Control nonconforming activity
4. Resources – trained personnel provided for management, work performance, verification of quality and training
5. Documented management reviews with required level of details

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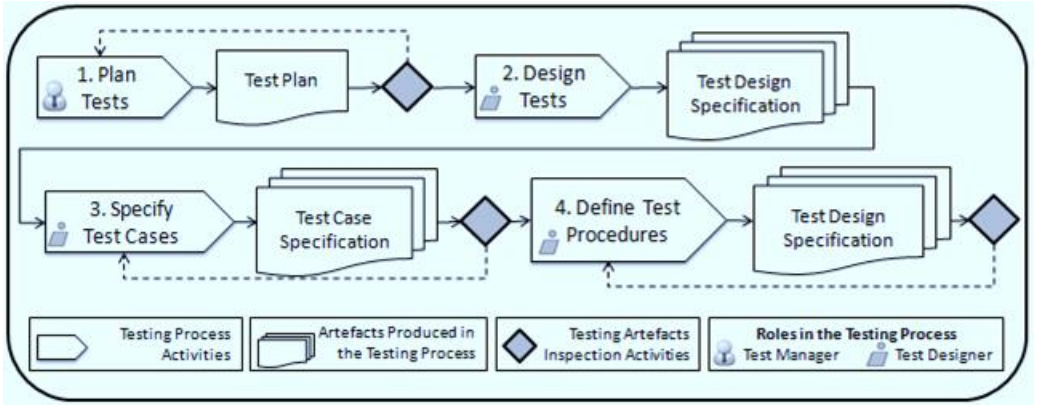
2.5 Production, Inspection and Test Planning

Objective Evidence:

1. Inspection and test plan document satisfying the requirements for:
    - A plan be developed for the activity
    - Inspection and test points
    - Characteristics to be inspected
    - Acceptance criteria
    - Points where MTE is utilized
    - Mandatory hold points
    - Sampling plans / SPC if used and where
    - Verification of compliance to process procedures
    - Subcontractor services employed



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2.6 Corrective and Preventive Actions

Objective Evidence:

1. CAPA procedure / system in place
2. Records of CAPA's resulting from internal audits and management reviews
3. Includes Containment provision
4. Root cause determination using problem solving tools to prevent reoccurrence
5. Verifications of CAPA effectiveness
6. Demonstrated use of sources (process / work operations, concessions, audit results, service reports, customer complaints to detect, analyze and eliminate

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2.7 Document Control

Objective Evidence:

1. Document control procedure
2. Master document listing
3. Documents approved / controlled
4. Availability of documents where needed (Inspection and Test Points)
5. Documents in language of personnel. Technical documents must be English as well as appropriate language
6. Obsolete document retention plan and files
7. Document change(s) record, written changes by authorized personnel only
8. Document revision practice in place

What is an adequate number of documents to be reviewed during an audit

- Considerations should be given to statistical methods to evaluate since the audit is time bound
  - ANSI/ASQ Z1.4 Sampling Plan is recognized and proven effective

Lot Size	Sample Size
1	1
2 to 8	2
9 to 15	3
16 to 25	5
26 to 50	8
51 to 90	13
91 to 150	20
151 to 280	32
281 to 500	50
501 to 1200	80
1201 to 3200	125

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2.8 Measuring and Testing Equipment

"IF YOU CAN'T MEASURE IT, YOU CAN'T MANAGE IT"
PETER DRUCKER

Objective Evidence:

1. Procedure
2. MTE listing of calibrated devices
3. Traceability of calibrations to NIST, ISO
4. Required calibration record details
   - Date of calibration
   - Reference to standard
   - Equipment type
   - Identification #
   - Location
   - Frequency of checks
   - Description of check method
   - Acceptance criteria
   - Action to take when results are unsatisfactory
   - Tag, sticker, or other means to show calibration status
   - Safeguards to prevent adjustments impacting settings
   - Storage / preservations requirements

What is an adequate number of MTE devices to be reviewed during an audit

- Similar to Document Control, considerations should be given to statistical methods to evaluate since the audit is time bound
  - ANSI/ASQ Z1.4 Sampling Plan is recognized and proven effective

Lot Size	Sample Size
1	1
2 to 8	2
9 to 15	3
16 to 25	5
26 to 50	8
51 to 90	13
91 to 150	20
151 to 280	32
281 to 500	50
501 to 1200	80
1201 to 3200	125

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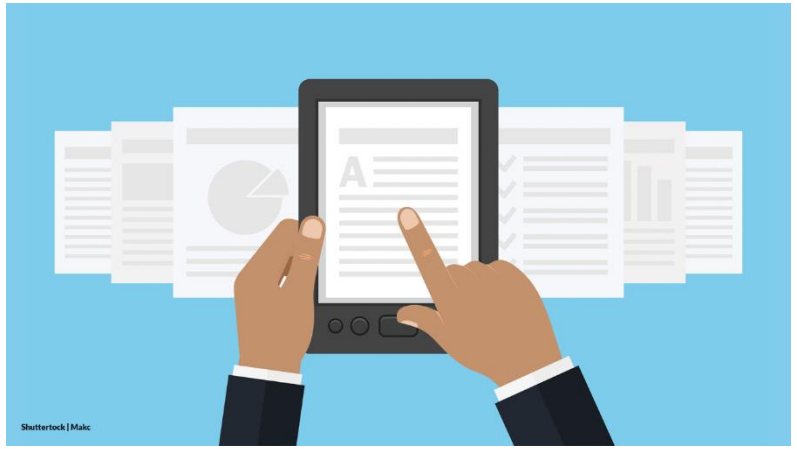
2.9 Purchasing / Subcontracting

Objective Evidence:

1. Procedure / Approved Vendor Listing
2. Records of items purchased / Subcontracted
3. Subcontractor verification – Records for Inspections, Source inspections, Incoming Inspection, Certificates of Conformance
4. Purchasing documents with required details – class, grade, identification (AAR spec., drawings or tech specs, title, number, issue rev date)
5. Purchasing documents with evidence of review for quality requirements
6. Purchasing documents permit customer verification at the subcontractor's plant



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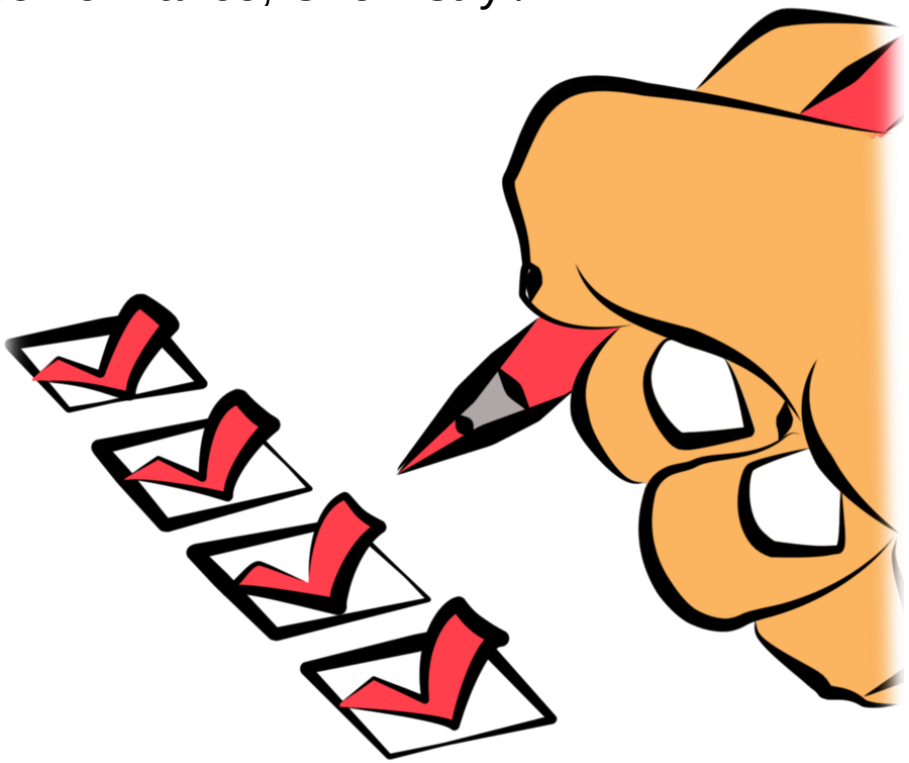
2.10 Incoming Inspection 2.11 In-Process Inspection and 2.12 Final Inspection

Objective Evidence:

1. Procedure, forms, records, tags, area signage / Hold Points
2. ITP
3. Objective evidence review from subcontractors (certificates of conformance, Chemistry / Mechanical certs, inspection records, etc.)
4. Nonconformance marking / segregation
5. Status indicators
6. Identification of customer materials and reporting records
7. Reviews of inspection and test records
8. Records retained per procedure / regulatory requirements



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2.13 Inspection Status & 2.14 Identification and Traceability

Objective Evidence:

1. Procedure and exhibit(s) of methods used (tags, stamps, labels, bar codes, color codes, etc.)
2. Examples in use of container or other marking methods
3. Electronic records used to track status
4. Lot / Batch # usage
5. Serialization methods

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2.15 Process Control

Objective Evidence:

1. Procedure, forms and records
2. Technical specifications for process(s) used
3. Required equipment for process control / verification and maintenance records for same
4. Controlled environmental conditions, where required
5. ITP / Workmanship criteria
6. Qualification of process / procedure / equipment / employee
7. AAR required technical approvals
8. AAR technical documents / MSRP’s

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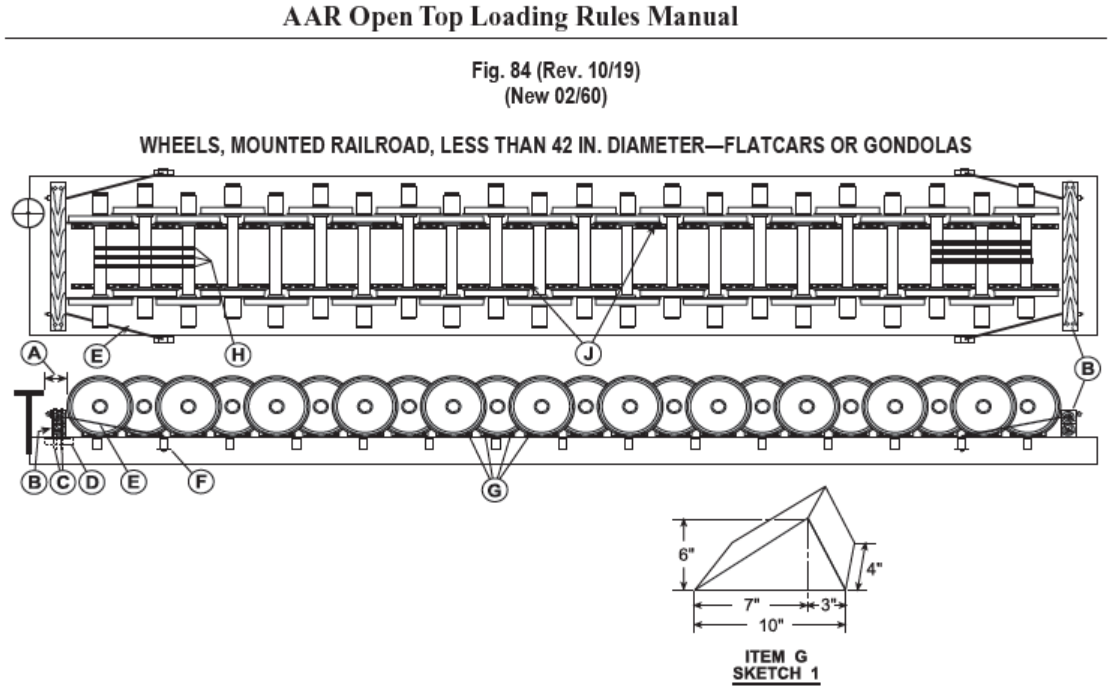
2.16 Preservation, Packaging, and Shipping

Objective Evidence:

1. Procedures, forms, records
2. Demonstrated conditions viewed for movement, packing, packaging, storing, shipping, marking and the prevention of damage during these processes
3. Provisions for FIFO / date controls to prevent deterioration
4. Signage addressing storage / preservation
5. Regulatory or industry standards for specific items i.e. shelf life / environmental requirements are met



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2.17 Quality Records

Objective Evidence:

1. Procedures, forms, records supporting the activity(s) met M-1003, MSRP technical requirements and contractual requirements as well as:
   - Materials
   - Personnel
   - Special Process
   - Inspections
   - Nonconformance controls
   - Dates of inspections and testing

2. Reviews of quality records for analysis
3. Filing of records for easy retrieval
4. Record retention process in place and demonstrated
5. Suitable environment for records
6. Electronic record backup system in place

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2.18 Nonconformance Control

Objective Evidence:

1. Procedures, forms, records
2. Authority for personnel documented to identify, dispose, re-inspect, classify and implement accepted disposition
3. Identification methods established and in use
4. Access, use and compliance with Chapter 7 reporting system
5. Provision of Holding Areas
6. Training records, visual aids, etc. created to address nonconformance reduction

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2.19 Quality Assurance Program Review and Manual Revision

Objective Evidence:

1. Procedures, forms, records
2. QAM with annual review / revision listed
3. QAPE updated and date of review / revision noted

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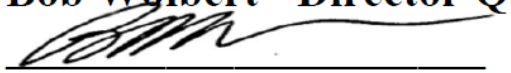
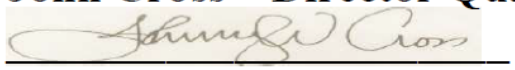
Prepared by	Approved by
Ben Masters	Doug Vroman – Vice President of Quality – Progress Rail  Bob Wolbert - Director Quality– LRS  Mark Donnell – Director Quality - ETS  John Cross – Director Quality – LRE 

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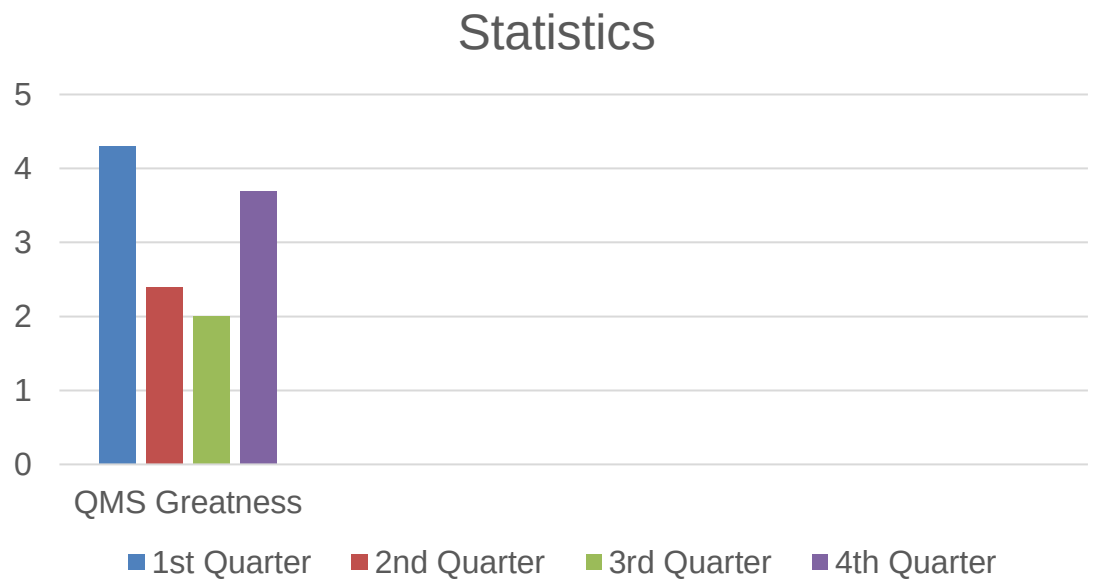
2.20 Process Capability / Statistical Methods

Objective Evidence:

1. Procedures, forms, records
2. ITP / Points of use identified for SPC
3. Controlling equipment / instruments are managed under MTE calibration (Time, Temperature, Amps / Feeds, CFM, etc.)
4. Are used to measure quality conformance and promote improvement – CI projects



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2.21 Internal Audits

Objective Evidence:

1. Procedures, forms, records
2. Training and qualification of auditors
3. Audit schedules
4. Audit report with all 24 elements addressed
5. CAPA's resulting from the audit
6. Effectiveness observations of CAPA's

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Facility: _____ Prepared: _____ Date: _____

Paragraph	Element	Manual		Audit		Objective Evidence	CA/PA Number
		Yes	No	Yes	No		
2.1	Objective of Quality Assurance Program						
2.2	Applicability and Scope						
2.3	Quality Assurance Program and Manual Requirements						
2.4	Management Responsibility						
2.5	Production, Inspection, and Test Planning						
2.6	Corrective and Preventive Actions						
2.7	Document Control						
2.8	Measuring and Testing Equipment						
2.9	Purchasing/Subcontracting						
2.10	Incoming Inspection						
2.11	In-Process Inspection						
2.12	Final Inspection						
2.13	Inspection Status						
2.14	Identification and Traceability						

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2.22 Training

Objective Evidence:

1. Procedures, forms, records
2. Defined job responsibilities and qualification requirements
3. Training requirements for positions / responsibility documented
4. Records for function and specific training required for special processes
5. Training records / Posted qualifications
6. Personnel aware / knowledgeable of their specific responsibilities
7. Provision(s) / records for maintaining currency of proficiency
    - Required activity in process documented AWS 6 month rule records
    - Certification and Re-certification requirements documents
        - NDE
        - Regulatory
        - Other internal requirement adherence

Knowledge is Power!

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2.23 Contract Review

Objective Evidence:

1. Procedures, forms, records
2. Contract review logs
3. Contract review checklists
4. Contract amendments / revisions and approvals follow procedure

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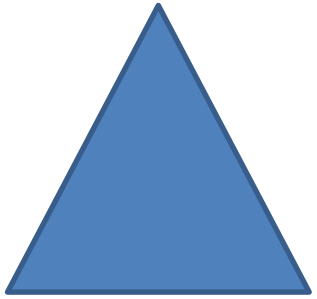
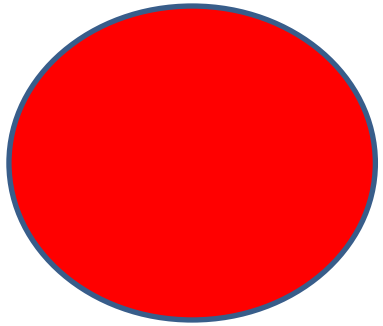
2.24 Design Control

Objective Evidence:

1. Procedures, forms, records
2. Review records
3. Design meeting records
4. Design testing records
5. Design approval records
6. Design validation records
7. Design change records





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AAR Quality Auditors and Industry Conference

May 11-12, 2021

Webinar

AAR M-1003 Facility Certification Process

Dave Ronzani
Director, Railcar Regulatory Compliance
AllTranstek, LLC
ronzani@alltranstek.com

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Certification Overview

- MSRP Section J, M-1003, Specification For Quality Assurance
- Who should be certified?
- Who must be certified?
- What are the requirements?

Certification Overview

- MSRP Section J, M-1003, Specification For Quality Assurance
  - Latest issue October 2019
  - 5 active chapters, 3 active appendices
  - Understand how each chapter and appendix applies to your scope of work (chapter 2 is not everything!)

Certification Overview

What does it take to become certified?

An implemented Quality Assurance Program approved by the AAR.

Technical Approval as applicable.

Certification Overview

- Where do I start? Should I or must I become certified?

- M-1003 certification is mandatory when referenced in;
  - AAR Field Manual / MSRP's
  - AAR Circular Letters
  - Appendix A (M-1003)
    - List's materials, products, and services that require certification when used in North American Railway Interchange Service.
    - Also lists any required technical certification's.

Certification Overview

- Should I become certified?

- M-1003 certification can be obtained on a voluntary basis when certification is not mandatory.

  - Material, product, or service must still be for North American Railway use
  - All requirements apply as if mandatory

Certification Process

- Where do I start?
- M-1003 Chapter 3 - Administrative Provisions
  - Describes the application and maintenance for Quality Assurance Program certification.
- TTCI website (ttci.tech)
  - Quality Assurance Committee (QAC)
    - Applying For M-1003 Certification
    - Frequently Asked Questions

Certification Process

- M-1003 Chapter 3 - Administrative Provisions
  - Application must be completed online at aar.iirx.net
  - Audit fees are stated in the AAR Office Manual Appendix E
  - Application is required for initial certification only
  - For voluntary certification follow instructions in the Facility User's Guide
  - Schedule AAR Audit

Certification Process

- Application at aar.iirx.net website
  - Requires a username and password
  - Initiate the application then wait for AAR permission to access the system
  - Enter additional information about your company
  - Choose Activity Codes for Certification
  - Upload documents as required

New Corporation

Select Corporation...

Facility Information

Legal Company Name	
Facility Point of Contact	
Address	
City	
State or Province	
Country	Please Select a Country
Postal Code	Lookup
Phone Number	
Website	
Email	
Total Number of Employees	0

Submit Request

Association of American Railroad

aar.iirx.net/Home/AarHome

ASSOCIATION OF AMERICAN RAILROADS

Hello ronzani@alltranstek.com! Log off

Home | Facility Certifications | M-1003 Chapter 7 Nonconformance Reporting

Welcome to the AAR M-1003 and M-1002 Certification Application and Chapter 7 Nonconformance Reporting System!

User Guide »

M-1003 Registry

Facilities Associated with your Account

Submit a new QA-7.1

View In Process QA-7.1's

View Completed QA-7.1's

Certification Process

- Choose Activity Code(s)
  - See M-1003 Appendix A – Reference guide
  - All mandatory activities are listed in Appendix A
  - Includes reference to Field Manual Rules, AAR Circulars, and required Technical Approval

APPENDIX A
REFERENCE GUIDE

Shown below is a listing of materials, products, and services (activities) that require M-1003 certification, the AAR *Field Manual* rule and/or circular letter that added the materials, products, or services (activities) to the M-1003 program, and the number of the standard or specification that requires technical approval in addition to M-1003 certification.

Activity Group A

Activity Code	Activity Description	AAR *Field Manual* Rule Reference	AAR Circular		Technical Approval Required
			Reference	Date	
A1	Manufacturer of Journal Roller Bearings	36	C-7081/ C-8306	9/10/85– 1/31/95	M-934
A2	Blank				
A3	Manufacturer of Freight Couplers	16, 17, 18	C-7144	10/20/86	M-211 or M-215
A4	Manufacturer of Locomotive Couplers		C-8306	1/31/95	
A5	Manufacturer of Freight Knuckles	16, 17, 18	C-7144	10/20/86	M-211 or M-215
A6	Manufacturer of Locomotive Knuckles		C-8306	1/31/95	
A7	Manufacturer of Freight Yokes	19, 20	C-7144	10/20/86	M-211 or M-215
A8	Manufacturer of Locomotive Yokes		C-8306	1/31/95	
A9	Manufacturer of Freight Side Frames and Bolsters	47, 48	C-7144	10/20/86	M-210
A10	Manufacturer of Locomotive Truck Frames and Bolsters		C-8306	1/31/95	
A11	Manufacturer of Freight Cushioning Devices	59	C-7196	6/10/87	M-921/ M-921G
A12	Blank				

IMPLEMENTED 09/2020

Certification Process

- Upload Required Documents (M-1003 3.3.2)
  - Quality Assurance Manual
  - Organization Chart depicting QA functions
  - Quality Assurance Program Evaluation (QAPE) checklist*
    - Showing where your manual addresses each requirement in M-003 Chapter 2
    - Upload to “Supplemental Information”
  - Current Technical Approval certificates
  - Proof of sales to North American Railway Interchange Service

Certification Process

- Quality Assurance Manual
  - Must address the 24-elements described in M-1003 Chapter 2
  - Includes QA supporting procedures as applicable (But not required to upload at time of application)
    - Corrective and Preventive Actions
    - Document Control
    - Contract Review, etc…

Technical Approval

- M-1002 Specifications for Tank Cars
  - Now part of the M-1003 online application process
  - When selecting tank car Activity Codes for M-1003, additional application pages will become active for M-1002 technical information
    - Nondestructive Testing
    - Welding Processes
    - Process Equipment, etc…

Technical Approval

- Other Technical Approvals
  - Obtain the applicable technical requirements referenced in Appendix A
  - Understand the technical requirements for your Activity Code

Certification Process

- What are the steps to Certification?

1. Obtain the latest issue of M-1003 including any circular letter revisions
2. Determine the desired activity Codes
3. Review M-1003 Chapter 3 application requirements
4. Create a 24-Element QA Manual
5. Initiate the online application process

Certification Process

- What are the steps to Certification?

6. Upload required documents
7. Receive notification that your application has been accepted
8. AAR auditor will contact you to schedule the audit
9. IMPLEMENT the 24-Elements of the QAM at your facility
10. Prepare for any Technical Approval audits

Certification Process

- What are the steps to Certification?

11. Receive audit from the AAR
12. Respond to any audit findings
13. Receive Certification from the AAR Quality Assurance Committee / Technical Committee

Certification Process

- M-1003 Certification is valid for 3-years
  - Provided continuous satisfactory performance at annual audits
- This presentation does not address every aspect of the certification process you may encounter

Certification Process

Certification takes the effort of management and employees.

An effective QAP cannot be achieved alone by the “QA Manager”

David J. Ronzani
Director, Railcar Regulatory Compliance
AllTranstek, LLC
Ronzani@alltranstek.com
219-670-3401

Thank you!

AAR Quality Assurance
55500 DOT Road
Pueblo, Colorado 81001
www.aar.com

AAR Quality Auditors and Industry Conference

May 11-12, 2021

Webinar

Chapter 7 Nonconformance Update

Don Guillen
Manager – Quality Assurance Committee
TTCI / AAR

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Industry Nonconformance Report to Technical Committees

- **QAC Docket Item:**
  - QA-7 Nonconformance (Material Rejection) Review
- **Date Initiated:**
  - November 15, 2011
- **Background:**
  - Docket item opened for QAC members to review and close all nonconformance reports

    When necessary, identify critical or outstanding nonconformance's and ***report to applicable technical committee managers***

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Revised Chapter 7 Nonconformance Objective

The objective of nonconformance reporting is to document and provide traceability of a failure or nonconformance of an M-1003 certified facility's Activity as defined in the Manual of Standards and Recommended Practices. This includes all Activities certified on a voluntary basis. The disposition and corrective action shall be documented to ensure that the cause of failure is eliminated and follow-up is initiated to ensure the corrective action is effective and permanent.

APPENDIX A
REFERENCE GUIDE

Shown below is a listing of materials, products, and services (activities) that require M-1003 certification, the AAR *Field Manual* rule and/or circular letter that added the materials, products, or services (activities) to the M-1003 program, and the number of the standard or specification that requires technical approval in addition to M-1003 certification.

Activity Group A

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A7	Manufacturer of Freight Yokes	19, 20	C-7144	10/20/86	M-211 or M-215

- **134 Components or Services**
- **Called Activities**
- **AAR Technical Committees**
- **Oversight**
- **QAC Reports 7.1**

Nonconformance for Activities to the Applicable Committee

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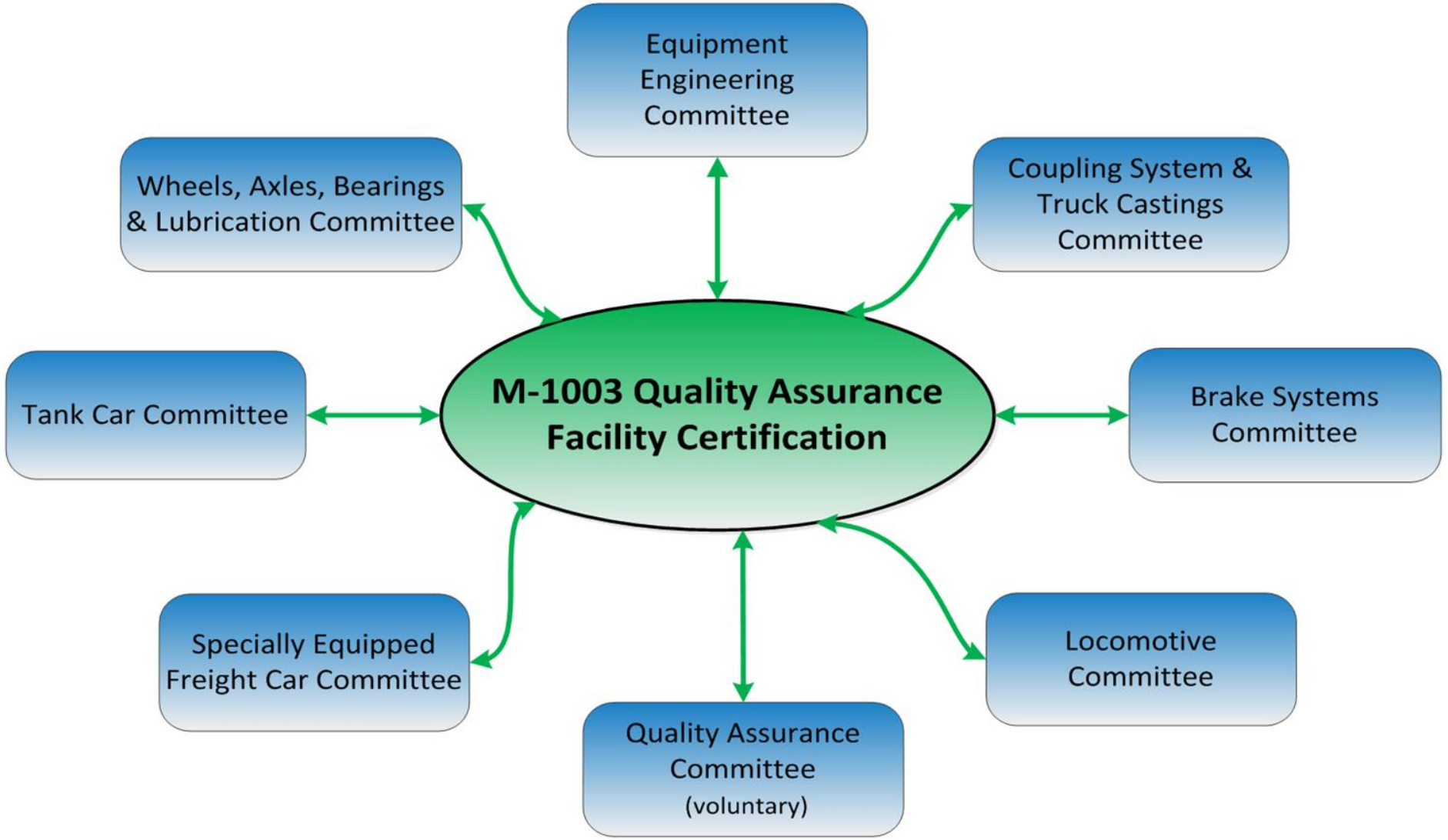
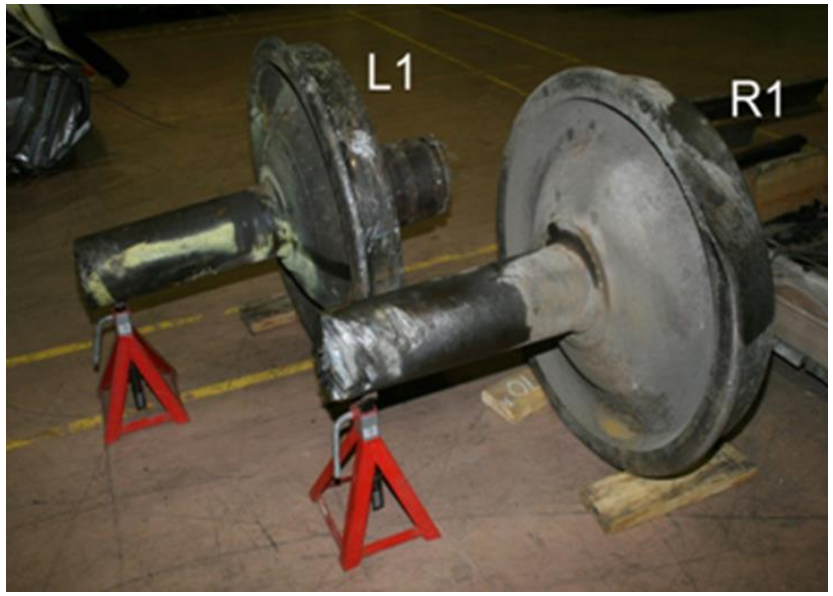
AAR Technical Committee Requirements and M-1003 Quality Assurance Certification



Chapter 7 Nonconformance Reporting

Objective – The objective of nonconformance reporting is to document and provide traceability of a material, product, or service (activity) failure or the failure of a material that is described in the Manual of Standards and Recommended Practices or that is supplied by a facility that is certified per the M-1003 program. This includes all activities certified on a voluntary basis.

Nonconformance - A material, product, or service (activity) that does not meet the applicable standards, specifications, recommended practices, rules, codes, regulations, and contractual requirements.
A Defect.

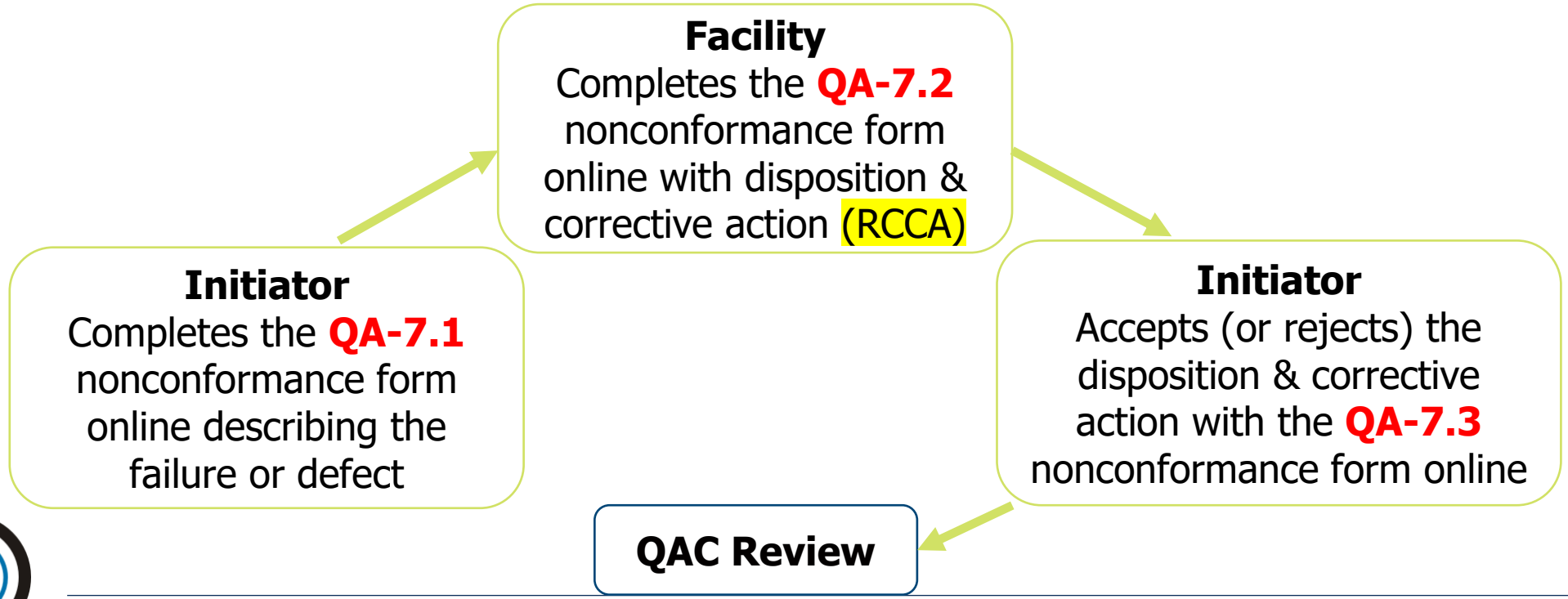


Nonconformance Reporting Process

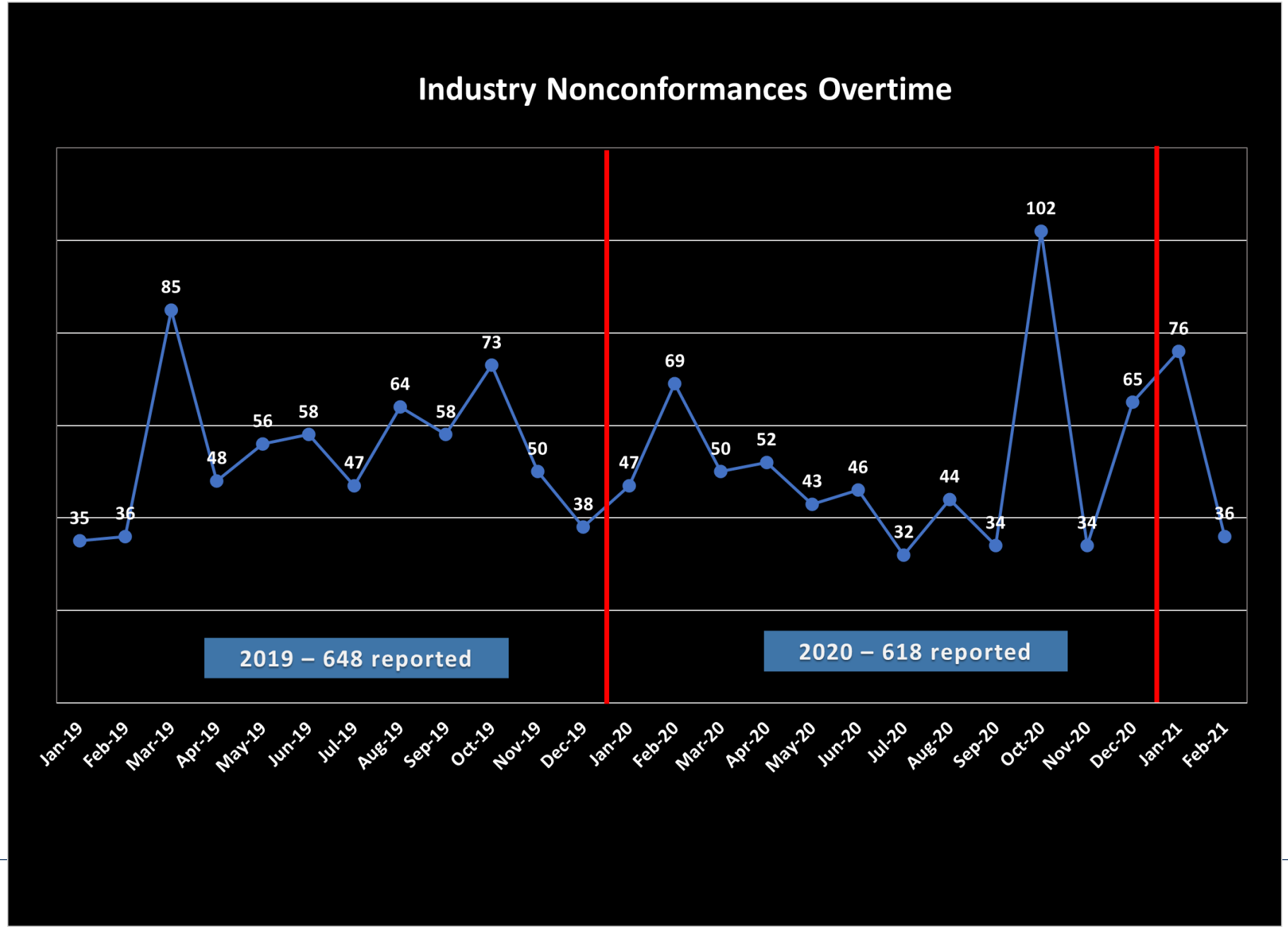
Nonconformance - An activity, document, or characteristic that is in violation of a company, customer, regulatory, or industry requirement (**a defect**)

Initiator - The company or organization that identifies the failed material or service and is **responsible for reporting** the nonconformance.

Facility - The company or organization who **provided the failed** material or service.



Chapter 7 Industry Nonconformances Overtime



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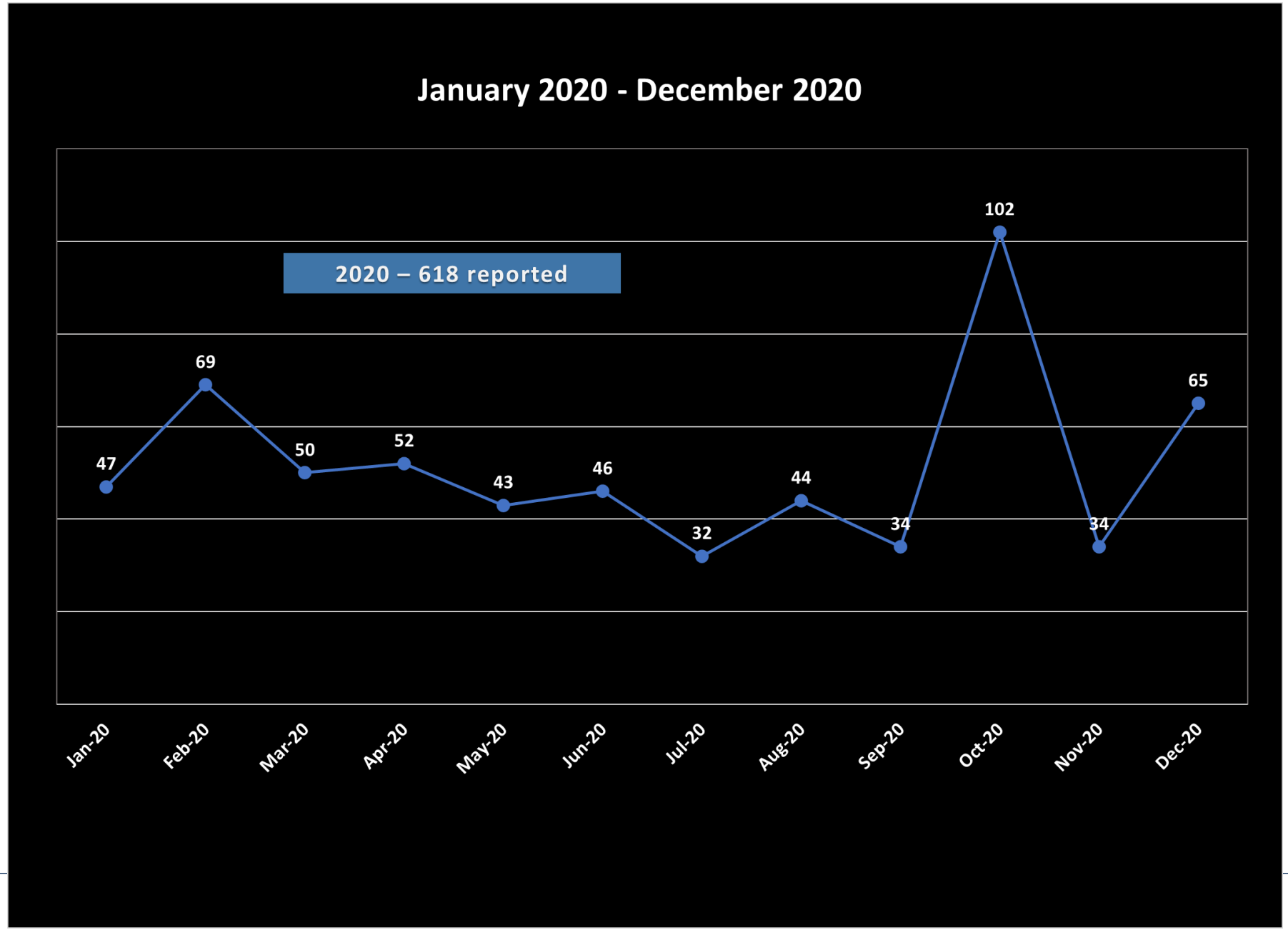
2020 Industry Nonconformances



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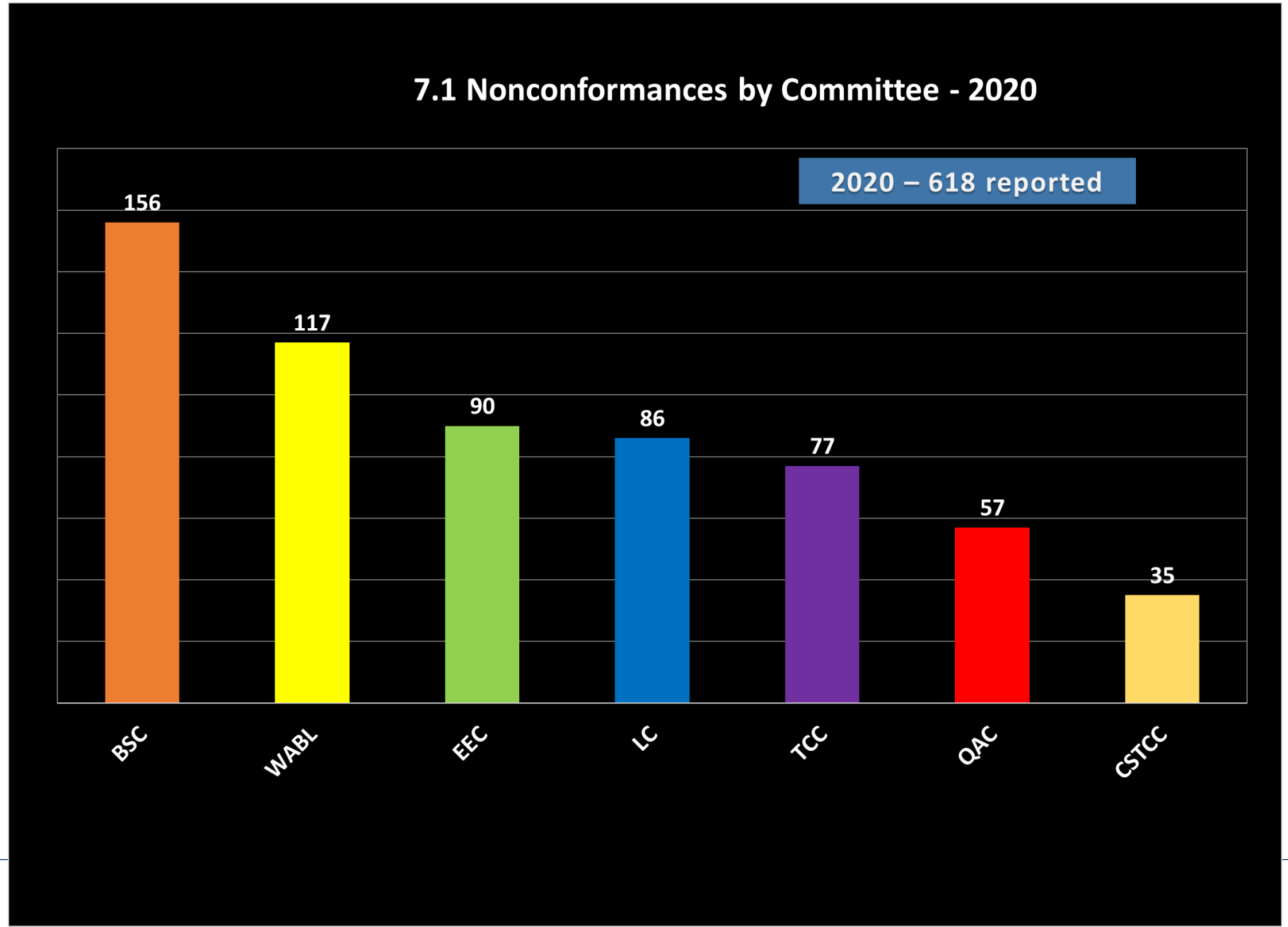
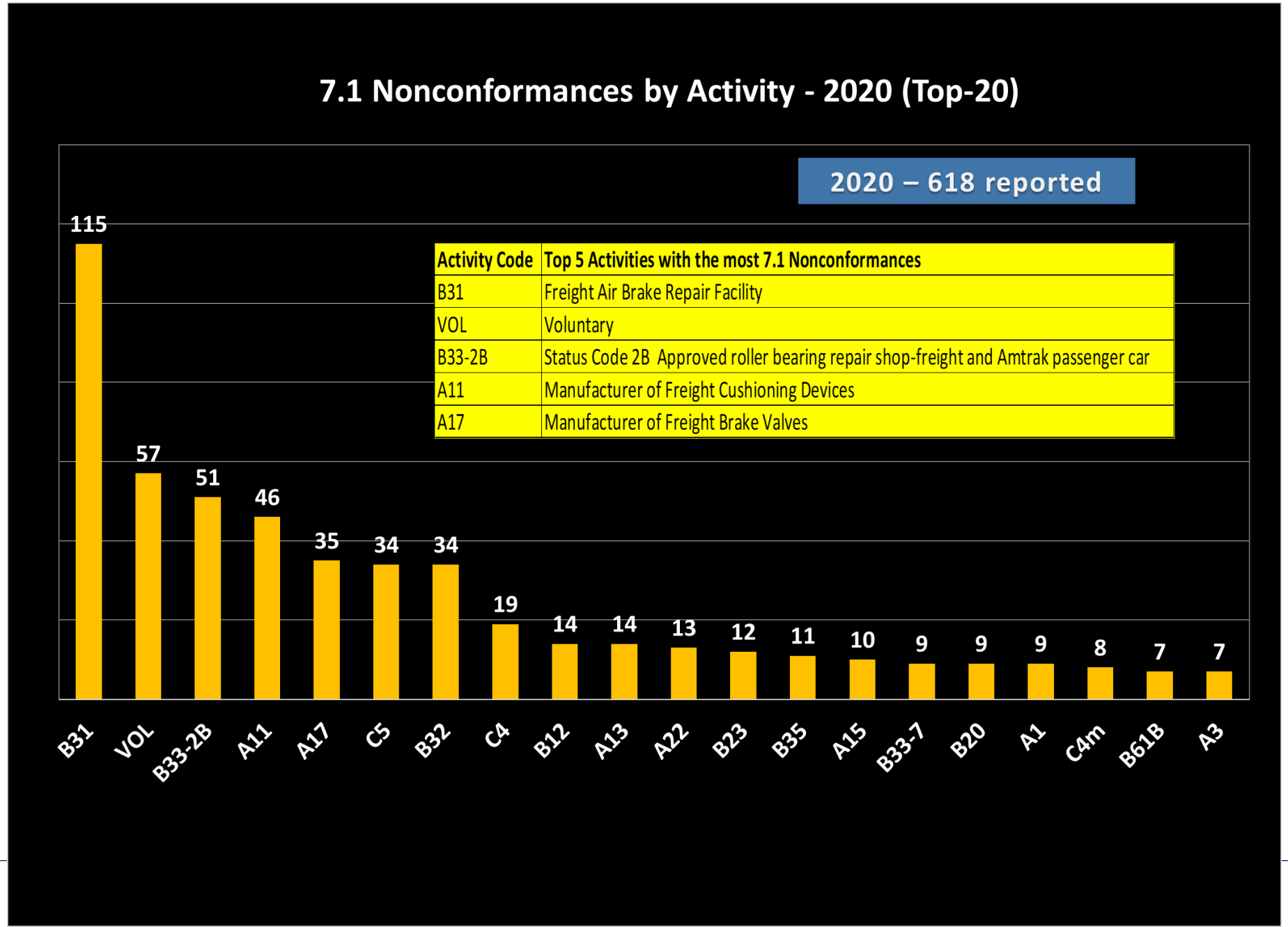
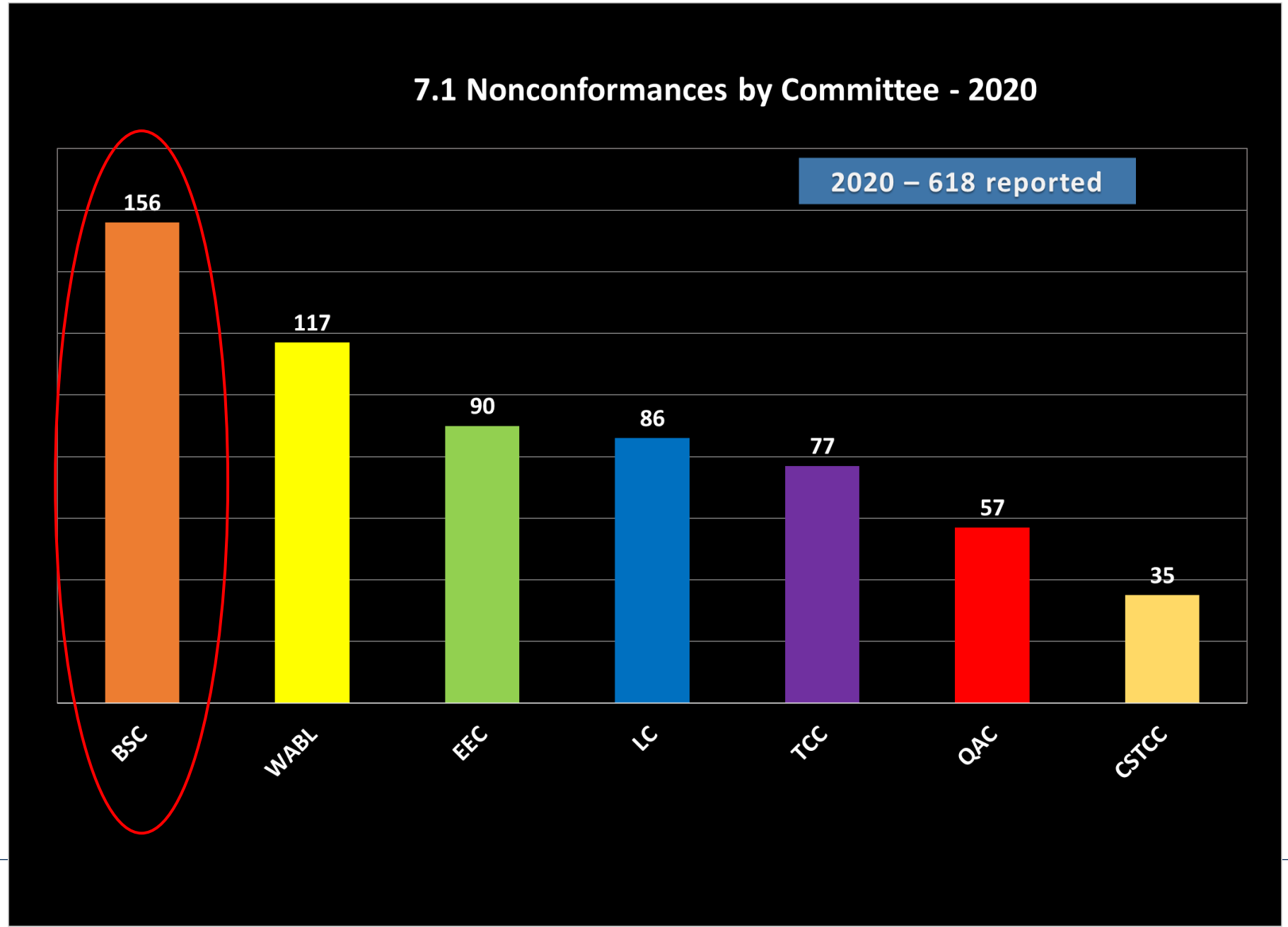
2020 Industry Nonconformances by Committee



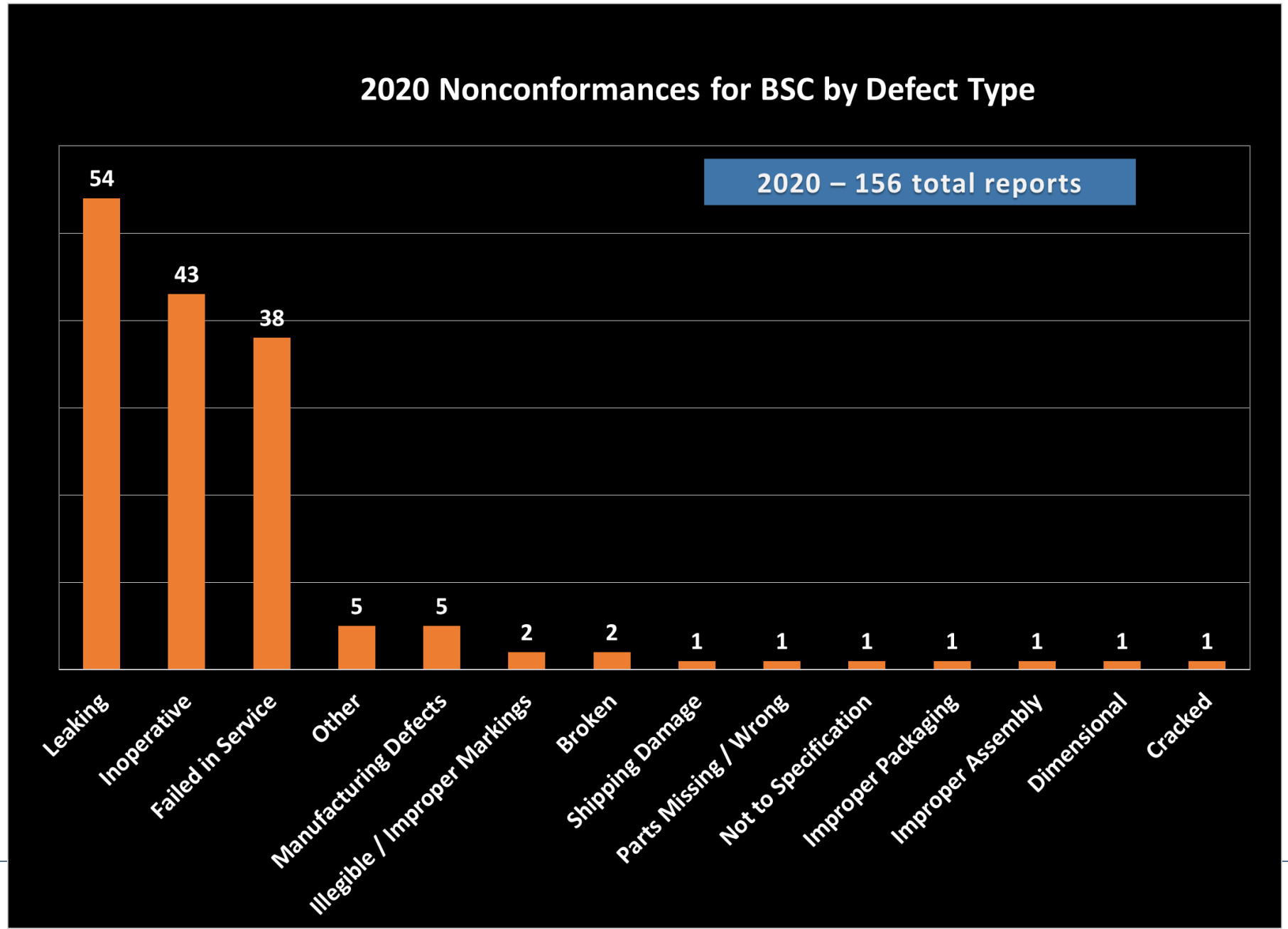
2020 Industry Nonconformances by Activity



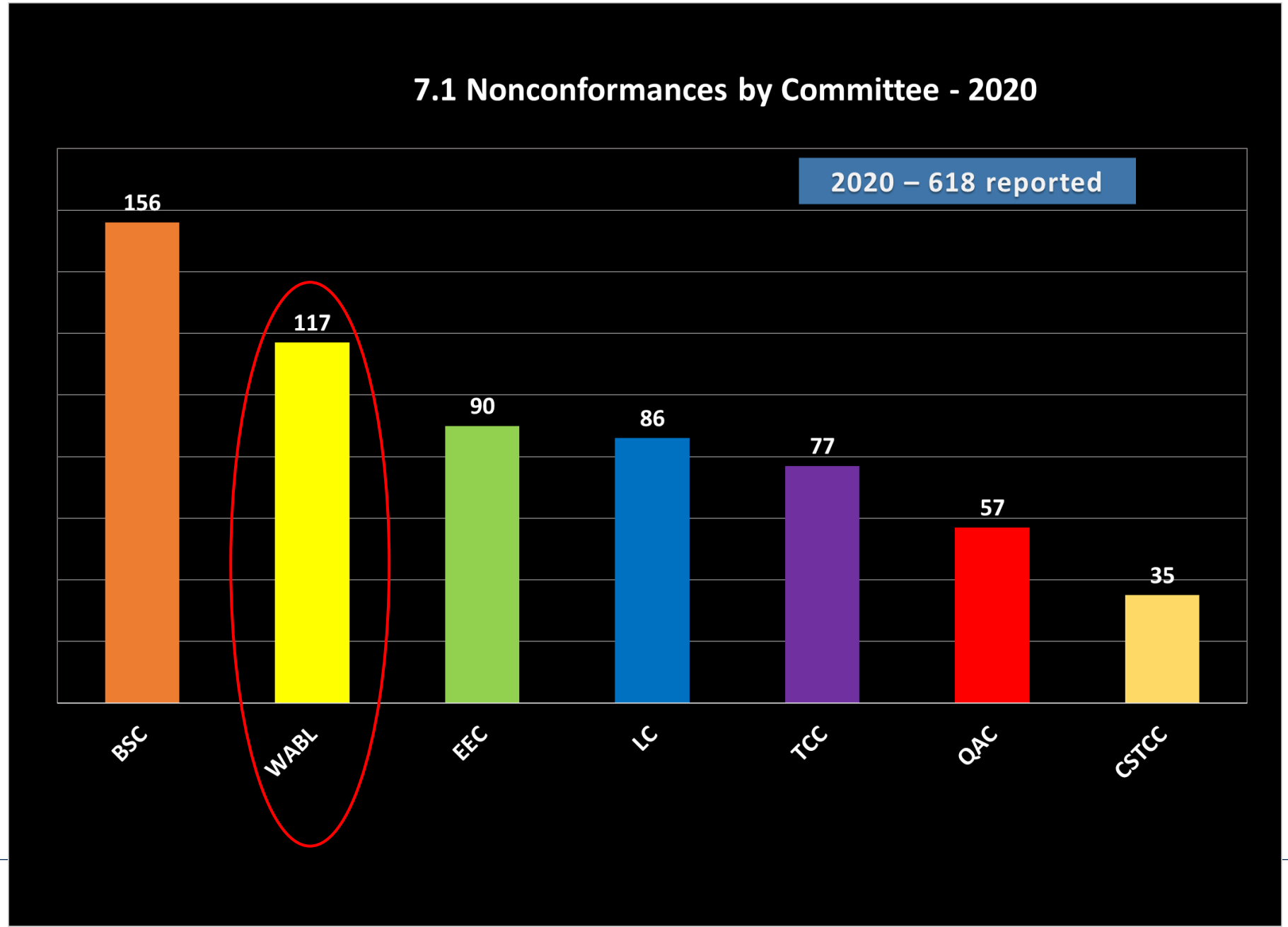
2020 Industry Nonconformances by Committee



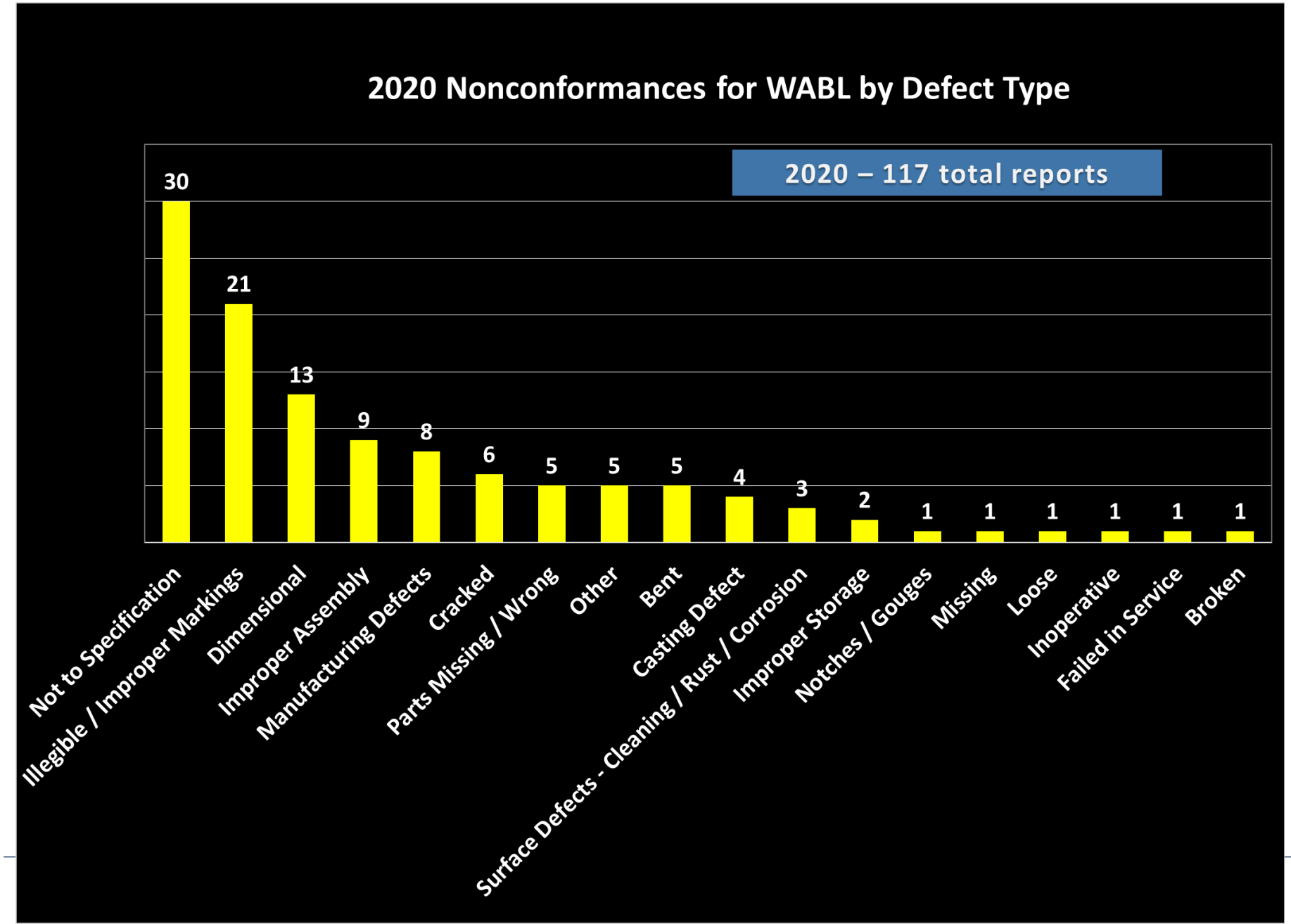
2020 Nonconformances for BSC by Defect Type



2020 Industry Nonconformances by Committee



2020 Nonconformances for WABL by Defect Type



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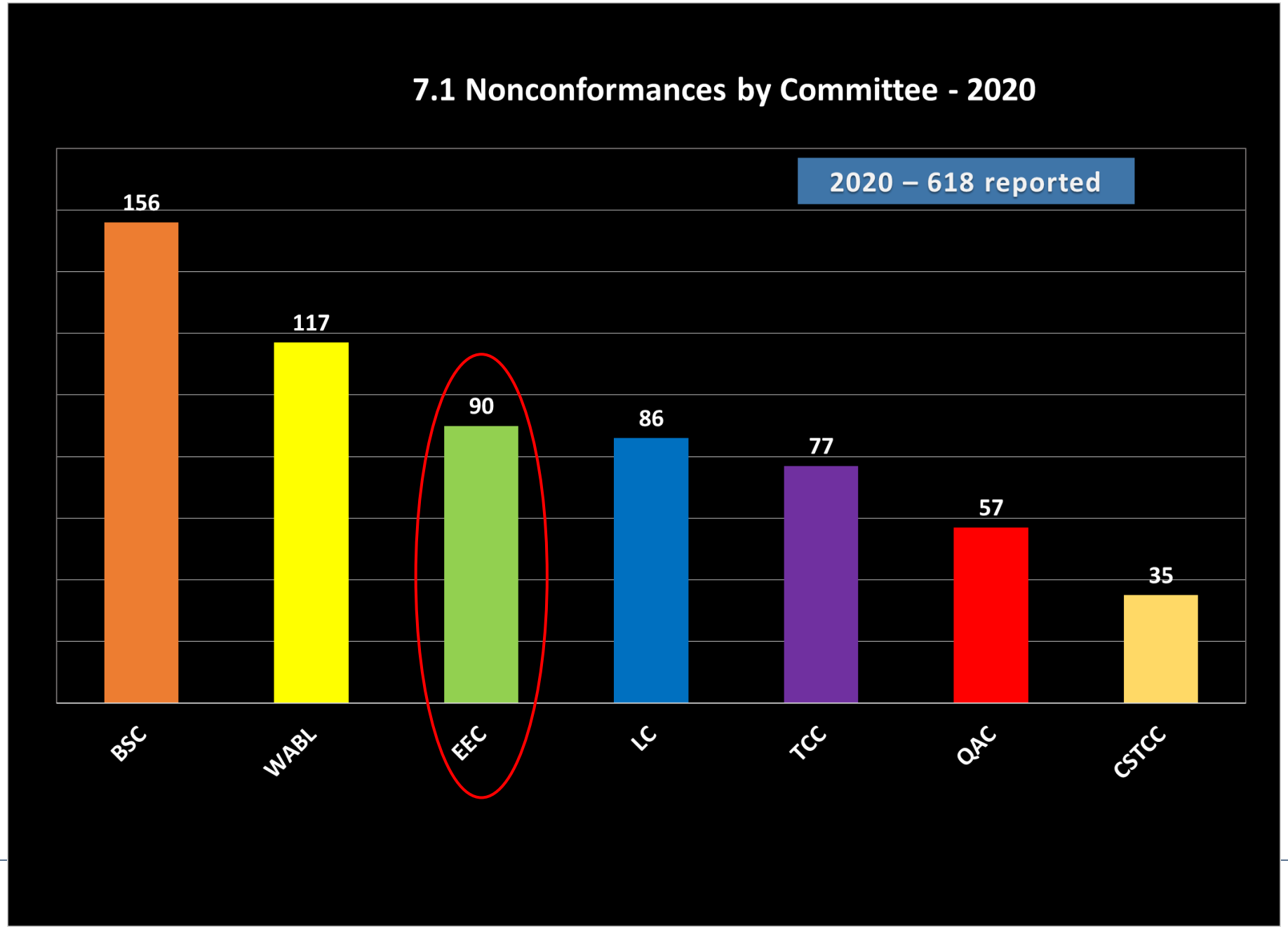
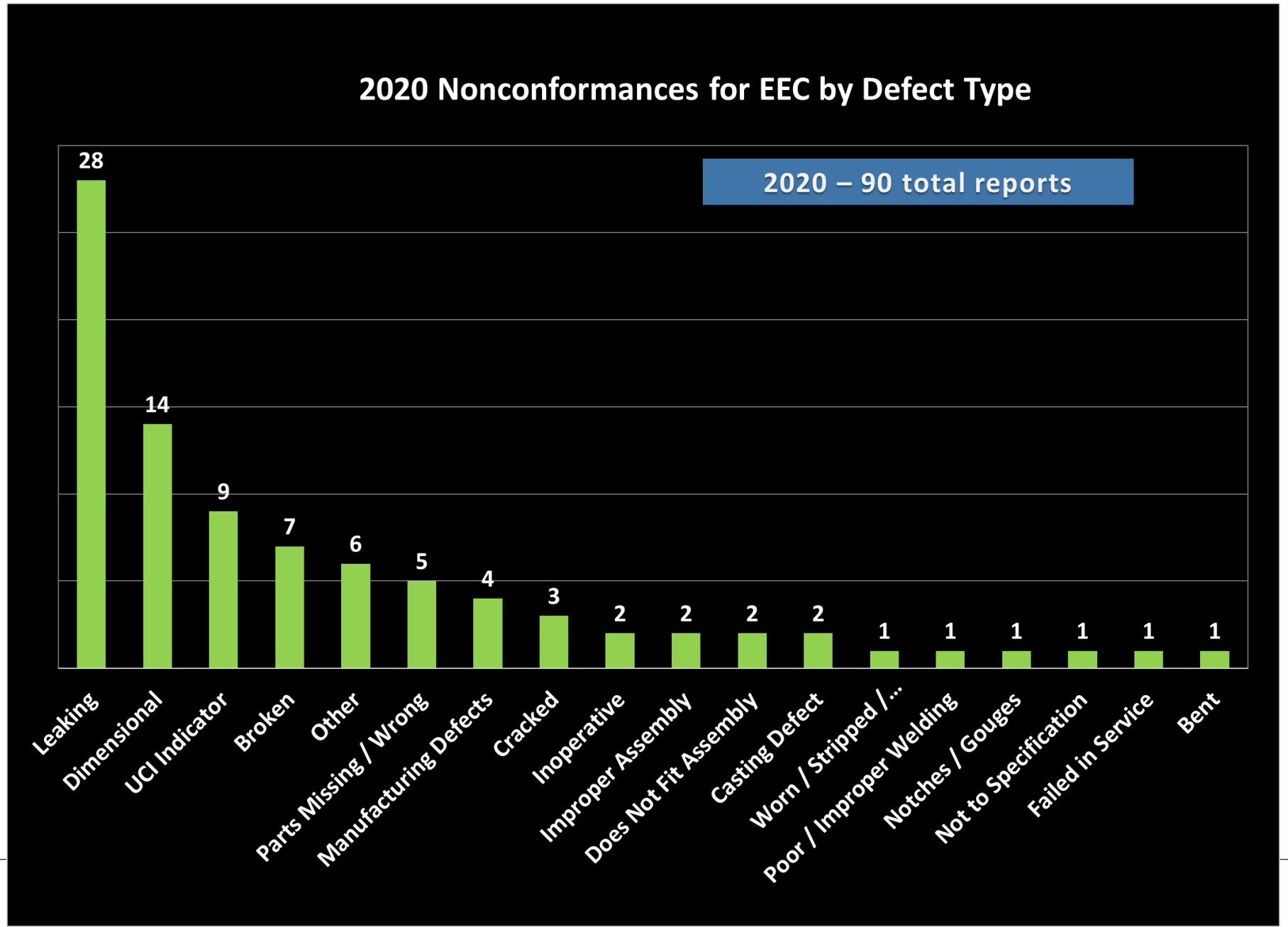
2020 Industry Nonconformances by Committee



2020 Nonconformances for EEC by Defect Type

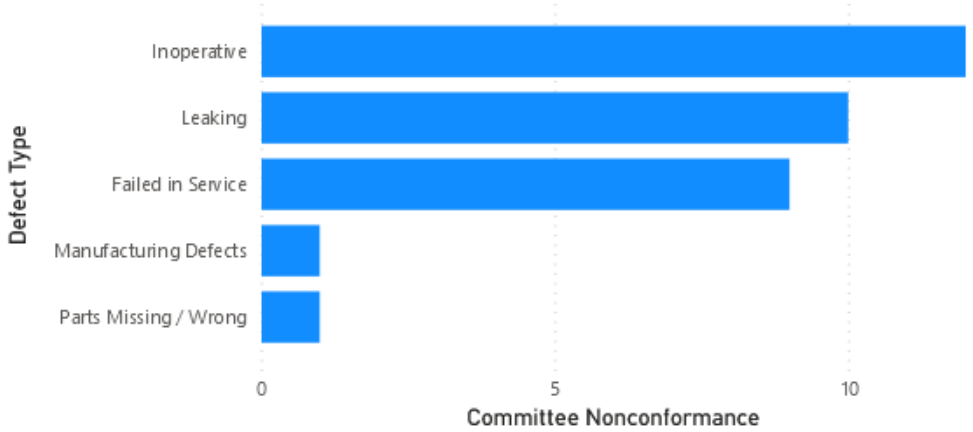


Coming Soon - 2021 Committee Access

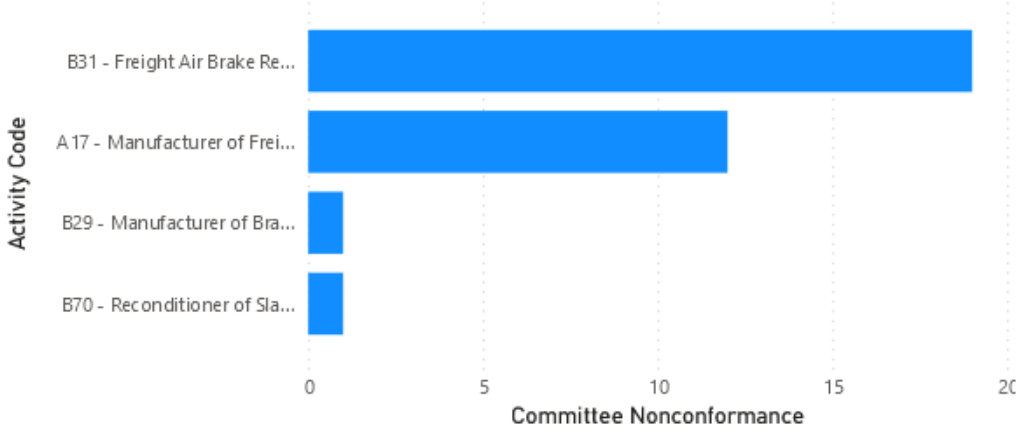
- Soon the technical committees will be able to access nonconformance data directly from the IIRX database
- Each committee manager will have access to live nonconformance data specific to their committee
- Data is displayed in a dashboard view with filtering capabilities for defect type, activity code and date range

2021 Committee Access Improvements

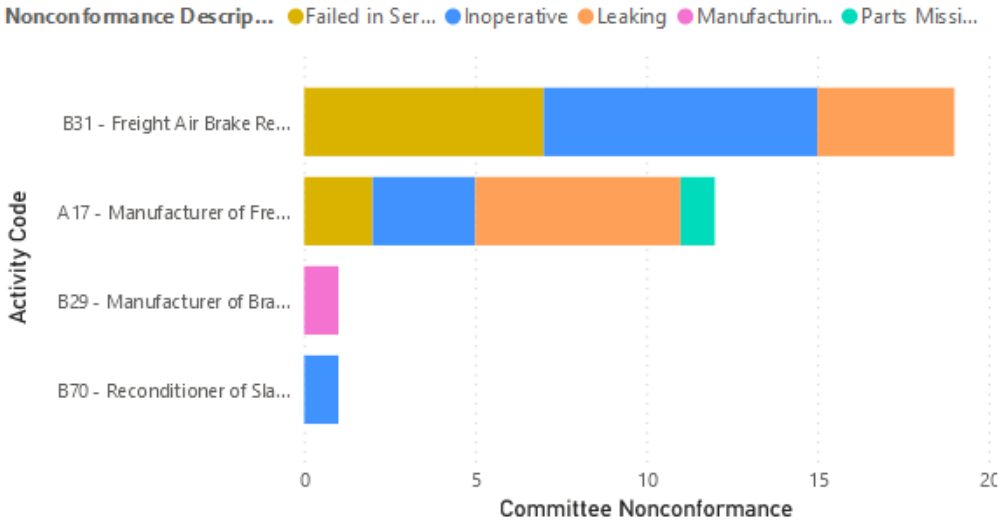
Committee Nonconformance by Defect Type



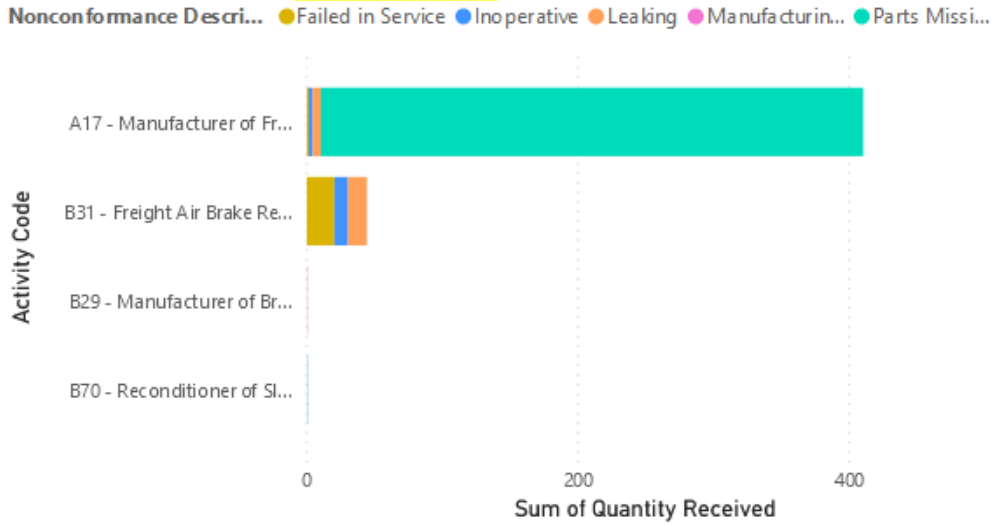
Committee Nonconformance by Activity Code



Committee Nonconformance by Activity Code and Nonconformance Description



Sum of Quantity Received by Activity Code and Nonconformance Description



Dashboard | Nonconformances By Defect Type | Nonconformances By Activity Code | Nonconformances By Activity Code and De... | Quantity Received By Activity Code and Des...

Filters

Search

Filters on all pages

Committee
is BSC

Filter type: Basic filtering

Search

- Select all
- [x] BSC 33
- [ ] CSTCC 6
- [ ] EEC 13
- [ ] LC 35
- [ ] QAC 4

Date Added
1/1/2021 - 12/31/2021

Filter type: Relative date

Show items when the value:

is in this

year

Apply filter

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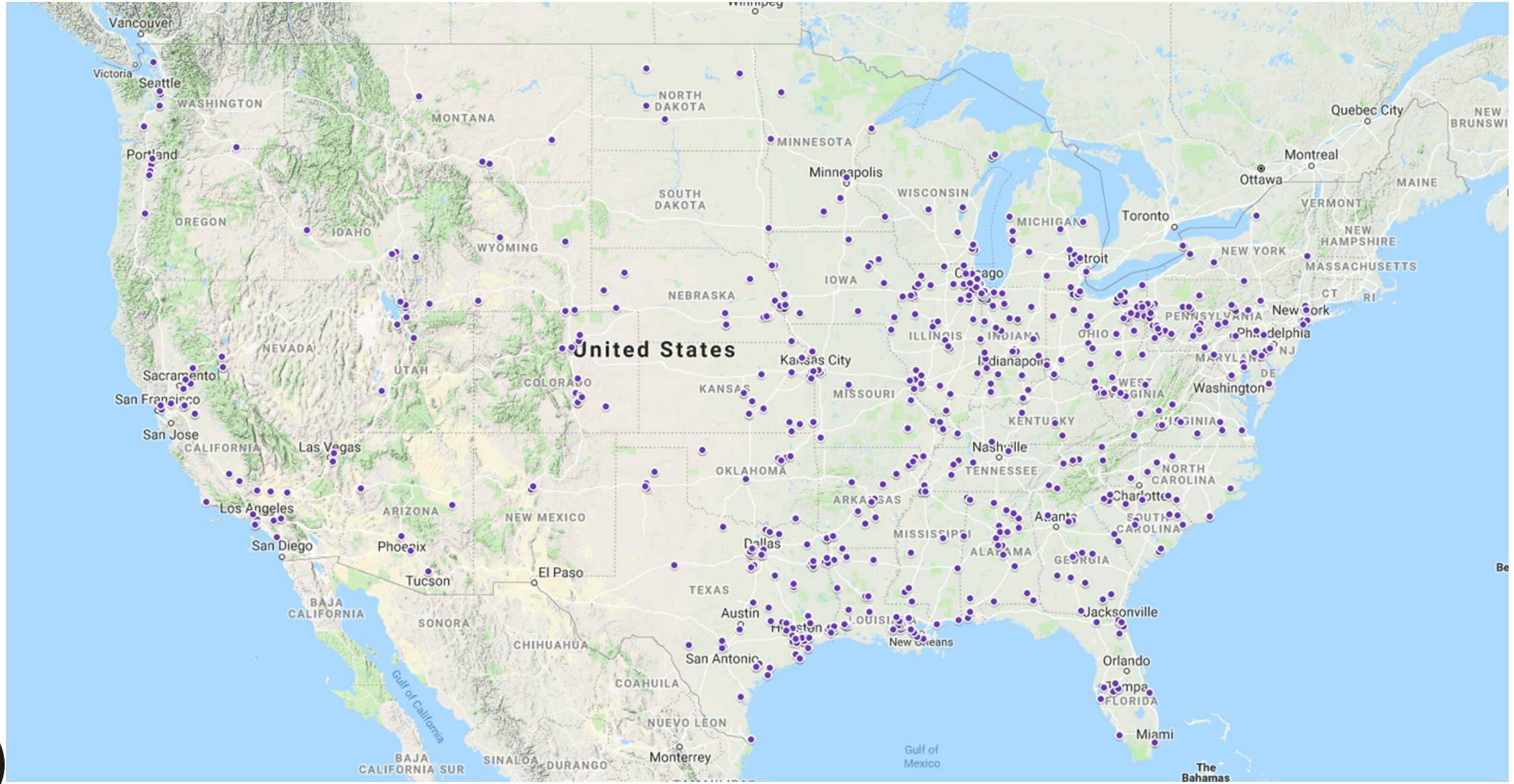
1,095 Facilities M-1003 Certified Worldwide



Thank you!

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55500 DOT Road
Pueblo, Colorado 81001
www.aar.com

AAR Quality Assurance

QA - Conference

May 2021

Virtual

2020 QA Audits and Inspections
The Impact of Covid-19

Steve Berkshire – MID Chief Inspector / GM

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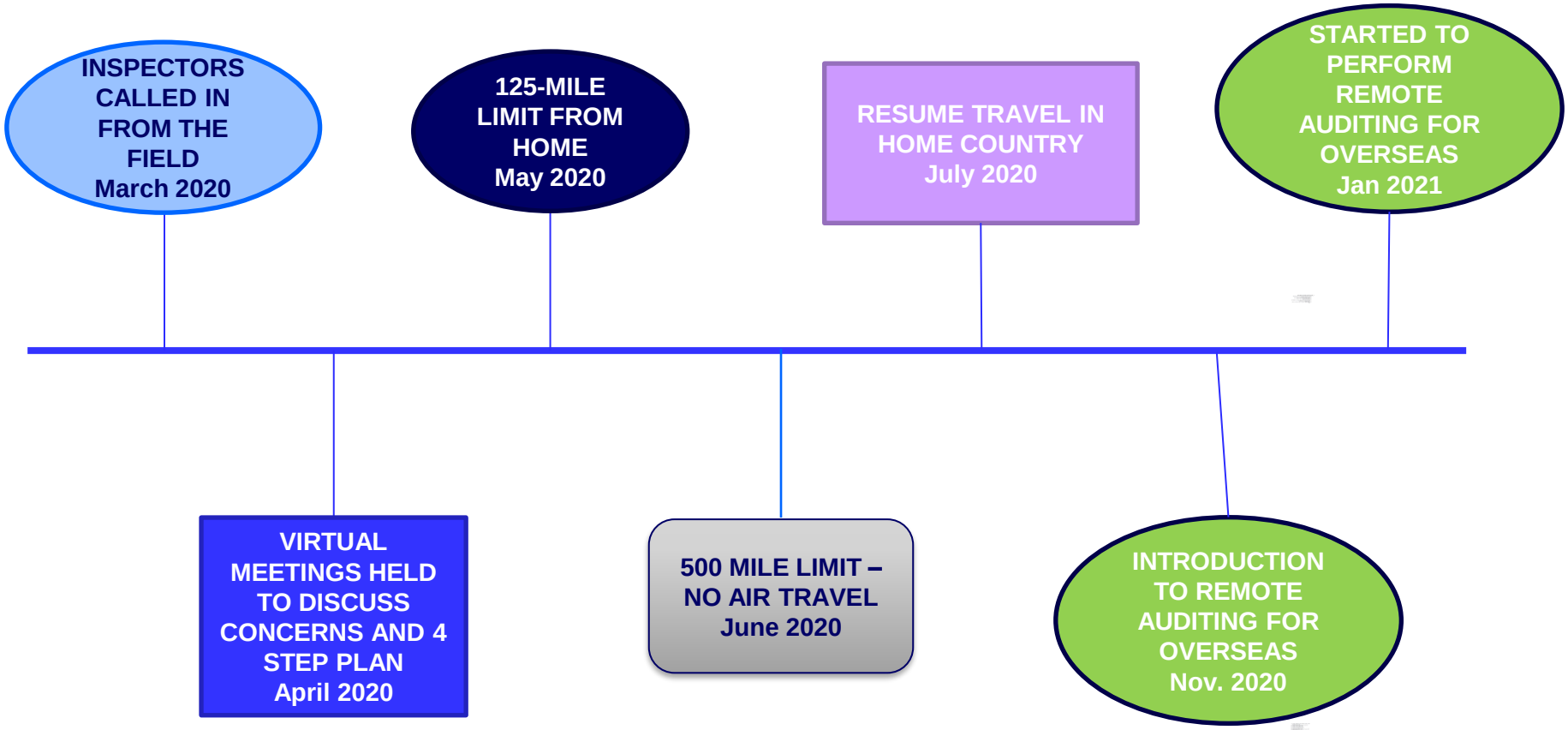
Mechanical Inspection Department

Cumulative Industry Experience = 565 years

Inspector Average Service Years = 28

Virus Timeline



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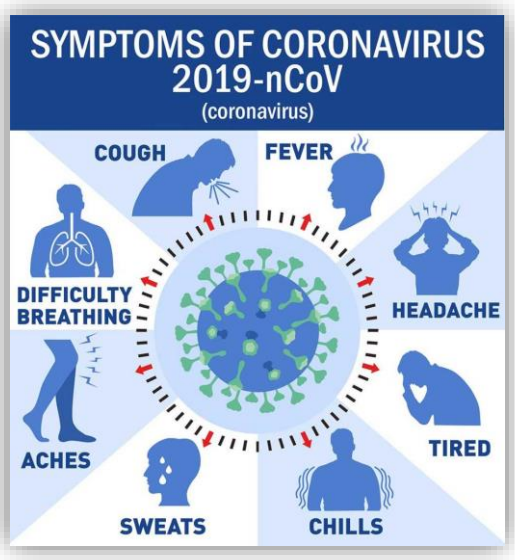
Scheduling


SYMPTOMS OF CORONAVIRUS
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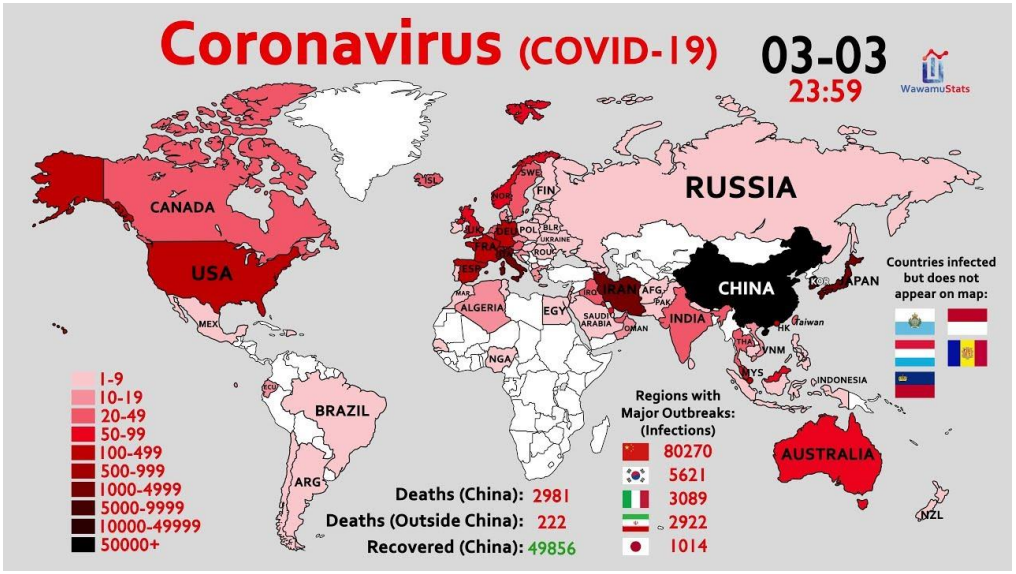
(coronavirus)
COUGH
FEVER
DIFFICULTY BREATHING
HEADACHE
ACHES
TIRED
SWEATS
CHILLS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03-03
23:59
WawamuStats
CANADA
USA
RUSSIA
CHINA
JAPAN
INDIA
BRAZIL
AUSTRALIA
Countries infected but does not appear on map:
1-9
10-19
20-49
50-99
100-499
500-999
1000-4999
5000-9999
10000-49999
50000+
Regions with Major Outbreaks: (Infections)
80270
5621
3089
2922
1014
Deaths (China): 2981
Deaths (Outside China): 222
Recovered (China): 49856

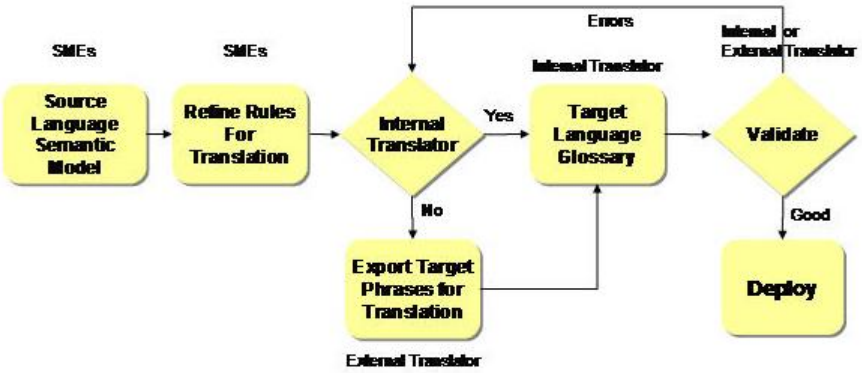

Coronavirus
COVID-19
Coronavirus COVID-19 Public Health Advice
No entry


CHANGE
OF
PLANS

SAFETY MEASURES FOR THE INSPECTOR AND FACILITIES TO FOLLOW

Remote Auditing

Remote Auditing



Moving Forward / Summary


QUESTIONS?
COMMENTS?
CONCERNS?

Thank you!

AAR Quality Assurance
55500 DOT Road
Pueblo, Colorado 81001
www.aar.com

AAR Quality Auditors and Industry Conference

May 11-12, 2021

Webinar

Bureau of Explosives (BOE) Update

Jeremy Killian – BOE General Manager

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BOE Mission Statement

- The Bureau of Explosives (BOE) is a unique membership organization dedicated to helping carriers, shippers, and container manufacturers continually improve hazardous materials (hazmat) transportation safety.
- Formed in 1907 by the railroad industry to serve as a self-policing agency to advance the safe transportation of explosives and other dangerous articles, the BOE actually developed the first hazmat safety rules, which were later adopted and expanded upon by the Interstate Commerce Commission and later the U.S. Department of Transportation (DOT).

  Today's BOE continues to provide valuable services and products throughout North America that promote compliance with federal hazmat regulations and industry safety standards.

BOE Auditors
The BOE Currently has 19 auditors

Tracey Smith – Senior Auditor – Illinois

Dewayne Green – Field Auditor – Texas

Seth Lasure – Field Auditor – Pennsylvania

John Van Ryswyk – Field Auditor – Quebec, Canada

Randy Penix – Field Auditor – Alabama

Gary Beard – Field Auditor – Indiana

**Wayne Menth – Field Auditor – Texas*

**Michael Henderson – Field Auditor – Georgia*

**Dal Cosby – Field Auditor – Alberta, Canada*

Tom Perez – Senior Auditor - Texas

Marty Rich – Field Auditor – Texas

Kerwin Kjelstrom – Field Auditor – North Dakota

Jeffrey Souleyrette – Field Auditor – Kentucky

Edgar De La Cruz – Field Auditor – Texas

Lucho Rodriguez – Field Auditor – Texas

**Gary Hazlewood – Field Auditor – Arkansas*

**Shane Lindsey– Field Auditor – Texas*

**Dylan Sawyer – Field Auditor – Mississippi*

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▲ Dal Cosby
Edmonton, Alberta
Canada
John Van Ryswyk
Pierrefonds, Quebec
Canada ▲
Kerwin Kjelstrom ▲
Fargo, ND
▲ Seth Lasure
Alum Bank, PA
Tracey Smith ▲
Antioch, IL
▲ Gary Beard
Chesterton, IN
▲ Jeffrey Souleyrette
Lexington, KY
Wayne Menth
Ft. Worth, TX
▲Gary Hazlewood
Marmaduke, AR
Edgar De La Cruz
Ft. Worth, TX
▲Jeremy Killian
Texarkana, TX
▲ Randy Penix
Citronelle, AL
Shane Lindsey▲
Temple, TX
▲ Michael Henderson
Lake Park, GA
▲ Dewayne Green
Huxley TX
▲ Dylan Sawyer
Vancleave, MS
▲ Marty Rich
Conroe, TX
Lucho Rodriguez ▲
Brenham, TX
Tom Perez ▲
Houston, TX

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M-1002 Auditors Handbook

Due to the revised M-1003 and M-1002 standards, the M-1002 handbook is in process of being revised.

- BOE General Manager - Jeremy Killian and Director, Tank Car Safety – Matt Forister are currently working to revise the M-1002 Auditors Handbook
- The revised M-1002 handbook will follow the 24 elements of MSRP Section J Chapter 2

BOE 2020 Activity

Despite the global pandemic, the BOE performed:

- 168 total Audits performed in 2020
- 26 Certification Audits
- 90 Recertification Audits
- 52 Compliance Audits

Other BOE Activities included:

- 2 BOE Service Trials
- 11 BOE Member Plant Inspections/Training with the assistance of SERTC

BOE New Personnel

The BOE added 4 auditors in November 2020

Wayne Menth – Field Auditor – Texas

Michael Henderson – Field Auditor – Georgia

Gary Hazlewood – Field Auditor – Arkansas

Shane Lindsey– Field Auditor – Texas

The BOE added 2 auditors in February 2021

Dal Cosby – Field Auditor – Alberta, Canada

Dylan Sawyer – Field Auditor – Mississippi

BOE 2021 Activity

- All current facilities will have their T-1 audit performed
- BOE Leadership continues to educate the BOE Team regarding 49 CFR, M-1002, M-1003 Standards
- The backlog has continued to shrink as the auditors work diligently to schedule and perform audits while completing audit reports.
- New auditors will complete their training and become M-1003 and M-1002 accredited auditors by 3rd quarter of 2021.
- The BOE will hire 4 additional auditors in 2021, with a total of 22 BOE auditors by 3th quarter 2021

THANK YOU

Thank you for your time today. Your questions will be addressed during the next Q & A session

Thank you!

AAR Quality Assurance
55500 DOT Road
Pueblo, Colorado 81001
www.aar.com

AAR Quality Assurance

QA Conference Webinar

May 11 & 12

Industry Update

Ron Hynes
AVP – Technical Services
Association of American Railroads

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Changes to TSWC

Now: Mechanical Committee

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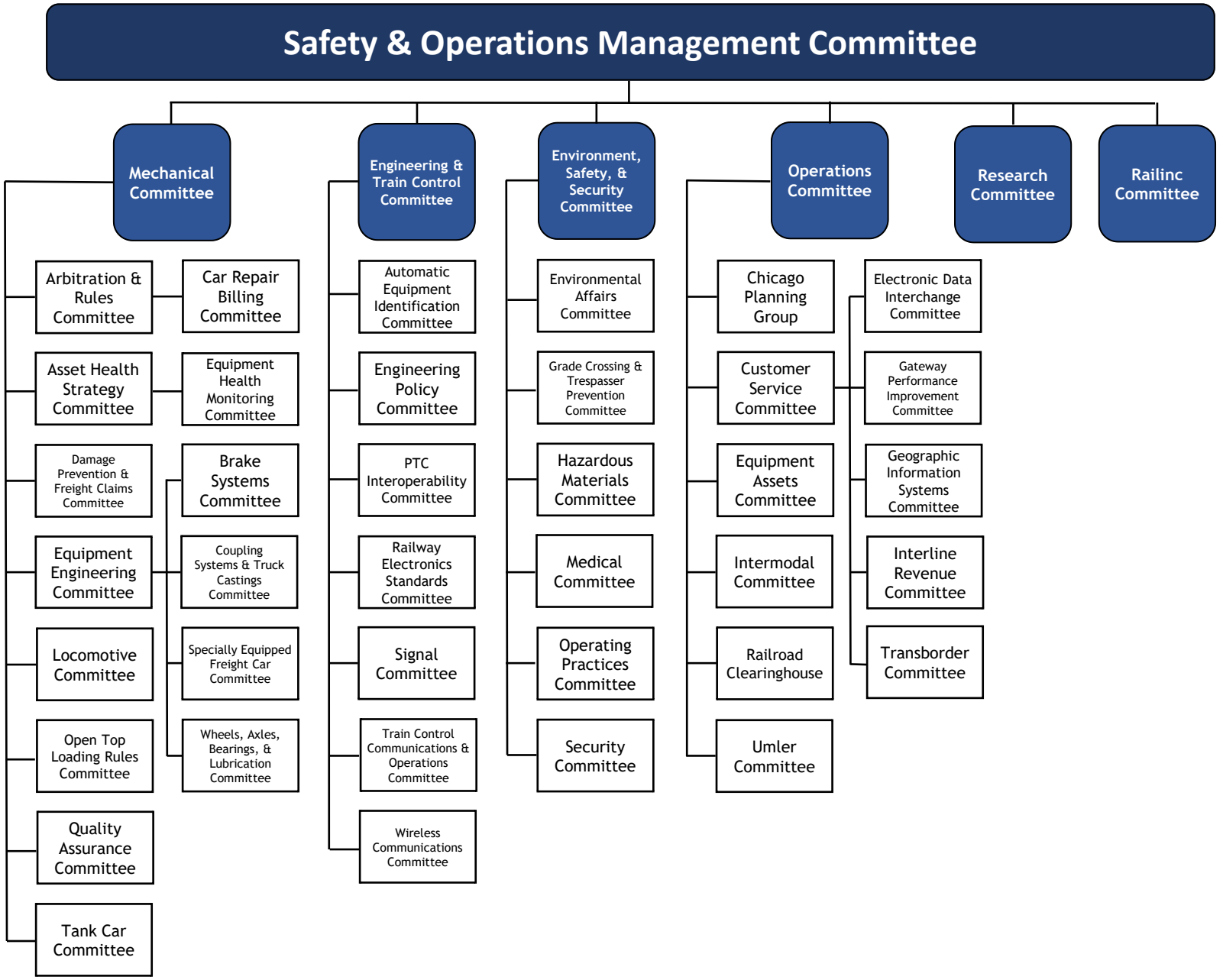
Safety & Operations Management Committee
Mechanical Committee
Arbitration & Rules Committee
Car Repair Billing Committee
Asset Health Strategy Committee
Equipment Health Monitoring Committee
Damage Prevention & Freight Claims Committee
Brake Systems Committee
Equipment Engineering Committee
Coupling Systems & Truck Castings Committee
Locomotive Committee
Specially Equipped Freight Car Committee
Open Top Loading Rules Committee
Wheels, Axles, Bearings, & Lubrication Committee
Quality Assurance Committee
Tank Car Committee
Engineering & Train Control Committee
Automatic Equipment Identification Committee
Engineering Policy Committee
PTC Interoperability Committee
Railway Electronics Standards Committee
Signal Committee
Train Control Communications & Operations Committee
Wireless Communications Committee
Environment, Safety, & Security Committee
Environmental Affairs Committee
Grade Crossing & Trespasser Prevention Committee
Hazardous Materials Committee
Medical Committee
Operating Practices Committee
Security Committee
Operations Committee
Chicago Planning Group
Customer Service Committee
Equipment Assets Committee
Intermodal Committee
Railroad Clearinghouse
Umler Committee
Electronic Data Interchange Committee
Gateway Performance Improvement Committee
Geographic Information Systems Committee
Interline Revenue Committee
Transborder Committee
Research Committee
Railinc Committee

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Quality Assurance

For Improved Rail Transportation Services

Railroad Safety and Service

QAC plays an important role

Quality Assurance –

M 1003 QA certification is required for companies that supply components or perform services to railcars in interchange service

QA audits enhance safety, reliability, and service

MID: Increasing the Reliability of Rail Service

"……..When on Shop or Repair Track"

- Railroad goal: Keep cars out of the shop if possible
- Don't shop cars for routine maintenance
- But: When cars are in the shop, maintain and inspect thoroughly
- Competing demands when cars are in the shop
- The important work of committees increases reliability – but only if carried out in the shop.

BOE: Increasing Safety and Reliability

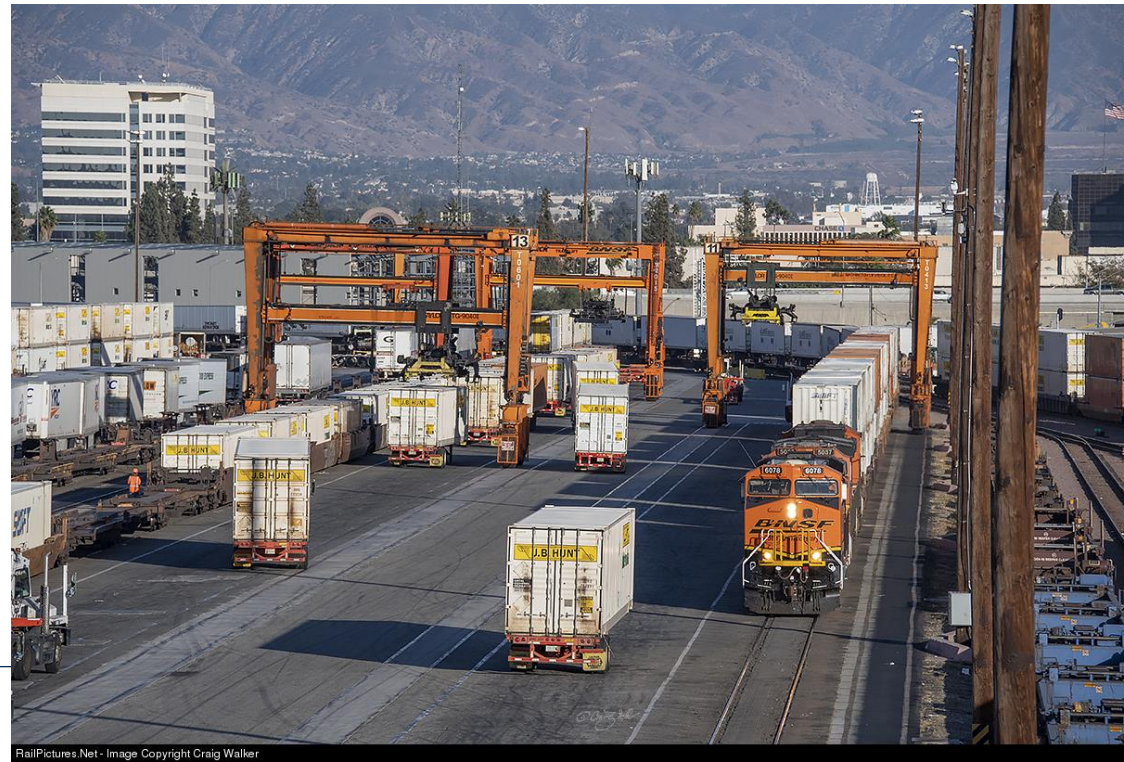
"Keep the Juice in the Can"

- Being sure that rail equipment is manufactured and maintained correctly and with integrity
- Striving to eliminate Non-Accident Releases (NARs)
- Railroads move a great amount of hazardous materials and therefore are in the spotlight when there are issues.
- Hazmat incidents can be extremely costly and disruptive.

Railroad Safety and Service

Railroads Compete in the Transportation Marketplace

- We provide transportation services to our customers
- Required: Safe, reliable, timely transportation
- Must meet customer's expectations for price & service
- Customers have choices in transportation



Railroad Safety and Service

Railroads Compete with Trucks & Barges

- Customers decides how freight will move, or if it will move
- Each mode has its niche in certain services and competes with other modes in other services
- Must meet customer's expectations
- Railroads excel at moving high volumes over long distances

Railroad Safety and Service

Railroads Compete with Other Modes

- Transportation cost directly affect a shipper's bottom line.
- Customers can switch from one mode to the other, or use both.
- Efficiency gains in one mode will result in an increase in market share for that mode. Driverless trucks? Changes in
- Continuous attempts to increase truck size and weights.

Groups battle for hearts and minds on longer trailers

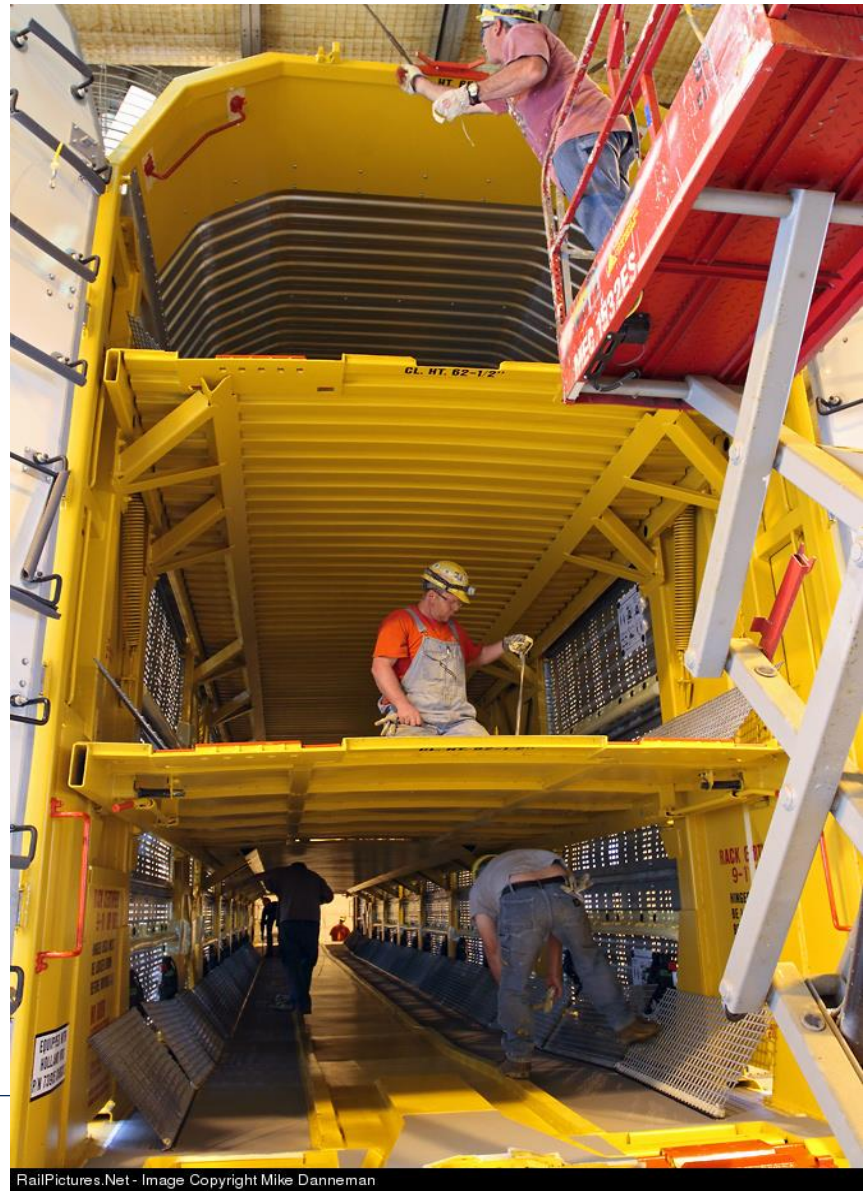
OCT 09, 2015

The tug-of-war continues in the nation's capital this week over allowing tractors pulling longer 33-ft. double trailers on federal and interstate highways, as opposed to the double 28-ft. trailers currently specified. Only at this point, it's not so much legislative debate as a battle for public opinion as related congressional activity brews

Rail Equipment has evolved in the Marketplace

Equipment Improvements for Better Service

- Larger equipment, increased capacity.
- Increased utilization.
- Better designs, higher quality materials.
- Strive for damage-free transportation.
- Freight cars have a lifetime of 50 years, for better or worse.



RailPictures.Net - Image Copyright Mike Danneman

Improved Quality Assurance

For Improved Rail Transportation Services

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Railroad Safety and Service

Railroad operation requires high levels of QA

- A chain is only as strong as the weakest link
- A 200-car train can be stopped on the main track for a minor problem
- A worn air hose, malfunctioning brake, worn anti-creep, all can stop the highest priority train, or the train ahead of the highest priority train
- A major problem can tie up the railroad for hours

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Railroad Competitiveness

Railroad operation requires high levels of QA

- Trucks – one or two trailers. If a problem develops, one or two trailers are sidelined.
- Trains – 100 to 200 cars. If a problem develops, the entire train is sidelined.

Railroad Competitiveness

Railroad operation requires high levels of QA

- Increased equipment utilization by keeping cars moving.
- Focus on keeping trains moving by eliminating individual mechanical failures.
- Each technical committee is doing its part to make rail equipment more reliable.

Increasing the Reliability of Rail Service

Reducing Line Of Road Failures

- Asset Health Strategic Initiative (AHSI), can track and mine Big Data to locate “bad actors” from information gathered from Line of Road Failures
- LORF/NCF events are being reduced significantly
- New task: working to reduce air hose separations

Railroad Safety and Service

Equipment Improvements to Railroad Safety:

- Asset Health Strategic Initiative (AHSI), can monitor the health of rail cars as they move on the network.
- Can provide real-time pertinent information of equipment health trending.
- The Component Tracking Program allows critical components to be tracked and monitored.

Auditing Quality Task Force

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A Q T F

There are differences in the types of AAR QA audits of facilities.

The Tank Car Committee uses a combined audit in which all activity codes must be demonstrated.

Other committees use a separate QA audit, use a sampling method for activity codes.

A Q T F

TSWC requested the formation of a task force

- Relatively large task force was assembled.
- Experts from all aspects of the industry.
- Focused on the differences between TCC and all other audits.
- Found discrepancies in audits, technical committee oversight of audit activities and findings.

A Q T F

A recommendation was made to the MC:

- The AAR consider Quality Assurance Program Audits and technical approvals as distinct responsibilities.
- The audits should be addressed by the appropriate committee using documented processes and procedures.

Safety Statistics

An enabler of Regulatory Modernization

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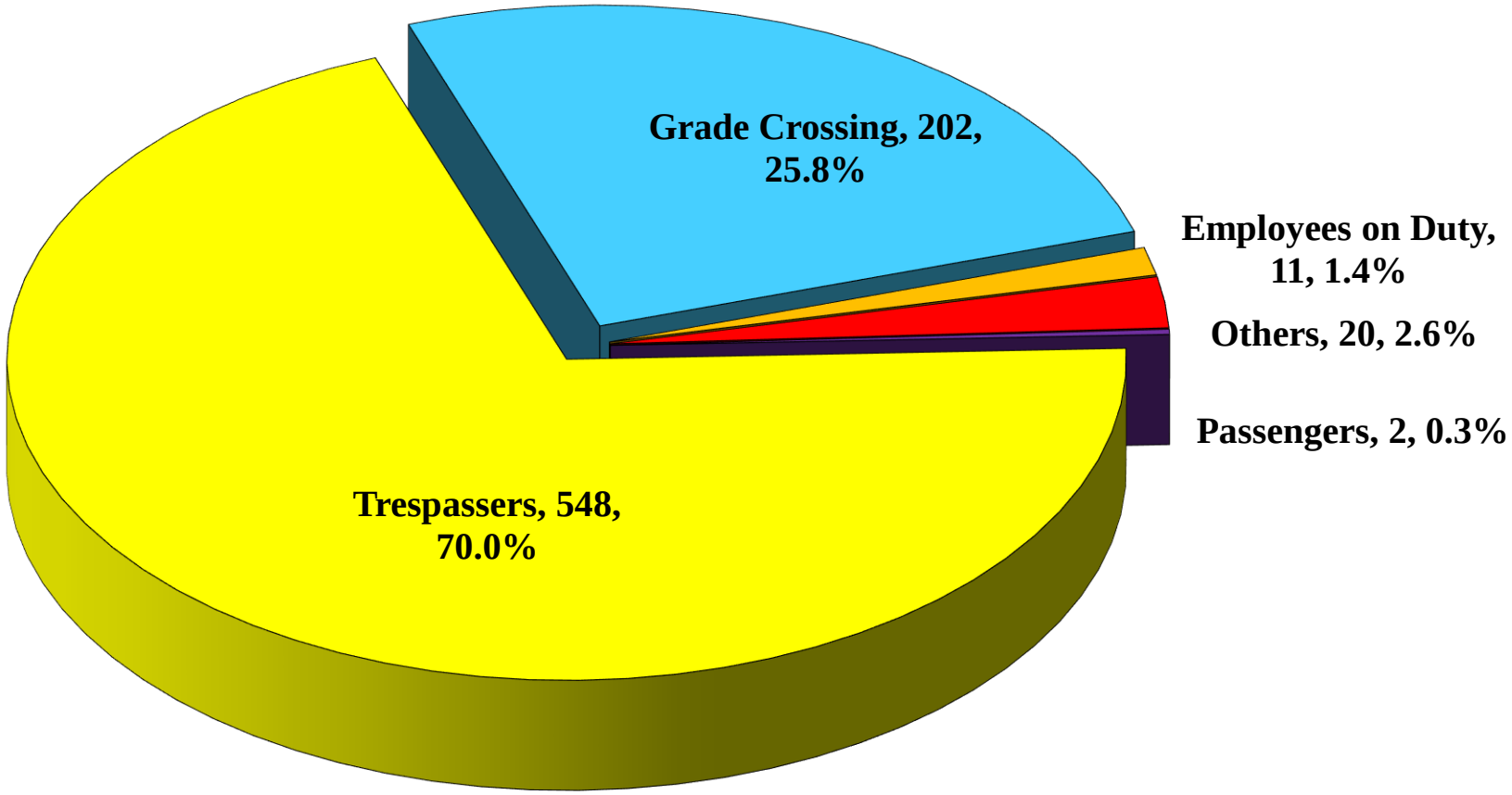
2020 Rail-Related Fatalities at Glance



Source: FRA website (2020 data as of March 2021):http://safetydata.fra.dot.gov/OfficeofSafety/publicsite/summary.aspx
Note: Data for 2020 are preliminary.

How the Competition Compares

Table 4

People Killed and Injured in Crashes Involving Large Trucks, by Person Type, 2018 and 2019

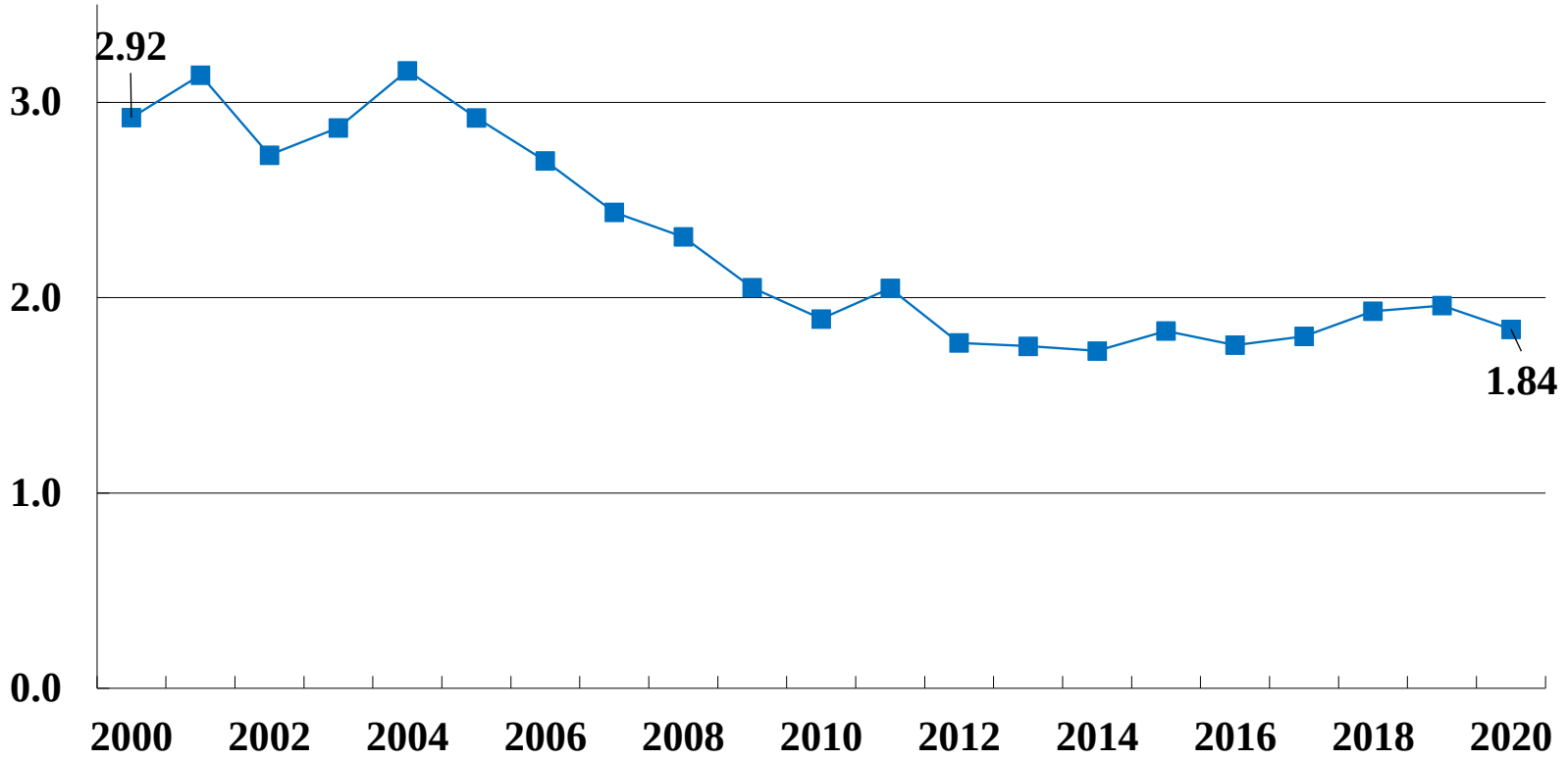
Person Type	Killed				Injured*			
	2018	2019	Change	% Change	2018	2019	Change	% Change
Total	**5,006**	**5,005**	**-1**	**-0.0%**	**151,000**	**159,000**	**+8,000**	**+5.3%**
Large-Truck Occupants	**890**	**892**	**+2**	**+0.2%**	**39,000**	**46,000**	**+7,000**	**+18%**
In Single-Vehicle Crashes	538	495	-43	-8.0%	13,000	15,000	+2,000	+15%
In Multiple-vehicle Crashes	352	397	+45	+13%	26,000	30,000	+4,000	+15%
Other People	**4,116**	**4,113**	**-3**	**-0.1%**	**112,000**	**114,000**	**+2,000**	**+1.8%**
Other Vehicle Occupants	3,563	3,544	-19	-0.5%	108,000	110,000	+2,000	+1.9%
Nonoccupants	553	569	+16	+2.9%	3,000	4,000	+1,000	+33%

Sources: FARS 2018 Final File, 2019 ARF; CRSS 2018-2019

*Percentage changes are based on rounded numbers.

Notes: None of the injured estimates have statistically significant year-to-year difference at the α=.05 level. Components may not add to totals due to independent rounding.

Derailments per million train-miles have dropped 37% since 2000 and 10% since 2011



Sources: http://safetydata.fra.dot.gov/officeofsafety/publicsite/summary.aspx
Note: Excludes grade crossing accidents. Data for 2020 are preliminary as of March 2021.

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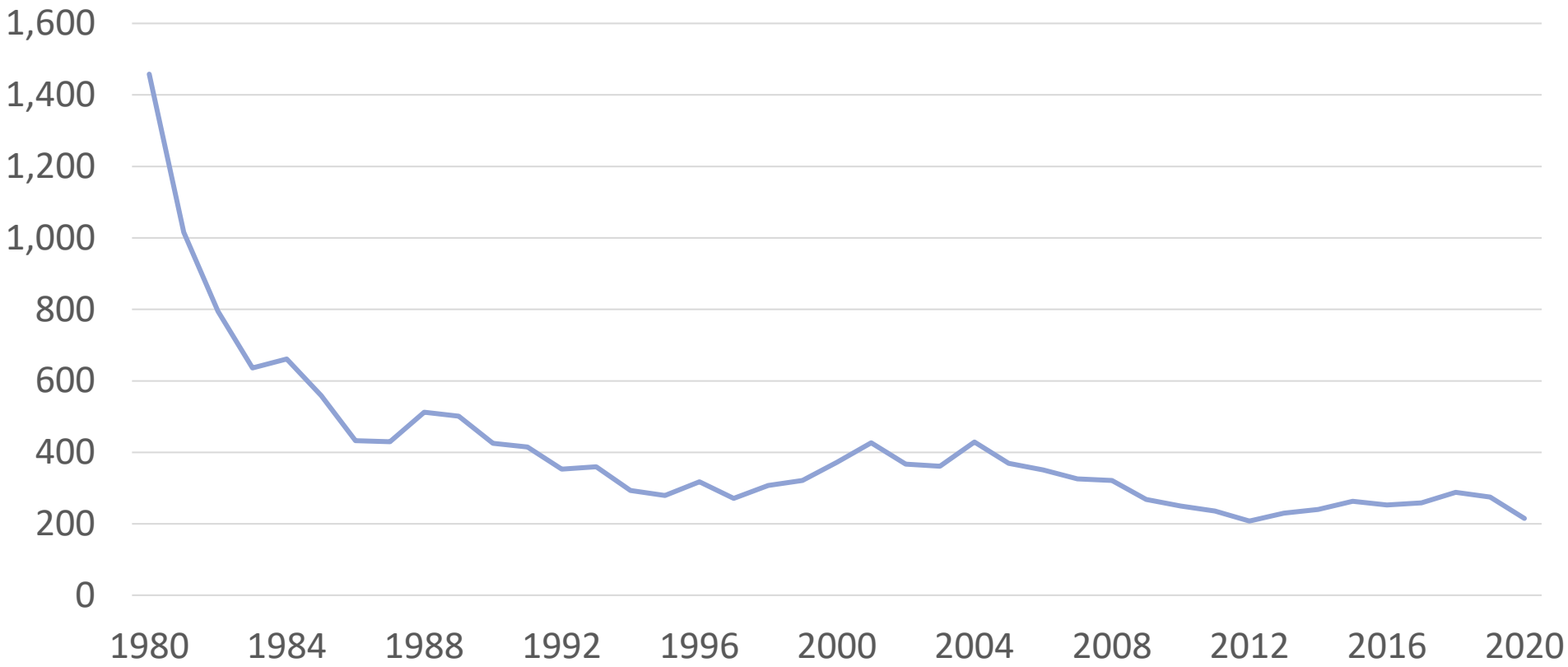
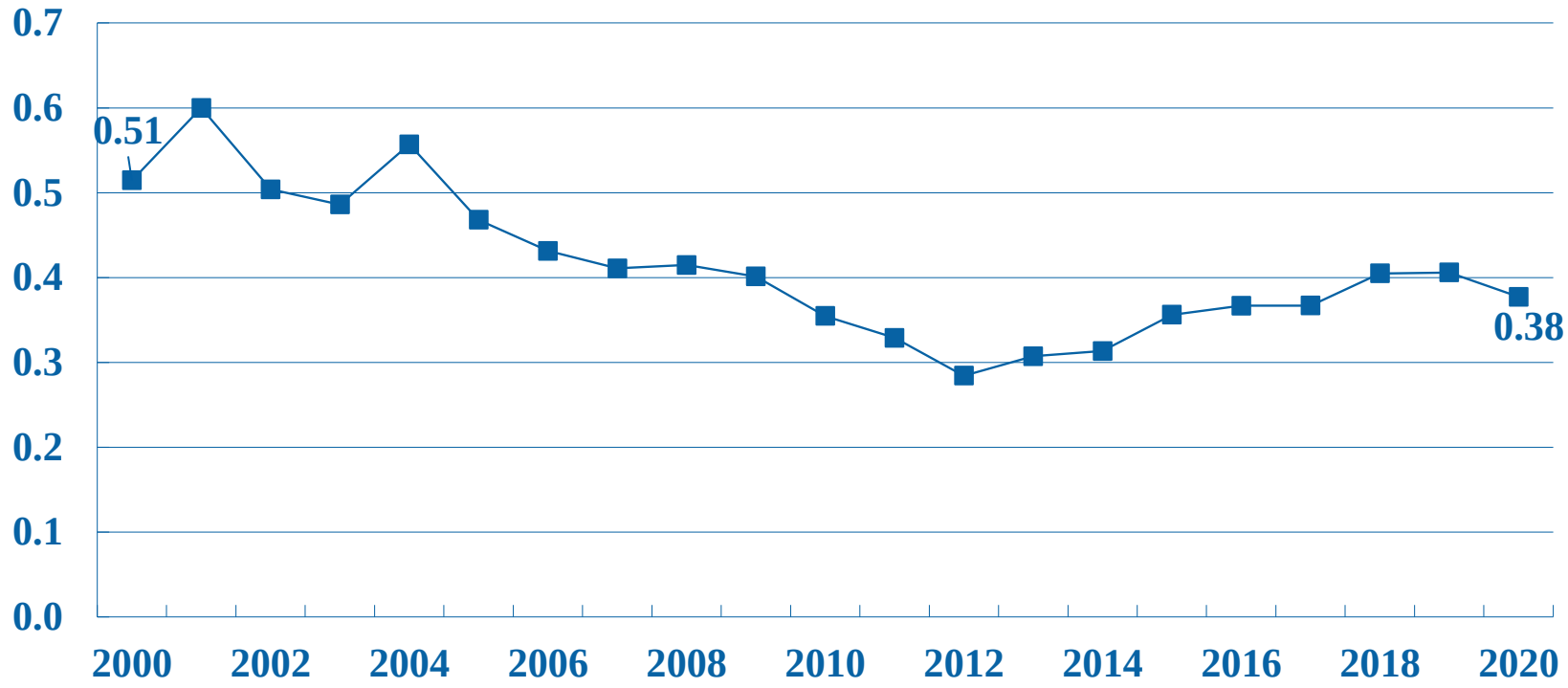
Equipment-caused accidents have dropped dramatically since 1980.



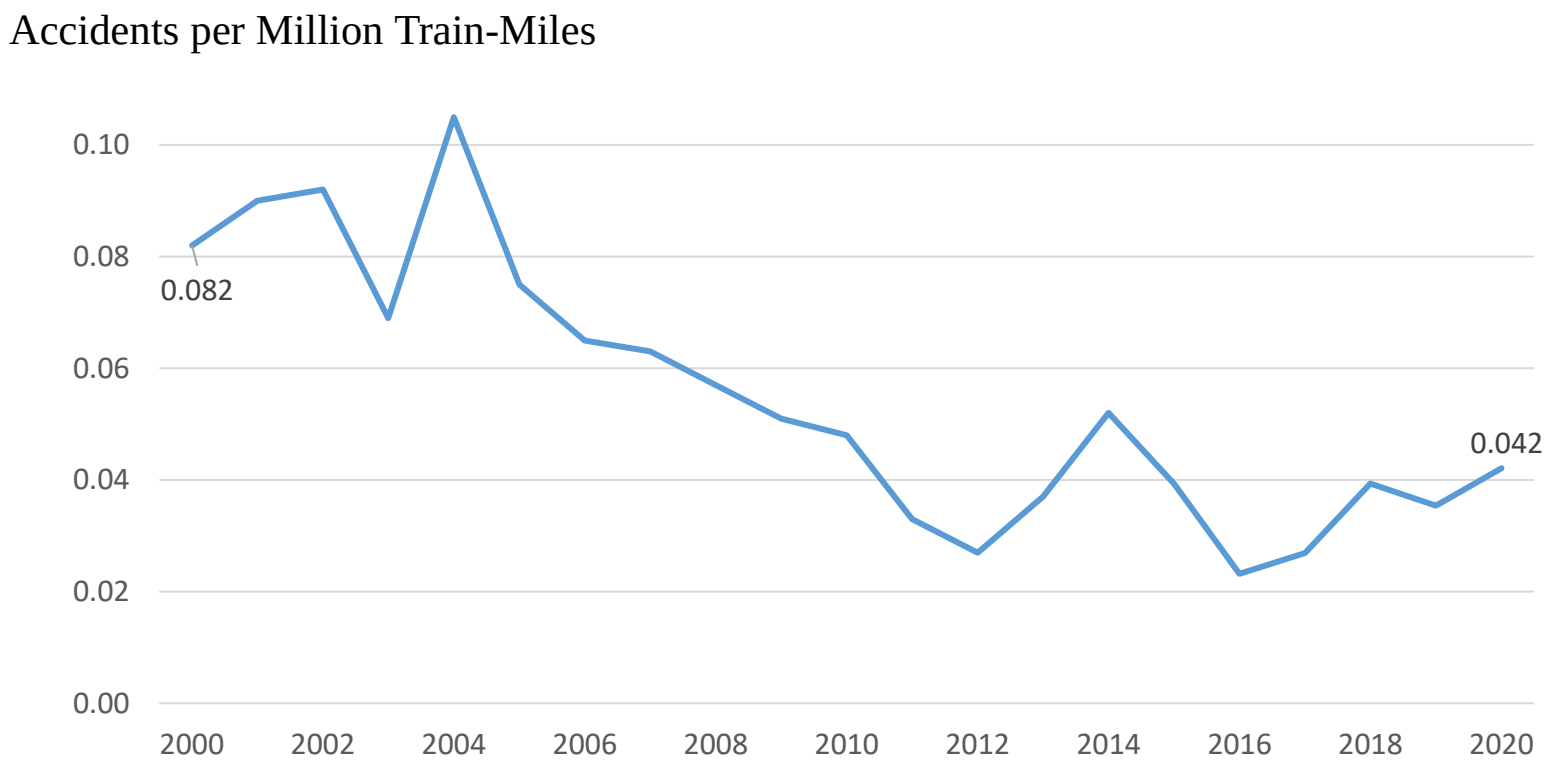
Sources: http://safetydata.fra.dot.gov/officeofsafety/publicsite/summary.aspx
Note: Excludes grade crossing accidents. Data for 2020 are preliminary, as of March 2021.

Equipment-caused accidents per million train-miles have dropped 27% since 2000 and have plateaued over the past decade



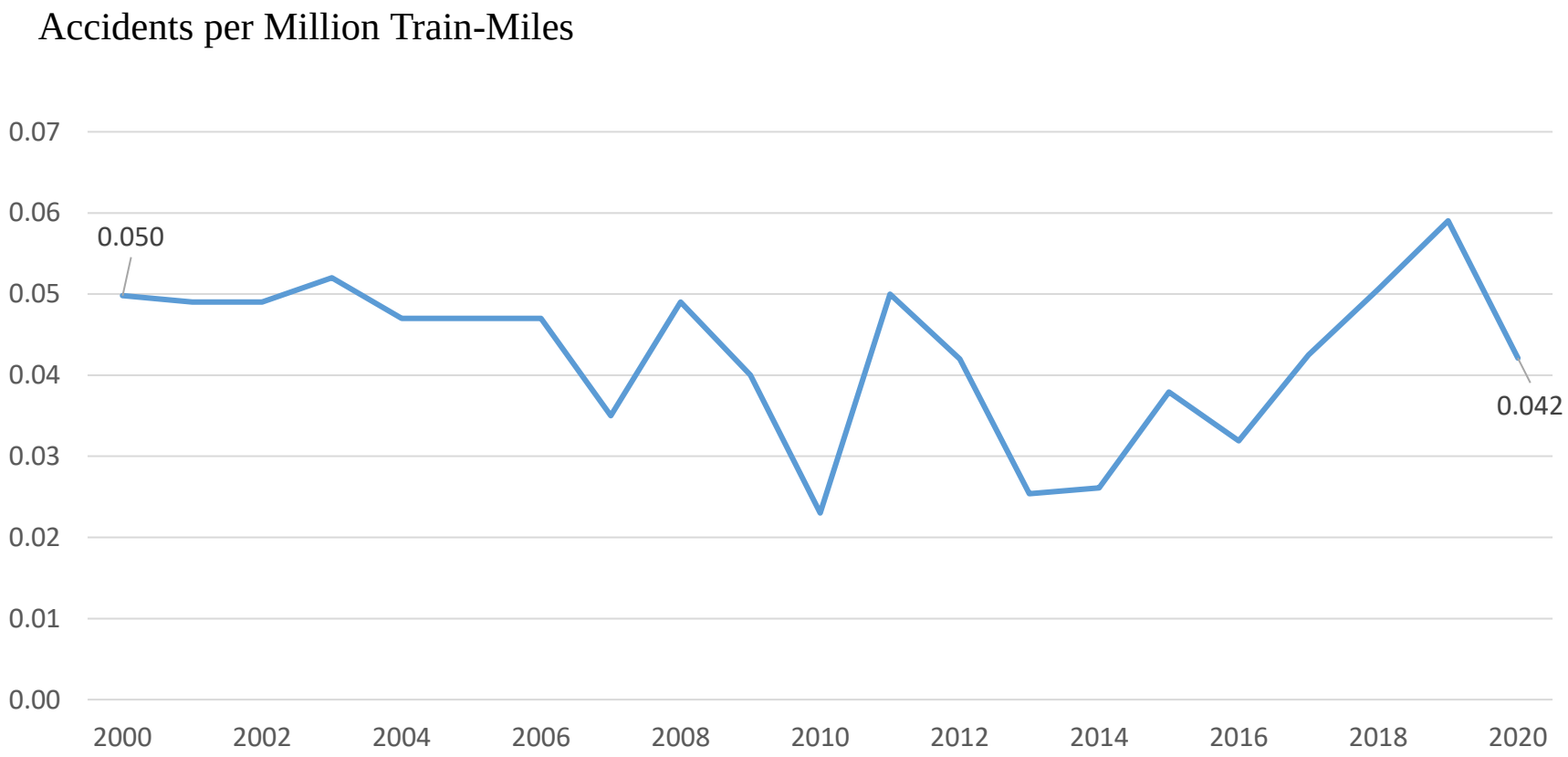
Sources: http://safetydata.fra.dot.gov/officeofsafety/publicsite/summary.aspx Note: Excludes grade crossing accidents. Data for 2020 are preliminary, as of March 2021.

Axle and bearings-related train accident rate has dropped 49% since 2000 and has plateaued over the past decade.



Sources: AAR Analysis of FRA Train Accident Database through 2020, as of March 2021.
Note: Includes accidents due to locomotive axle or bearing defects. Data for 2020 is preliminary.

Brake equipment-related train accident rates are low.



Sources: AAR Analysis of FRA Train Accident Database through 2020, as of March 2021.
Note: Includes accidents due to locomotive brake defects. Data for 2020 are preliminary.

Regulatory Modernization

Making Progress

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Brake Valves in Cold Weather

Problem: Old brake valves can pass a SCABT, but not work properly when cold

Two types of failures have occurred:

1. The service portion can fail to properly respond to a service brake application.
2. The emergency portion can fail to initiate an application or fail to propagate an emergency application.

Brake Valves in Cold Weather

Problem: Old brake valves can pass a SCABT, but not work properly when cold

Unit trains are a concern:

1. Similar equipment of same type and age may have a high percentage of brakes that do not operate when cold.
2. Often leased equipment, may have been in storage.
3. Can be expected to carry heavy commodities on steep grades.

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Coming to a Railroad Near You:

New Equipment Advisory System:

- Equipment based versus Notice/Letter based
- Enable the prioritization of equipment and components
- Include location on car
- Improve workflow of advisory development
- Implementation on June 28, 2021

Regulatory Modernization

24 Hours Off Air

- Final rule published December 11, 2020
- Increased the amount of time that cars are allowed off-air from 4 to 24 hours
- The rule also codified increased years for cars requiring SCABT when on a shop or repair track, EOT improvements and utilization, and airflow meter calibrations.

Regulatory Modernization

Single Car Air Brake Tests

Based on the type of device used
Device and Time Frame:

1. Manual test: 1 year
2. Automated test: 2 years
3. Automated 4-Pressure: 4 years

Regulatory Modernization

Electronic Air Brake Slip (eABS)

- The eABS NPRM was published on January 15, 2020.
- Important enabler of Regulatory Modernization by allowing increased operational freedom for making pick-ups and set-offs.
- Removes restrictions for extended-haul trains.
- Mileage increased between FRA-required brake tests to 2,500 miles in many cases.
- eABS will track the mileage remaining before the next air brake test is due.
- User interface for short lines.

Questions?

Thank you!

AAR Quality Assurance
55500 DOT Road
Pueblo, Colorado 81001
www.aar.com

AAR Quality Auditors and Industry Conference

May 11-12, 2021

Webinar

Wheels, Axles, Bearings, & Lubrication Committee Update

Daniel Carter

Manager – WABL

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Outline

- Introduction to WABL
- FRA Safety Data
- Review of WABL Dockets
  - Rule 41 Rewrite
  - Mechanical Defect Reporting

WABL Committee

- Establish, maintain, and enhance wheel, axle, bearing and lubrication system interchange rules and technical standards, specifications & recommended practices
- Certify manufacturing facilities and components
- Monitor the interchange performance of WABL components and equipment

Members

NS (Chair)	CSX
Standard Steel (Vice Chair)	GATX
Amsted Rail	Greenbrier
Amtrak	KCS
BNSF	Progress Rail
CN	TTX
CP	UP

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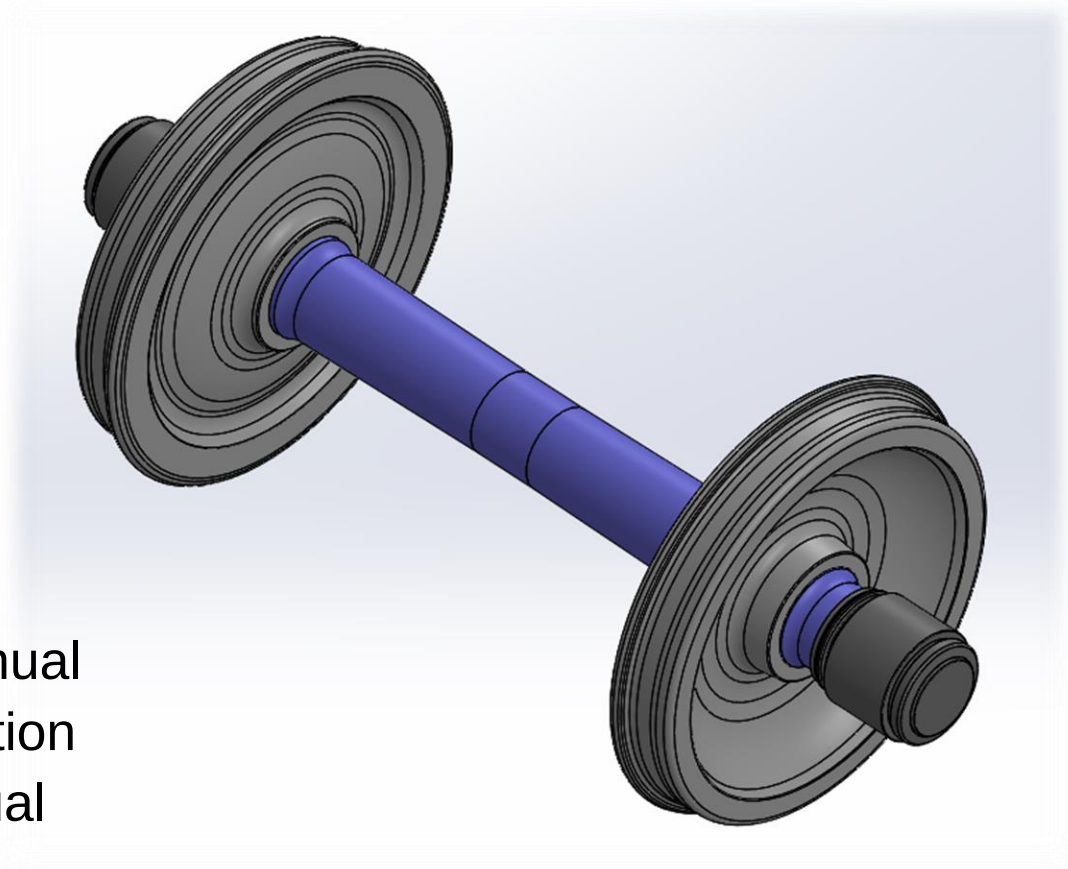
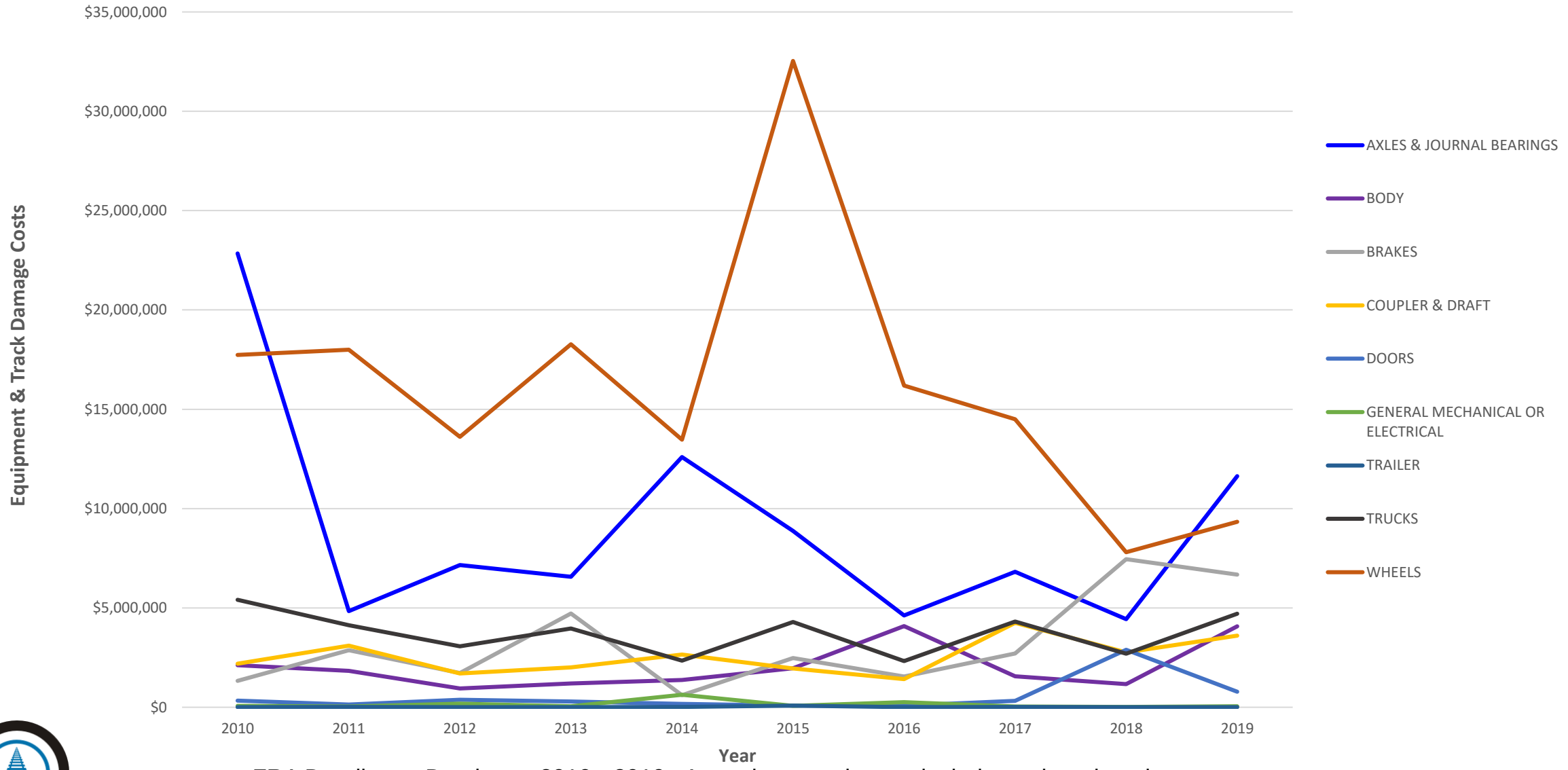
Publication Responsibilities

- Field Manual Rules Support for ARB
  - Rule 36 – Roller Bearings
  - Rule 37 – Adapters
  - Rule 41 – Wheels
  - Rule 43 – Axles
  - Rule 44 – Wheel Sets
- MSRP
  - Section G – Wheels and Axles
  - Section G-II – Wheel and Axle (Shop) Manual
  - Section H – Journal Bearings and Lubrication
  - Section H-II – Roller Bearing (Shop) Manual



FRA Safety Data



- FRA Derailment Database: 2010 - 2019. Annual cost estimates include track and equipment

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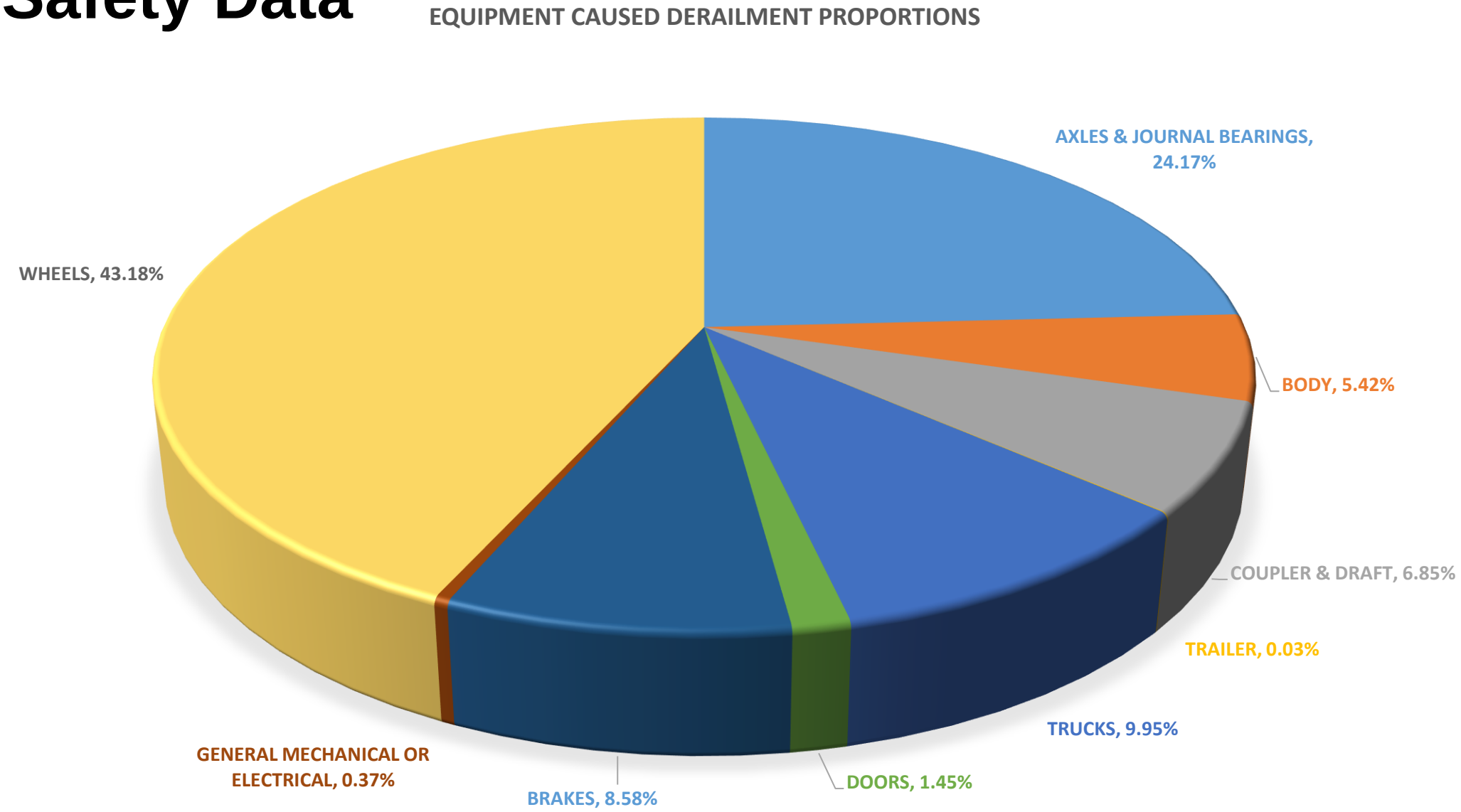
FRA Safety Data



- FRA Derailment Database: 2010 - 2019. Annual cost estimates include track and equipment

Rule 41 Rewrite

Docket

TWBL-11.45

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Rule 41 Rewrite

- AAR Field Manual Rule 41 Rewrite Highlights
  - Section A.1 – Streamlined to defect, WMC, Explanation, and reference to more information (gages and figures)
  - Section A.2 – Same as Section A.1
  - Section B – Removed Group -3, straight plate wheels
  - Section C – Reference Guidelines, inserted gages and how to use the gages, figures
    - Removed how to true the wheels verbiage
  - Section E – Created a priority list for wheels with multiple qualifying defects
    - All Government regulatory requirement moved to a single place
  - Section F – Reviewed WMC labels for consistency
    - Removed WMC 72 – Rim Spread – very little use, will still be captured under Cracked or Broken Rim
- 2020 Version 61 Pages
- 2021 Version 51 Pages

Rule 41 Rewrite

RULE 41 – WHEELS

A. Cause for Attention

1. At Any Time
   a. Thin flange (Why Made Code 60): Any flange 15/16 inch or less thickness at a point 3/8 inch above the wheel tread. Apply gage per Figure 41.8.
   b. Vertical Flange (Why Made Code 62): Flat vertical surface on the front flange face extending 1 inch or more from tread. Apply gage per Figure 41.9.
   c. High Flange (Why Made Code 64): Height is 1 ½ inches or more above the approximate center line of tread. Apply gage per Figure 41.10.
   d. Cracked or Broken Flange (Why Made Code 66): Any length. Chipped flange must exceed 1 ½ inch in length by ½ inch in width and not merely a flaking of the surface.
   e. Cracked or Broken Rim (Why Made Code 68): Any portion of the rim is cracked or broken, excluding:
      (1) A vertical split rim condition (Why Made Code 1D),
      (2) Thermal cracks (Why Made Codes 69 or 74), or
      (3) A shattered rim (Why Made Code 71).
      (4) Chips broken from the uniform curling over of the outer edge of the rim (this is not considered a Cause for Attention).
      See Figures 41.20 and 41.21 for examples of Why Made Code 68.
   f. Shattered Rim (Why Made Code 71): A broken rim showing a crack with concentric crack growth rings. See Figures 41.22 and 41.23 for examples.
   g. Vertical Split Rim (Why Made Code 1D): Wheel cracked or broken through the tread extending into either the front or back rim fillet, with fracture surface oriented approximately vertical as shown in Figures 41.24, 41.25, 41.26, and 41.27.

Rule 41 Rewrite

C. Reference Guidelines

1. Gages and Gaging Instructions

Table 1. Gage List

	Wheel Defect (Fig. 41.1)	Com-bined Wheel (Fig. 41.2)	Standard Wheel (Fig. 41.4)	Alternate Standard Wheel	Simplified Wheel (Fig. 41.3)	Tread Worn Hol-low (Fig. 41.6)	Alternate Standard Tread Worn Hol-low (Fig. 41.7)	Back-to-Back Ser-vice Limit	Salient-Canadian National (4CH-54094-D)	Out-of-Round Condition (W834)	Conrail Rocker (469616)	Cali-brated Dial Indi-catorThin
Thin Flange (WM60)	X	X										
Vertical Flange (WM62)	X	X										
High Flange (WM64)		X	X	X	X							
Thin Rim (WM73)		X	X		X							
Shelled Tread (WM75)												
Slid Flat (WM78)	X	X										
Built-up Tread (WM76)		X			X							
Grooved Tread (WM77)		X			X							
Wheels Out-of-Gage (WM81)								X				
Wheel Out-of-Round (WM67)									X	X	X	X
Scrape, Dent, or Gouge (WM80)		X			X							
Wheel Tread Hollow (WM63)						X	X					
Curved Plate/Straight Plate (WM07)		X			X							

NOTE: Only one gage is necessary to determine appropriate WM

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Rule 41 Rewrite

- E.13 Any defective wheel qualifying for more than one Why Made Code shall be marked and reported with the following priority:
  a. Shattered Rim (WM 71), or Vertical Split Rim (WM 1D)
  b. Cracked or Broken Rim (WM 68), or Cracked or Broken Plate (WM 83)
  c. Slid Flat (WM 78)
  d. Obsolete (WM 07)
  e. Any other gaged or visual defect covered by a WM
  f. High Impact Wheel (WM 61 and WM 65), or Out-of-Round (WM 67)
  g. Thin Rim with Dynamic Impact (WM 48)

Mechanical Defect Reporting

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History

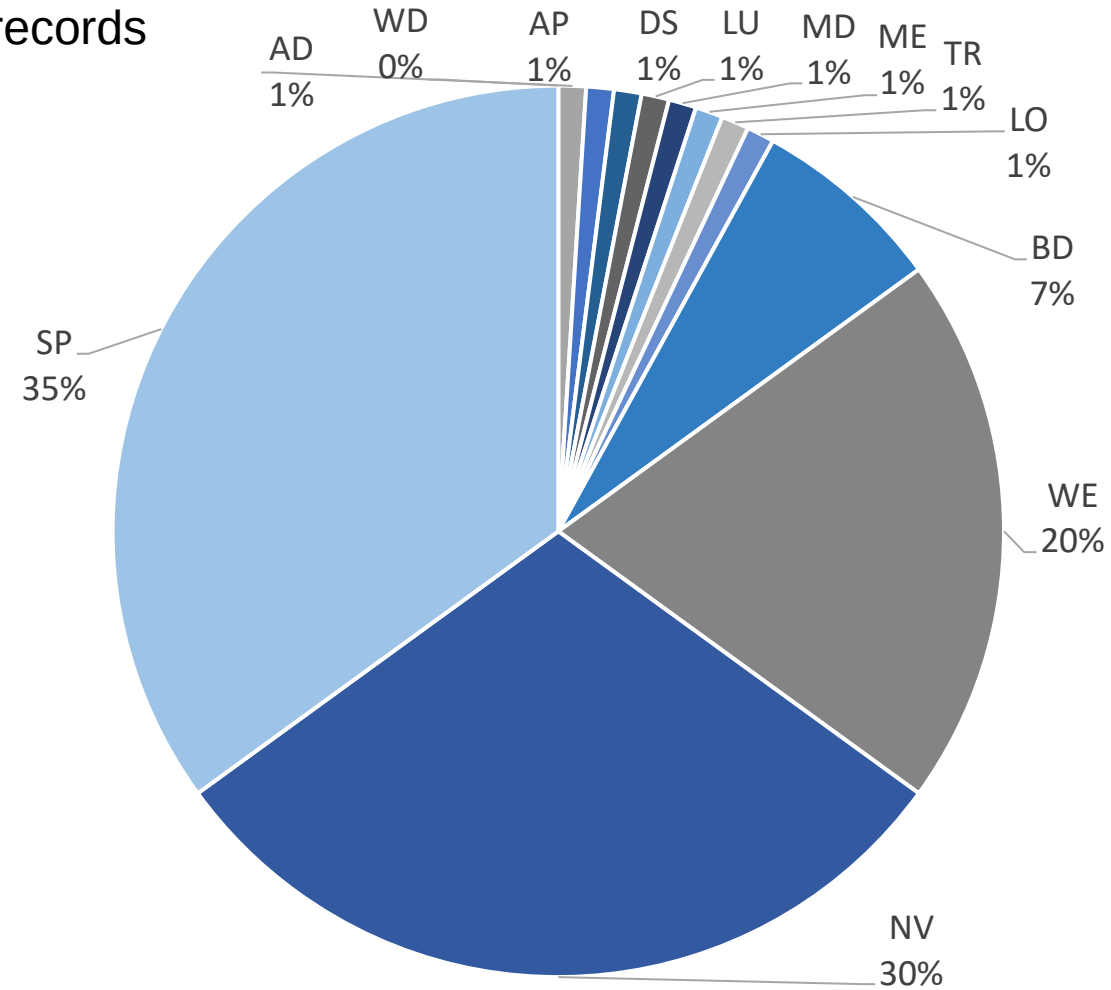
- MD-11 Reporting for Journal Roller Bearing Removals
  - Migrated to Railinc July 2018
  - https://www.railinc.com/md11/
- MD-12 Reporting for Axle Removals
  - Migrated to Railinc December 2020
  - https://www.railinc.com/md12/
- MD-115 Reporting for Wheel Removals
  - Migrated to Railinc July 2017
  - https://www.railinc.com/md115/

MD-11 Journal Roller Bearing Removal Reporting

Why Made Code	Description
50	Roller bearing heated
51	Roller bearing temperature performance – Warm bearing trending
52	Roller bearing temperature performance – Warm bearing trending
91	Acoustic Bearing Detector Level 1, non-verified
95	Roller bearing fused due to overheating

Bearing Removals

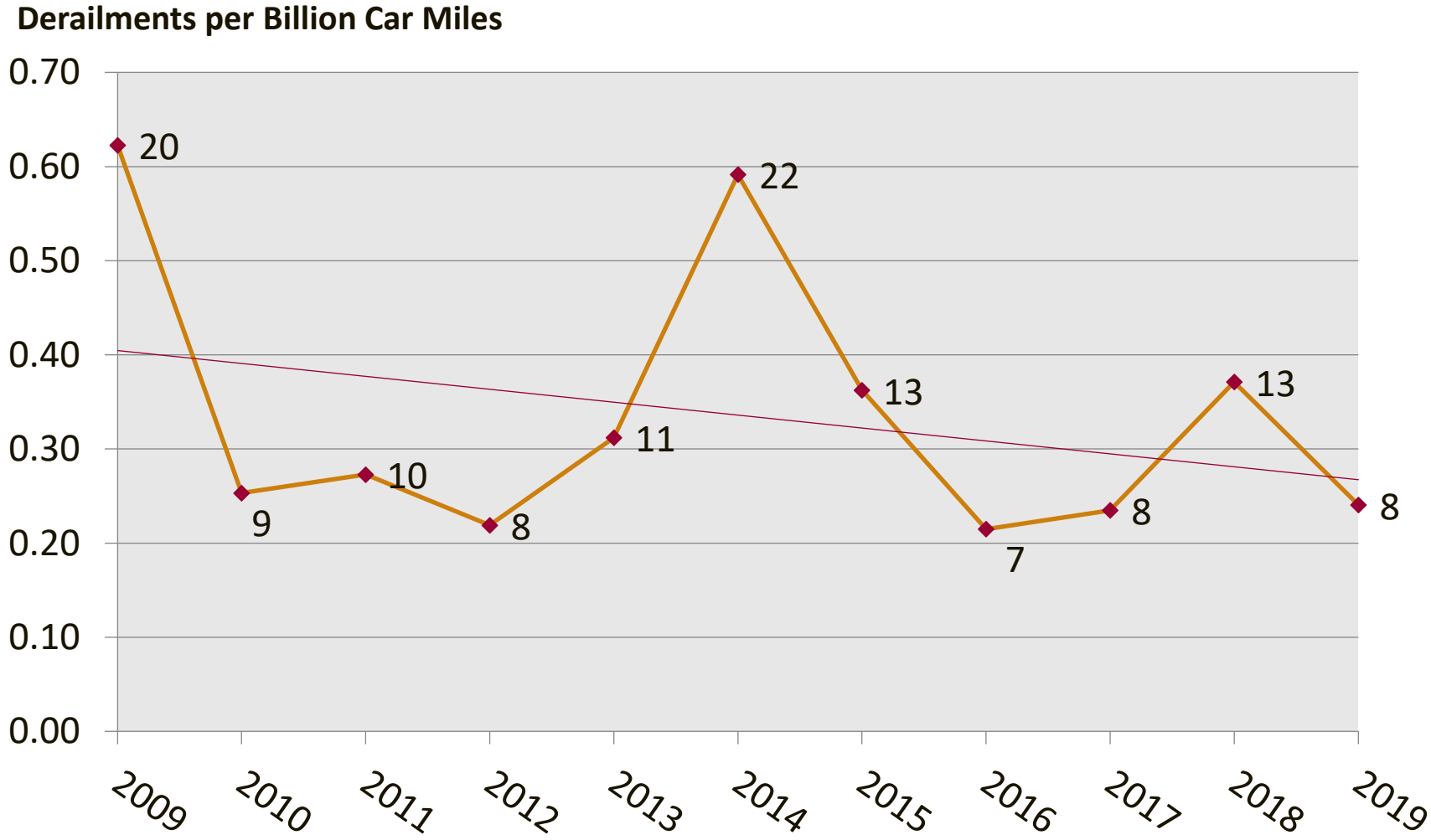
- 5 years of bearing teardown data
- ~23,000 records



Failure Progression Mode (FPM)	
AD	Adapter – Displaced, Worn, Wrong Size or Broken
AP	Application Defects
BD	Bearing Destroyed, Undetermined
DS	Displaced Seal
LO	Loose Bearing
LU	Lubrication
MD	Manufacturer/Remanufacturer/ Reconditioner Defect
ME	Mechanical
NV	Non Verified Setout
SP	Fatigue Spalling
TR	Truck Related
WD	Wheel Tread Defect
WE	Water Etch

Note: Simulated data

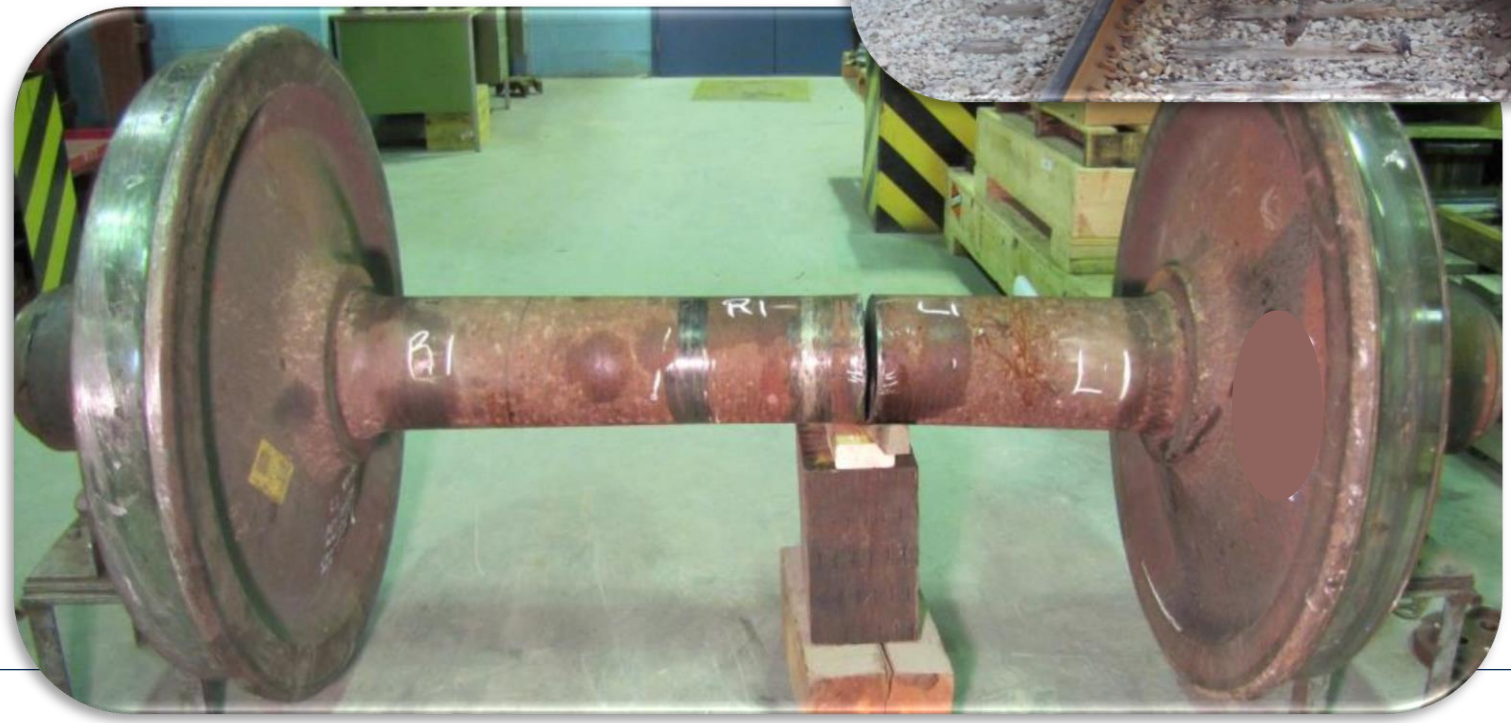
Bearing – FRA Reported Train Derailment Rates U.S. Class I Railroads on Main Track



Source: TTCI Analysis of FRA Train Accident Database, July 2020.
Note: Filtered by JOINTCD=1, ACCTRK=1 (main track), and TYPE=1 (derailments)
Wheel: E53C and E55C

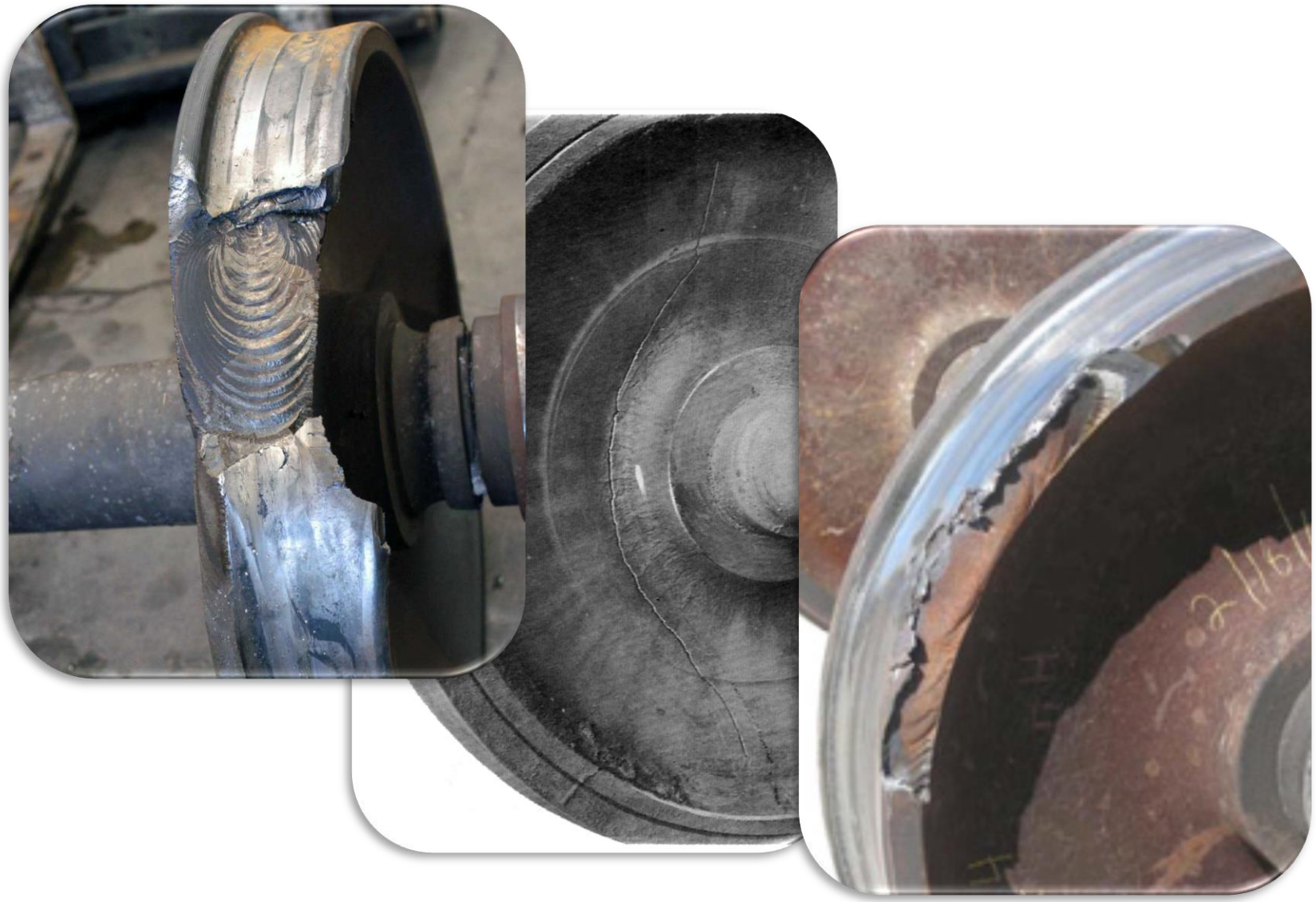
MD-12 Axle Removal Reporting

Why Made Code	Description
54	Axle broken or visually cracked



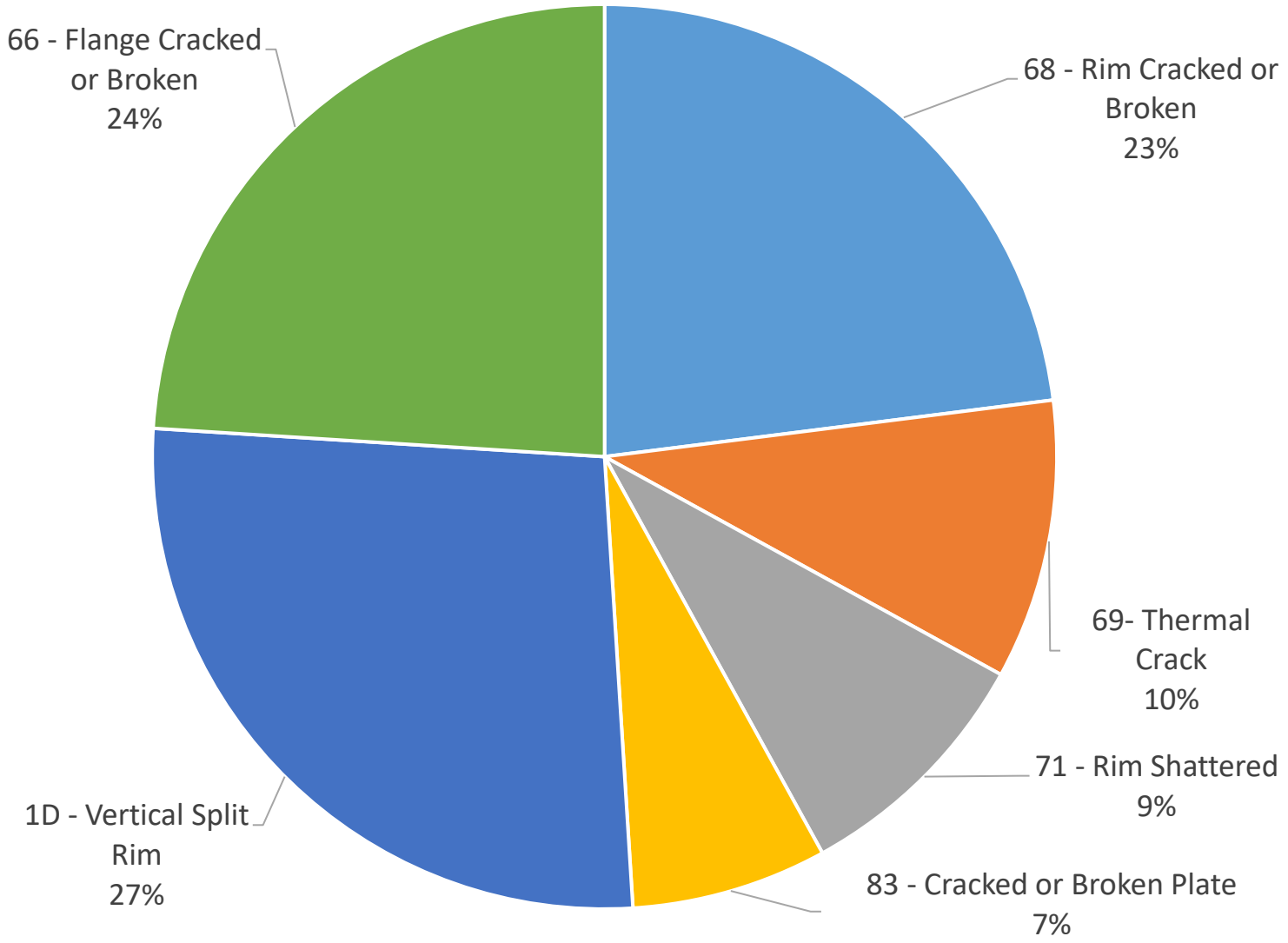
MD-115 Wheel Removal Reporting

Why Made Code	Description
66	Flange cracked or broken
68	Rim cracked or broken
69	Thermal crack extending into plate
71	Rim shattered
83	Wheel with cracked or broken plate
85	Wheel loose
1D	Vertical split rim



Wheel Removals

- MD-115 and CRB removal data
- Analysis includes 3 years of data
  - ~1,800 records



Note: Simulated data

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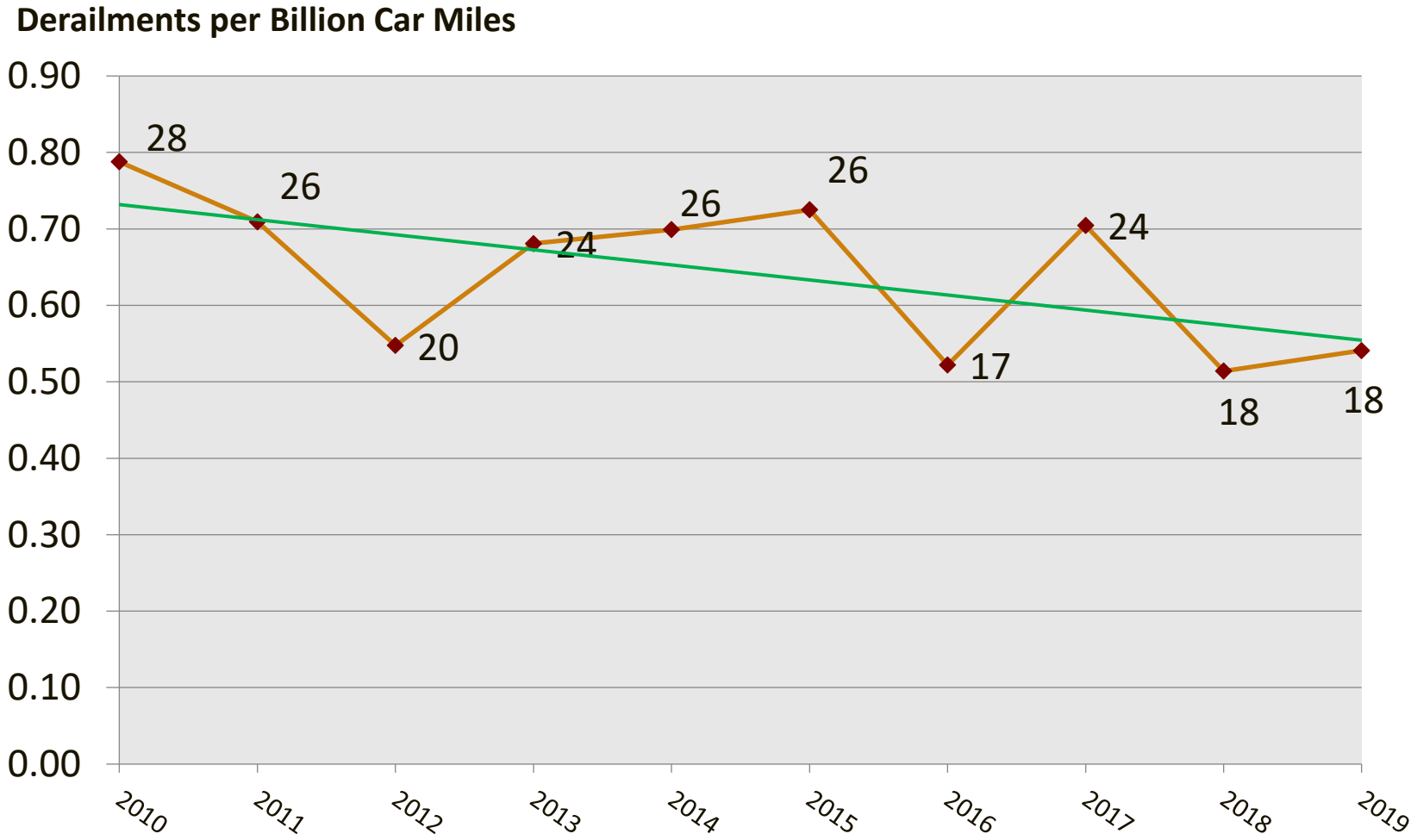
Wheel – FRA Reported Train Derailment Rates U.S. Class I Railroads on Main Track



Source: TTCI Analysis of FRA Train Accident Database, July 2020.
Note: Filtered by JOINTCD=1, ACCTRK=1 (main track), and TYPE=1 (derailments)
Wheel: E60C-E69C, and E6AC

Thank you!

AAR Quality Assurance
55500 DOT Road
Pueblo, Colorado 81001
www.aar.com

AAR Quality Auditors and Industry Conference

May 11-12, 2021

Webinar

Coupling System and Truck Castings Committee (CSTCC) Update

Daniel Gutscher

Manager – CSTCC

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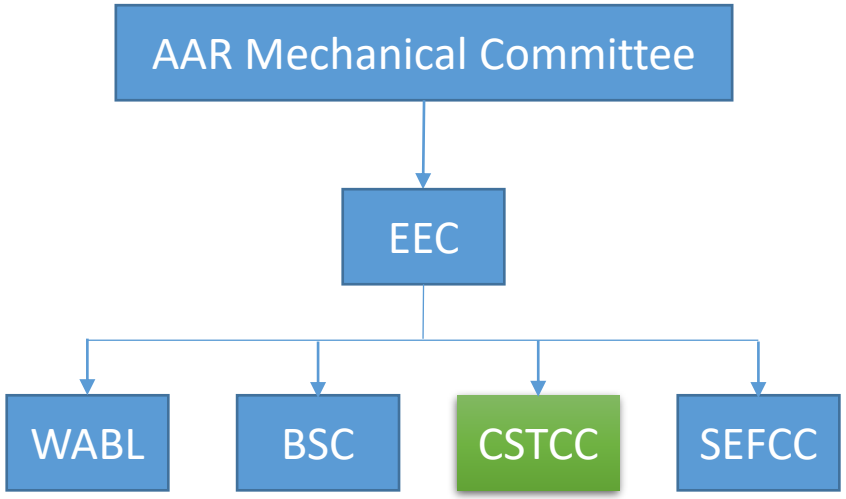
Outline

- Introduction to CSTCC
- FRA Safety Data
- Review of CSTCC Dockets
  - Mechanical Defect reporting (MD-500/MD-502)
  - Anticreep protection checks

CSTCC

- Mission: This committee develops and monitors the specifications and processes for casting freight car draft system components and trucks, including problem resolutions to casting problems which may arise.
- CSTCC reports to the Equipment Engineering Committee.



CSTCC Roster as of April 2021

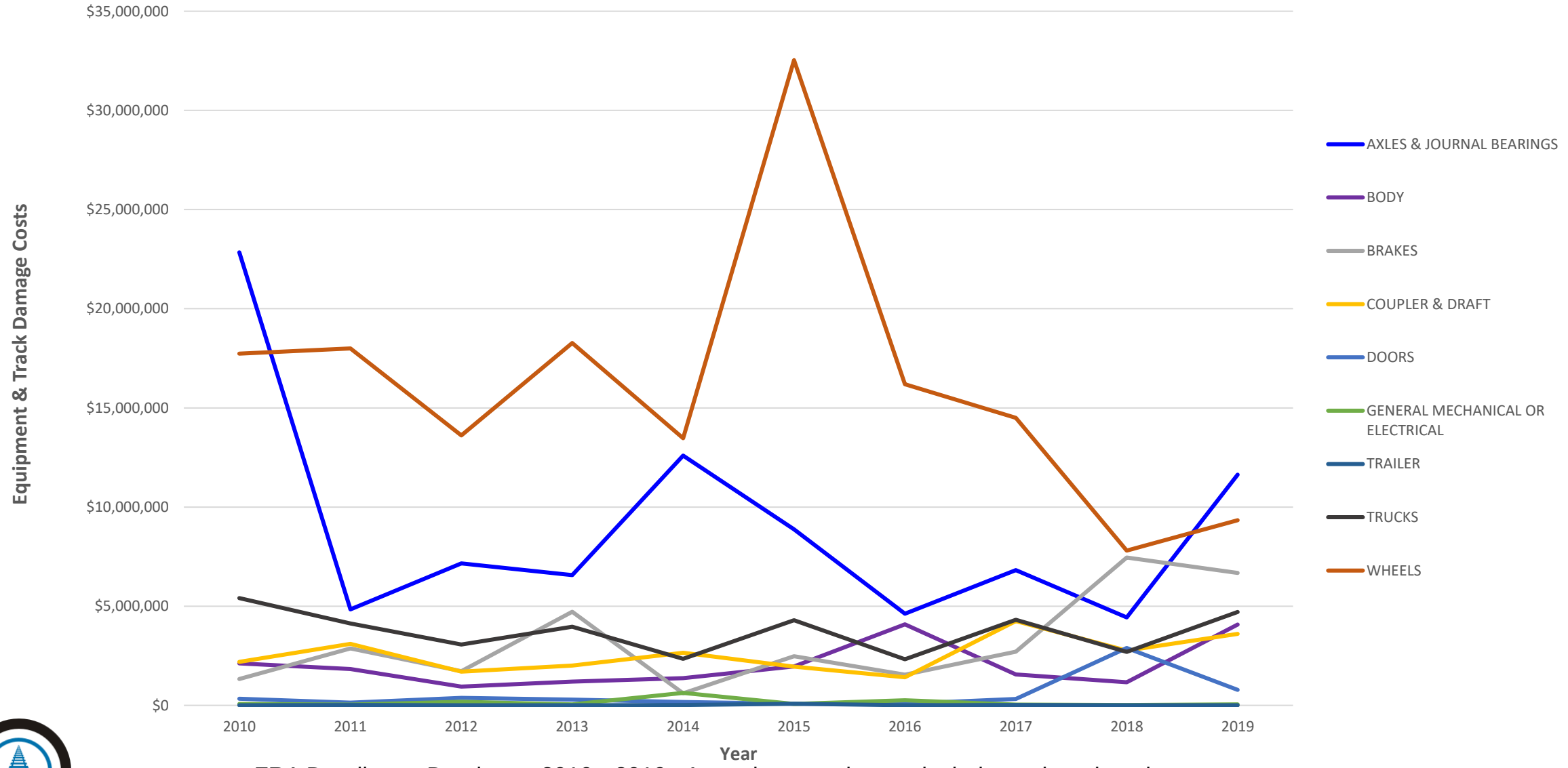
Name	Company	CSTCC Role
Joe Gagliardino	M&T	Chair (Associate)
Elizabeth Allran	NS	Vice Chair
Jason Rounds	TTX	
Bruce Siebold	BNSF	
Tony Hiatt, P.E.	TrinityRail	(Associate)
Mickey Clark	Amsted	(Associate)
Thomas Wynne	KCS	
Garth Franz	CSX	
Zachary Royer	UP	
Lincoln Oree	CP	
Ben Masters	Progress Rail	(Associate)
Daniel Gutscher	TTCI	AAR Support Staff

Publication Responsibilities

- Field Manual Rules Support for ARB
  - Rule 16 – Couplers, Type E and Parts
  - Rule 17 – Couplers, Type E-F and Parts
  - Rule 18 – Couplers, Type F and Parts
  - Rule 19 – Yokes, Type E
  - Rule 20 – Yokes, Type E-F and F
  - Rule 22 – Uncoupling Levers
  - Rule 23 – Articulated Connectors
  - Rule 47 – Truck Bolsters
  - Rule 48 – Truck Side Frames, Transoms, and Spring Planks
  - Rule 82 – Welding and Associated Heat Treatment
- MSRP
  - Section S – Casting Details
  - Section S-II – Truck Details and Casting Codes
  - Section S-III – Coupler and Yoke Details
- MSRP Support for EEC
  - Section B – Freight Car Draft Components
  - Section D – Trucks and Truck Details

FRA Safety Data

Equipment Caused Derailments: Annual Costs



- FRA Derailment Database: 2010 - 2019. Annual cost estimates include track and equipment

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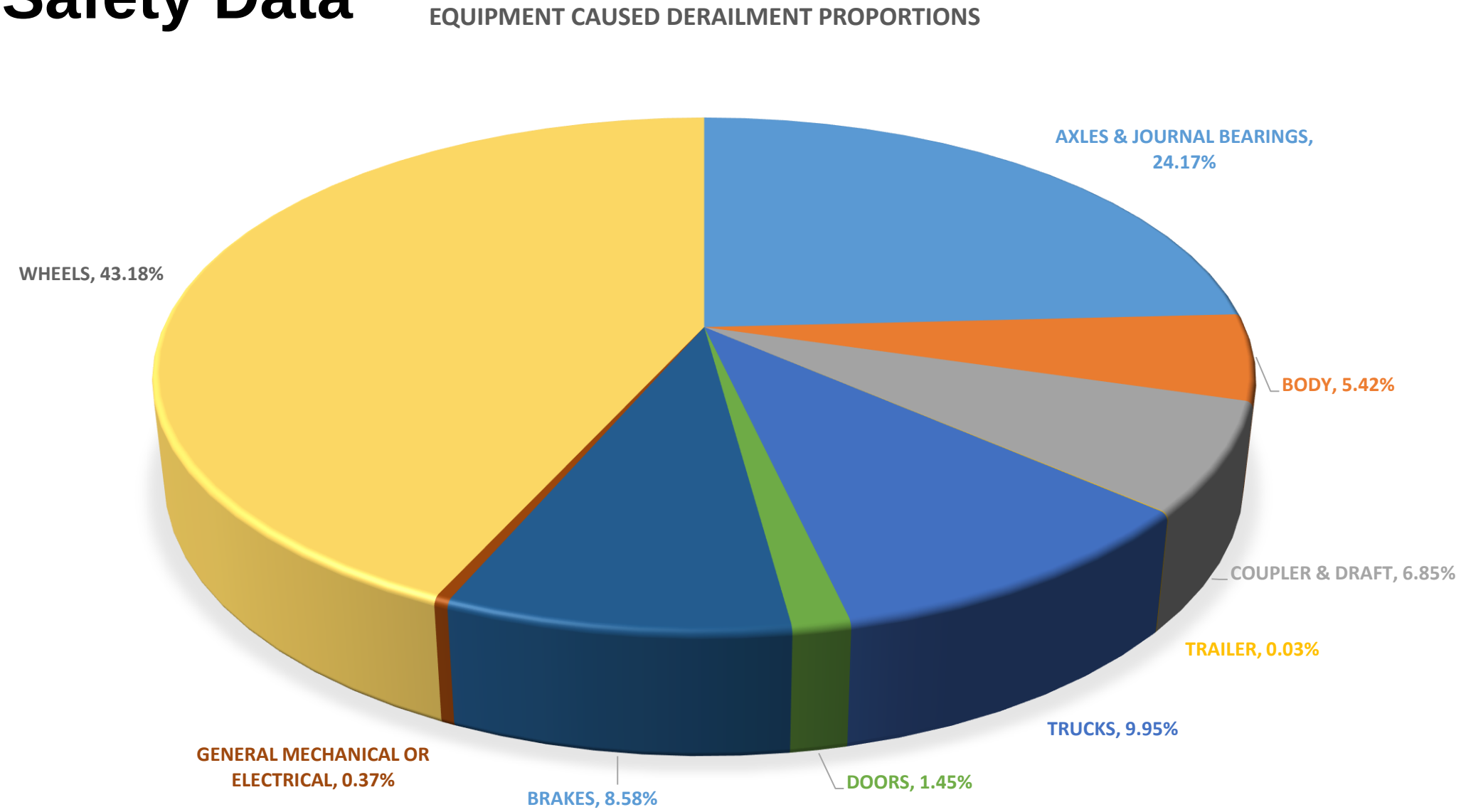
FRA Safety Data



- FRA Derailment Database: 2010 - 2019. Annual cost estimates include track and equipment

MD-500 and MD-502 Reporting

Dockets

CSTC-5.10.03

CSTC-7.00.01

CSTC-7.00.02

Scope and History

MD-500 Mechanical Defect reporting for side frames and bolsters

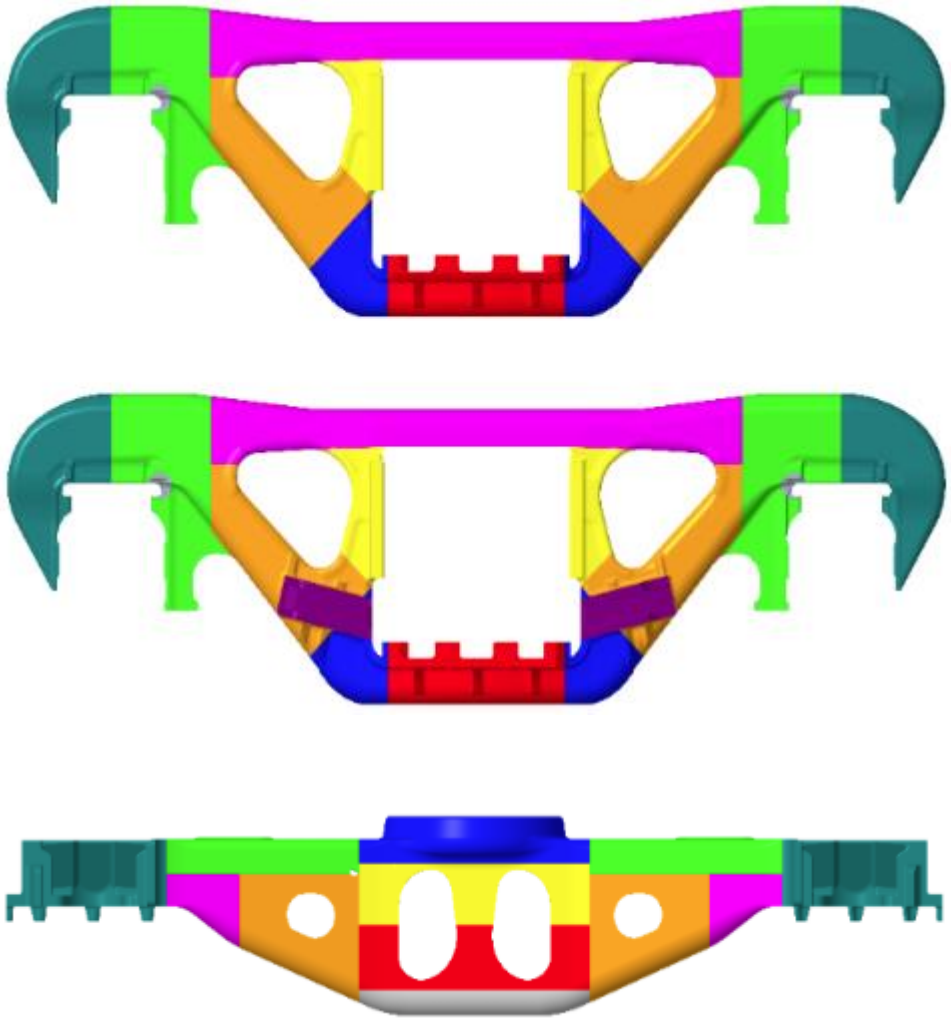
- MD-500 temporary online database started in 2013
- MD-500 migrated to Railinc in June 2020.
- https://www.railinc.com/md500/

MD-502 Mechanical Defect reporting for couplers

- MD-502 paper report from 1977-1994.
- MD-502 restarted as online report via Railinc in July 2019.
- https://www.railinc.com/md502/

MD-500 Reports

- Field Manual requires reporting of broken and cracked side frames/bolsters (WMC 02, 41, 1G)

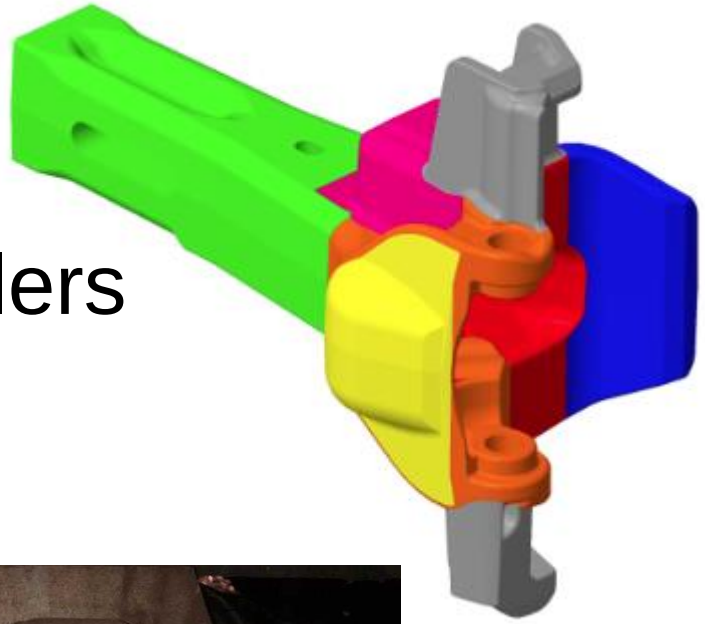


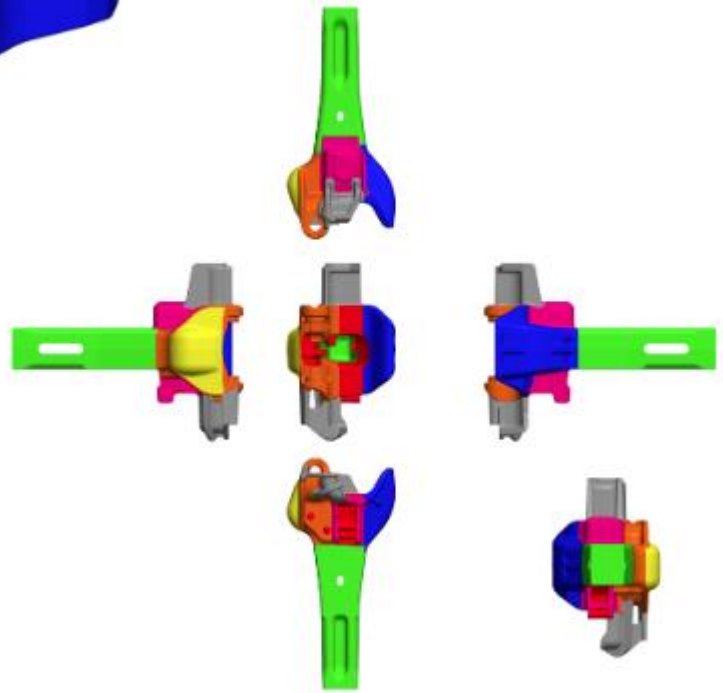
MD-500 Summary of Reports: 2020 – Mar 2021

Why Made Code	Description	Number of Bolsters	Number of Side Frames
02	Broken	20	4
41	Cracked	84	6
1G	Broken or Cracked in Rim	8	N/A

MD-502 Reporting

- Field Manual requires reporting of broken couplers (WMC 02)
- Reporting of cracked couplers is optional





MD-502 Summary of Reports: 2020

Why Made Code	Description	Number of E-Type Couplers	Number of EF-Type Couplers	Number of F-Type Couplers
02	Broken	1299*	258*	314*
41	Cracked	1052	145	224
79	Cracked behind horn	591	43	48
82	Cracked front face	424	83	70
86	Cracked key slot	18	N/A	N/A
87	Cracked pin protector	763	317	106
88	Cracked behind pulling lug	319	34	509
1J	Broken pin protector	420	97	261

- Data is preliminary and has not been thoroughly reviewed for accuracy – see note below.
- * WMC 02 is reporting high since a large portion need to be reclassified as WMC 1J or WMC 87. WMC 1J was added to the Field Manual after the implementation of MD-502.
- Reports of non-required WMCs (41, 79, 82, 86, 87, 88 and 1J) were primarily from one Class 1 railroad in support of CSTCC research.
- F-Type couplers include rotary couplers

Path Forward

- CSTCC continues to work with Railinc to improve reporting
  - Improved diagrams for data entry
  - Entry validation
  - Report generation
  - Data analysis
- CSTCC will use data to understand how couplers are performing in service and to assist in future dockets to address issues.

Anti-Creep Protection

Dockets

CSTC-3.0.16.25

CSTC-3.0.18.04

CSTC-S-M212.12

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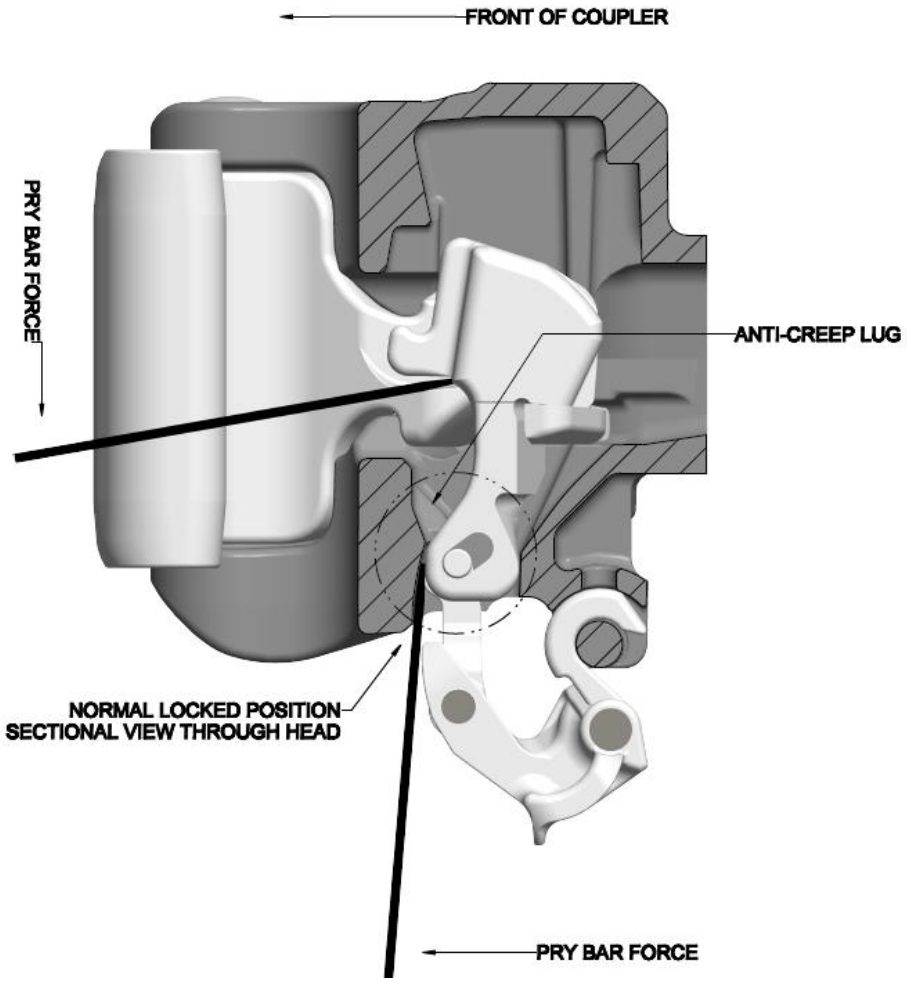
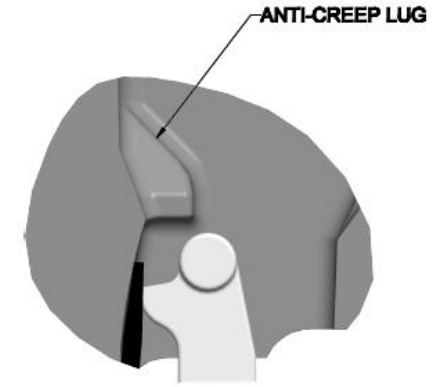
Background…

- Anti-creep: Component features in railcar coupling systems that act to prevent the unintended vertical movement, via ratcheting or single motion, of coupler locks during service operation which can result in unintended opening of coupler knuckles.
- CSTCC discovered lack of knowledge and confusion throughout industry regarding anti-creep features and how to check that they are in place and working properly
- CSTCC updated rules and worked with MID to disseminate information to the industry
- Primary benefits – safety and reduced line-of-road delays when anti-creep features are working properly to prevent unintended opening of knuckles during service

Primary Anti-Creep Protection E-Type Couplers

- Tab on locklift assembly engages with coupler anti-creep lug to prevent unintended vertical motion of lock during service.
- Check by applying pry bars and verifying proper engagement of tab and anti-creep lug.
- See Field Manual Rule 16.E.9.a for procedure.

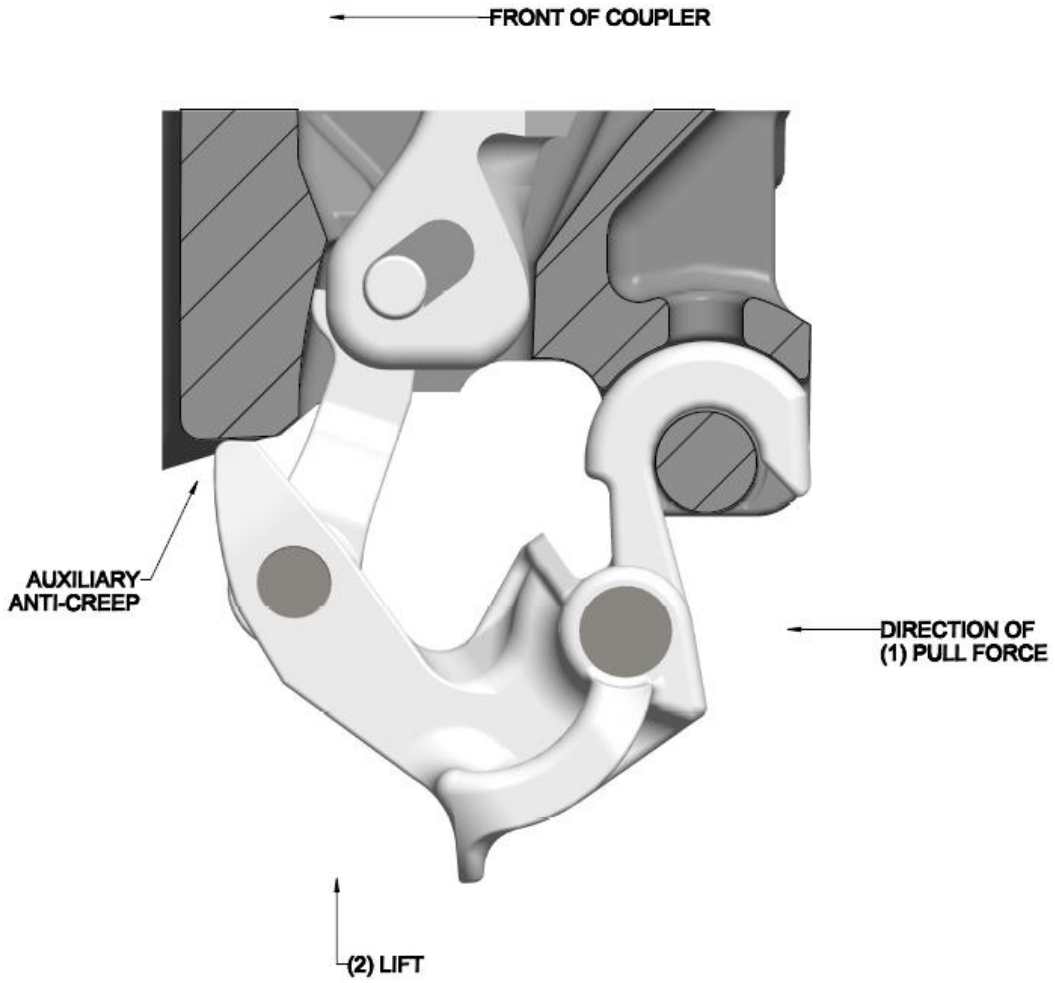




ANTI-CREEP LUG DETAIL
SCALE 2:1
LOCK GEOMETRY REMOVED FOR CLARITY

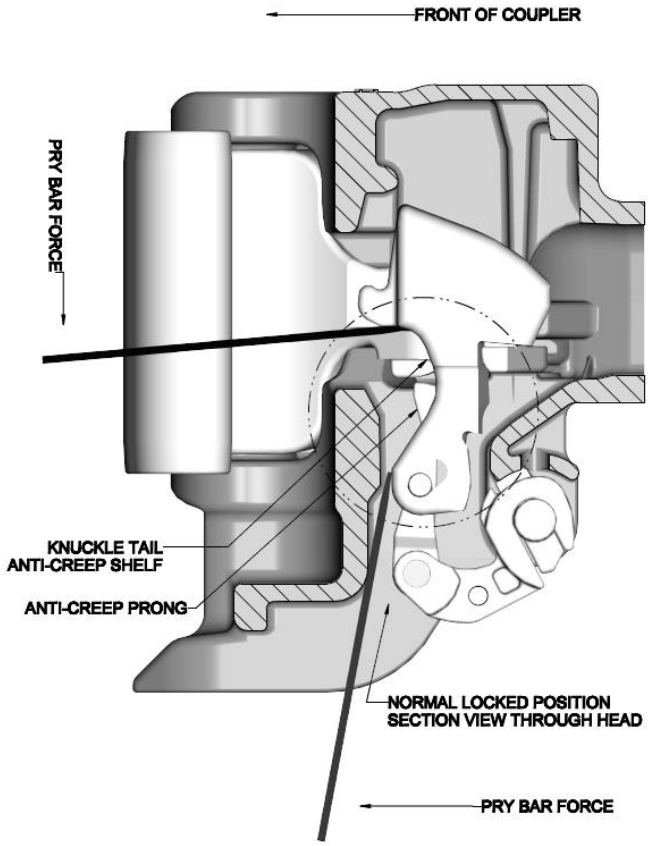
Auxiliary Anti-Creep Protection E-Type Couplers

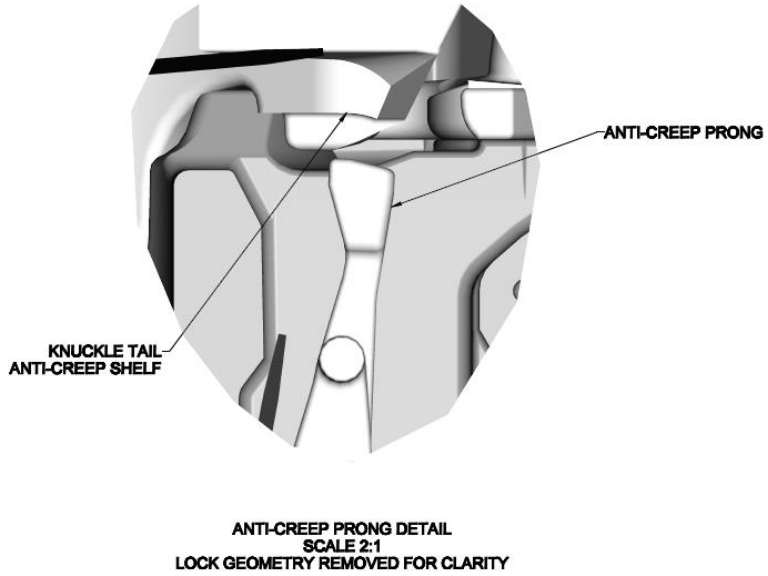
- Finger of locklift assembly will engage with coupler to prevent unintended lifting of the lock during longitudinal movement of the assembly.
- Check by pulling the locklift assembly forward and then lifting to verify proper engagement of assembly finger and coupler body.
- See Field Manual Rule 16.E.9.b for procedure.



Primary Anti-Creep Protection F-Type Couplers

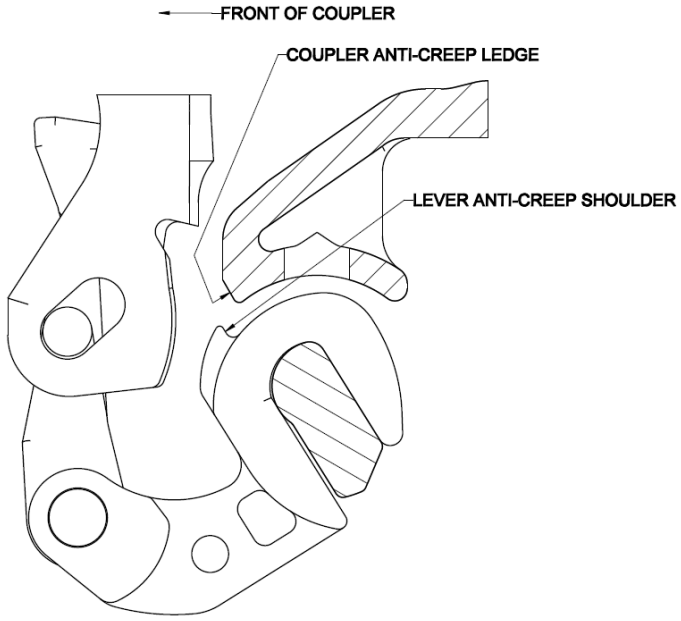
- Anti-creep prong on locklift assembly engages with knuckle anti-creep shelf to prevent unintended vertical motion of the lock.
- Check by applying pry bars and verifying proper engagement of anti-creep prong and shelf.
- See Field Manual Rule 18.E.5.a for procedure.



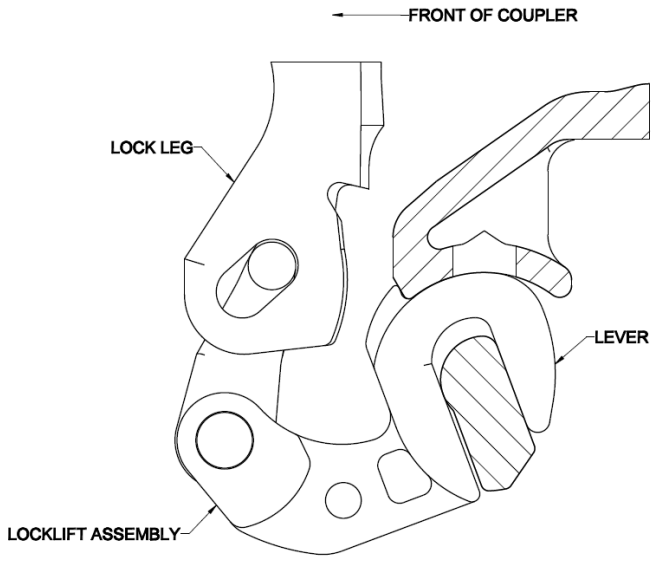


Auxiliary Anti-Creep Protection F-Type Couplers

- Anti-creep shoulder on on locklift assembly engages with coupler anti-creep ledge of coupler unintended rotation of the locklift assembly.
- Check by lifting the locklift assembly and then attempting to rotate to verify proper engagement of anti-creep shoulder and ledge
- See Field Manual Rule 18.E.5.b for procedure.



LEVER AND ANTI-CREEP SURFACES IN NORMAL POSITION



WITH LEVER IN RAISED POSITION ANTI-CREEP SURFACES MUST ENGAGE TO PREVENT LEVER ROTATING AND LOCK LIFTING

Path Forward

- Update M-212 Appendix D
- Elevate to independent standard or recommended practice
- Continue to work with AAR MID group to disseminate information to industry
  - https://aar.com/standards/Field_Manual_Gage_Use_Demonstration_Videos.html

Thank you!

AAR Quality Assurance
55500 DOT Road
Pueblo, Colorado 81001
www.aar.com

AAR Quality Assurance

33rd Annual Quality Assurance Conference

May 12, 2021

Webinar

How to Audit an Inspection and Test Plan

AAR MSRP Section J Chapter 2 Section 2.5

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Inspection and Test Planning

- ITP may be part of the Production Plan or stand alone
  - Inspection and Test Activities
    - ✓ Understand how the facility plans production?
      - ✓ Review and compare Inspection & Test to the production plan.
- Plan to include all covered items in paragraph 2.5.2
  - What are covered items?
    - ➢ Material Products & Services

- Verify that the facility ITP covers processes performed at the facility applicable to Section J - Appendix A activities

- Review ITP to ensure inspection points are identified, including incoming inspection through shipping
  - Preservation of materials

Área o Taller de Trabajo Area or Workshop	Modelo Car Type	N° Control	Plan de Control / Control Plan Aseguramiento de la Calidad / Quality Assurance
Slope sheet /Stiffener	Hopper	PC-HOP-02	El manejo de materiales utilizados en todas las etapas del proceso debera realizarse de acuerdo a PMA-03 y IMA-03-01 / The materials handling at all the process stages must be performed according PMA-03 and IMA-03-01 Todas las caracteristicas descritas estan sujetas a cualquier metodo de auditoria de acuerdo a PAC-06 para verificar el cumplimiento de los procedimiento del proceso / All the characteristics here described can be audited with any method according to PAC-06 to verify the compliance of the process procedures

Dibujos de Referencia Drawing Reference				Equipo Multidisciplinario Multidisciplinary team		Rev.	Fecha Date	Motivo de Revisión Description of Changes
A	SLOPE SHEET STIFFENER ASSEMBLY	G		Calidad: Quality	Joel Vazquez	0	06/Ene/20	First Edition
B	END SLOPE SHEET AND STIFFENER ASSEMBLY	H		Produccion: Production	Jose Avila	1	09/Dic/20	General Revision
D		I		Manufactura: Manufacturing	Johnatan Reyes	2		
E		J		Ingenieria: Engennering	Denise Becerra	3		
F		K		Mejora continua: Countinous Improvement	Edwin Munguia	4		

Caracteristicas Especiales Ref. QS-002 "Indicadores de Desempeño de Calidad"
Special characteritcs Ref. QS-002 "Quality Performance Measurements"

Defectos Criticos (C) – Una omisión crítica que puede resultar en un descarrilamiento, falla mayor o daño, o un defecto que es probable que no permita el desempeño adecuado de un componente o de un carro de ferrocarril.
A critical exception may result in a derailment, catastrophic failure or injury, or a defect that is likely to prevent intended performance of the component or railcar.
Defectos Mayores (M)– Una omisión Mayor que pueda afectar adversamente el desempeño y la vida útil del componente de un carro de ferrocarril. Un defecto Mayor significa el total mal funcionamiento del Sistema de Calidad, Proceso o Procedimiento.
A major exception may adversely affect the performance and expected life of the component or railcar. A major exception is the total breakdown of a quality system, process or procedure.
Defectos menores (m)– Una omisión Menor es probable que no afecte el desempeño y periodo de vida esperado del componente o carro de ferrocarril. Un defecto menor observado en el Sistema de Calidad, Proceso o Procedimiento.
A minor exception is not likely to impact the performance and expected life of the component or railcar. A single observed lapse in the quality system, process or procedure.

Plan de Reacción
Reaction Plan

1. Notificar a supervisor de producción / Notify to production supervisor
2. Identificar y/o segregar material según Proc. PAC-05 Material No conforme y PAC-10 estados de Inspección
   Identify and/or segregate material according of procedure PAC-05 Non Conformance Material and PAC-10 Inspection Status
3. Recuperar, Retrabajar, Reparar (según aplique)
   Rework, Repair, Recuperate (according apply)
4. Verificar, validar los dispositivos(PIN-01) y/o equipo de medición (PAC-04) / Verify validate Jig (PIN-01) and/or measuring equipment(PAC-04)
5. Cambiar o sustituir componte / Change or replace componte
6. Parar proceso y ajuste de parámetros / Stop the process and parameter setting

NÚM. OP OP. NUM.	DESCRIPCIÓN DE LA OPERACIÓN DESCRIPTION OF OPERATION	MECANISMOS, HERRAMIENTAS, MAQUINA MECHANISMS, TOOLS, MACHINARY.	Características de Inspección Inspection Characteristics				Especificación y/o Criterios de Aceptación Specification and/or Acceptance Criteria	Dibujos de Referencia Reference Drawings	Métodos Methods				Retención de documentación	Operación / Pruebas / Liberación Operations / Test / Release						Plan de Reacción Reaction Plan
			P.I. I.P.	Proceso Process	Producto Product	Caracteristicas Especiales Quality Performance Measurements			Técnica de Evaluación y Medición Measurement Technique and Evaluation	Muestra Sample Tamaño de muestra Size sample	Muestra Sample Frecuencia de Inspección Insp Frequency	Método de Control Control Method		CALIDAD QUALITY	TEC. SOLDADURA WELDING TECH	OPERADOR OPERATOR	SUPERVISOR PROD. PRODUCTION SUP.	MANUFACTURA MANUFACTURE	MANTENIMIENTO MAINTENANCE	
PP180	SLOPE SHEET STIFFENER ASSEMBLY (A END / B END)		⊙	Release and verification of device		Accord to PIN-01	According to procedure PIN-01	N/A	measuring tape, square	100%	Accordin to PIN-01	According to PIN-01	☐	X	X		X	X	X	1,2,3,4,5,6
			⊙		Distance between CENTRAL LINE and END SLOPE SHEET SUPPORT (RH / LH)	m	Verify distance according to reference drawing	B	Jig	100%	Each assembly		☐			X	X			1,2,3,4,5,6
			⊙		Final height of the END SLOPE SHEET SUPPORT (LH / RH)	m	According to reference drawing	B	Measuring tape Square	100%	Each assembly		☐			X	X			1,2,3,4,5,6
			⊙		Position of SLOPE SUPPORT STIFFENER	m	Verify position according to reference drawing	B	Measuring Tape Square	100%	Each assembly		☐			X	X			1,2,3,4,5,6
			⊙		Position of END SLOPE CONNECT	m	Verify position of END SLOPE CONNECT According to reference drawing	B	Jig Measuring Tape Square	100%	Each assembly		☐			X	X			1,2,3,4,5,6
PP190	SLOPE SHEET STIFFENER ASSEMBLY (A END/B END) welding		⊙		Welding Application	M	According to reference drawing Welding Defects according to AWS D15.1 and WPS	B	Visual Welding Gage	100%	Each welding application		☐		X	X	X				1,2,3,4,5,6
			⊙	Release and verification of device		Accord to PIN-01	According to procedure PIN-01	N/A	measuring tape, square	100%	Accordin to PIN-01	According to PIN-01	☐	X	X		X	X	X	1,2,3,4,5,6
			⊙		Centered position of END SLOPE SHEET ASSEMBLY AND SLOPE SHEET STIFFENER ASSEMBLY (A END / B END)	m	Verify centered position according to reference drawing	A	Measuring Tape Square Jig	100%	Each assembly		☐			X	X			1,2,3,4,5,6

Puntos de Inspección / Inspection Points (I.P.)			Registros de Inspección / Inspection Records (I.R.)			
☑ Punto de Prueba Test Point	⊙ Punto de Inspección Inspection Point	⊗ Punto de retención Cliente Customer Hold Point	◇ Repeate de conformidad Conformity record of testing	⊡ Documentación de proveedores Documentation received by supplier	☐ Registros no incluidos en libro historial del carro These records are not included in the car history book	■ Registro incluido en libro historial del carro These records are included in the car history book or Product

FAC-13-01 (Rev. 6)

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Inspection and Test Planning

Plant	West		Car Type	Tank	117J100W	12345	Date	2/17/2020	Orig
Position W=West E=East	Process	Work Inst. / SOP	Measure & Test Assess-ments	Drawings	Records	Quality Criteria/ Special Instructions	Lots / Batches Inspection Level	Subcontract Services	SPC
Inbound	QA Hold Point Incoming Inspection	AQ 1.10	AQ 1.10	As Required Per QAII	FAQ 1.10-1	Reference Per QAII	AQ 1.10	Approved Vendors List Calibrations	None
Material	Perservation / Packaging	SOP 9020	None	None	None	None	None	None	None
1020 W	Plasma Table	SOP 1020	SOP 1020	Shell	F1020-1 F1020-2	Drawing	100%	Calibration	None
				Shell	F1010-1 F1020-3		1st Piece	Vendors	
1015 W	Plate Bevel	SOP 1015	SOP 1015	Shell	F 1015-1	SOP 1015	100%	Calibration	None
				Shell	F1010-1			Vendors	
1010 W	Plate Blast	SOP 1010	SOP 1010	Shell	F1010-1	ES 1094	100%	Calibration	None
				Shell		ES 1090 SOP 1010		Vendors	
1030 W	Plate Roll	SOP 1030	SOP 1030	Shell	F1030-1	Drawing SOP 1030	100%	Calibration	None
				Shell	F1010-1	EW 1.02		Vendors	
1160 W 2090 E	QA Hold Point Tank Visuals	SOP 1060	SOP 1060	Shell	VT Report	Drawing	100%	Vendors	Defects / Acceptance
				Tank Arrgt		SOP 1160			

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- Verify the facility ITP identifies the characteristics that are inspected, examined, and tested at each point and acceptance criteria required in the ITP and/or identify the document(s) that contain the information.
  - At each point verify that the ITP identifies:
    - characteristics that are inspected, examined and tested
    - contains acceptance criteria or references the document that contains the acceptance criteria
  - Examples:
    - Process/Object - Weld
      - Characteristics - size and conformity
        - Acceptance Criteria – AWS D.15.1, Appendix W
    - Process/Object – Railcar
      - Characteristics – Length of railcar over coupler pulling face
        - Acceptance Criteria = X +/- ½” (design dimension)

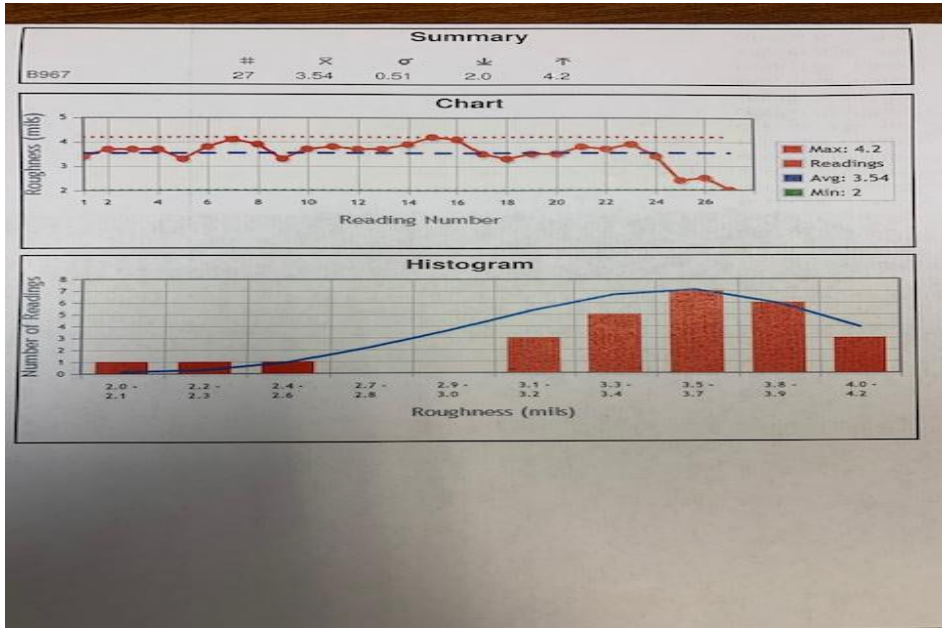
- Review reference ITP records to ensure identification of measuring equipment used is documented
  - Product produced or tested with a gauge later identified as suspect/defective
    - Traceability to support assessment and/or containment

- Review ITP to ensure hold points are identified

Plant	West		Car Type	Tank	117J100W	12345	Date	2/17/2020	Orig
Position W=West E=East	Process	Work Inst. / SOP	Measure & Test Assess-ments	Drawings	Records	Quality Criteria/ Special Instructions	Lots / Batches Inspection Level	Subcontract Services	SPC
Inbound	QA Hold Point Incoming Inspection	AQ 1.10	AQ 1.10	As Required Per QAII	FAQ 1.10-1	Reference Per QAII	AQ 1.10	Approved Vendors List Calibrations	None
		1010		Shell		SOP 1010		Vendors	
1030 W	Plate Roll	SOP 1030	SOP 1030	Shell	F1030-1	Drawing SOP 1030	100%	Calibration	None
				Shell	F1010-1	EW 1.02		Vendors	
1160 W 2090 E	QA Hold Point Tank Visuals	SOP 1060	SOP 1060	Shell Tank Arrgt	VT Report	Drawing SOP 1160	100%	Vendors	Defects / Acceptance

Inbound | QA Hold Point Incoming Inspection | AQ 1.10 | AQ 1.10 | As Required Per QAII | FAQ 1.10-1 | Reference Per QAII | AQ 1.10 | Approved Vendors List / Calibrations | None

- Verify and validate where sampling plans are in use
  - Incoming inspection based on an AQL
  - Radiography for General Service Tank Car
- Verify where in the process any SPC is in use
  - Defect tracking
  - Scrap rates



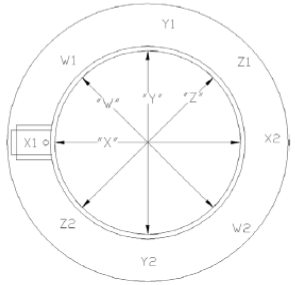
- Verify how compliance to process/procedures are accomplished
  - Sign off sheets/travelers
  - Inspection reports

XXXX Company

Report

NUMERO DE PLANO Y REVISON / DRAWING AND REVISION _____

DIAMETRO NOMINAL INTERIOR / INTERIOR DIAMETER NOMINAL _____



	DIAMETRO/*Diameter*		
	Inspección antes de relevo *Inspection before PWHT*	Inspección después de relevo *Inspection after PWHT*	OBSERVACIONES *Comments*
X			
Y			
W			
Z			

FECHA/DATE: _____ FECHA/DATE: _____

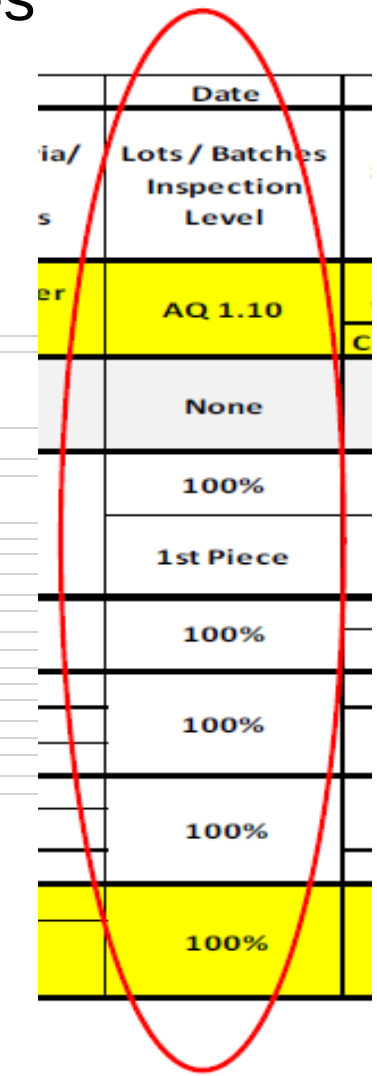
INSPECTOR: _____ INSPECTOR: _____

Rev.
Original Date:
Revised Date:
Approved By:

Page 1 of 2

- Verify plans identify the use of any lots or batches

Plant	West		Car Type	Tank	117J100W	12345	Date	2/17/2020	Orig
Position W=West E=East	Process	Work Inst. / SOP	Measure & Test Assess-ments	Drawings	Records	Quality Criteria/ Special Instructions	Lots / Batches Inspection Level	Subcontract Services	SPC
Inbound	QA Hold Point Incoming Inspection	AQ 1.10	AQ 1.10	As Required Per QAII	FAQ 1.10-1	Reference Per QAII	AQ 1.10	Approved Vendors List Calibrations	None
Material	Perservation / Packaging	SOP 9020	None	None	None	None	None	None	None
1020 W	Plasma Table	SOP 1020	SOP 1020	Shell	F1020-1 F1020-2	Drawing	100%	Calibration	None
				Shell	F1010-1 F1020-3		1st Piece	Vendors	
1015 W	Plate Bevel	SOP 1015	SOP 1015	Shell Shell	F 1015-1 F1010-1	SOP 1015	100%	Calibration Vendors	None
1010 W	Plate Blast	SOP 1010	SOP 1010	Shell Shell	F1010-1	ES 1094 ES 1090 SOP 1010	100%	Calibration Vendors	None
1030 W	Plate Roll	SOP 1030	SOP 1030	Shell	F1030-1	Drawing SOP 1030	100%	Calibration	None
				Shell	F1010-1	EW 1.02		Vendors	
1160 W 2090 E	QA Hold Point Tank Visuals	SOP 1060	SOP 1060	Shell Tank Arrgt	VT Report	Drawing SOP 1160	100%	Vendors	Defects / Acceptance



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- Review the ITP for subcontract services
  - Examples:
    - NDT Level III or testing
    - Internal Audit services for M1003 or ISO
    - Calibrations
    - Heat Treatment

Walk the Production Lines
Validation of ITP

- Compare the ITP to facility production processes for accuracy and completeness
  - Are the identified forms in use?
  - Is acceptance/rejection criteria adhered to?

Section J
APPENDIX C VIEWS AND INTERPRETATIONS

- 5.0 PRODUCTION INSPECTION AND TEST PLAN (REFERENCE PARAGRAPH 2.5 IN THE SPECIFICATION) For tank car facilities, the Production Inspection and Test Plan is not to be limited to the ‘tank,’ but needs to address those specific work procedures/component parts encompassed in the scope of the program.

Obtain current AAR QAPE Checklist from TTCI Website https://aar.com/standards/FAQ.html

M-1003 Certification

Where can I find the most current Quality Assurance Program Evaluation (QAPE) Checklist?

The most current Quality Assurance Program Evaluation Checklist – or QAPE for short – can be downloaded by **clicking here**. Check this link periodically for any updates to the QAPE.

Thank you!

AAR Quality Assurance
55500 DOT Road
Pueblo, Colorado 81001
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AAR Quality Assurance

AAR Annual Quality Conference

May11,12, 2021

Auditing in an IT Environment

Richard A. Sena
Vaquero Canyon Advisors, LLC

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Auditing in an IT Environment – AAR System Supporters

Systems – Apps – The Server – It is in "The Cloud"

Cell Phones – Text Messages – Analytics – "Solutions"

2G, 3G, 4G, now 5G – Self-Parking Cars – Drones

Servers … And of course, ALEXA …..

So, what can we do to identify and verify …

Who is watching and controlling our AAR System related data?

ALEXA ????

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Auditing in an IT Environment … Us - We the AAR QA

- **Let's focus in on … the System we are working with ….**

one of the best across various industries …

How can we setup and review and assess some key Check-points effecting the ongoing controls of our supplier services and the information that drives them and our received support –

So now we need to ask the IT entity wherever we go ....

A Look at the IT Systems and Are We Checking an Area Which is "subliminal" in its presence in M-1003 Audits

First ……..there are 3 Factors to consider:

In M-1003 audits the IT team is not generally a "serious participant", if at all

- **However, we need to be aware that TODAY ……..**

A. All our supplier's records may be directly entered and/or scanned into the recordkeeping archives (IT's infamous "The System"/"The Server")

B. IT is generally a "backroom" operating function while having hands-on control of "everything"– (all "computer" activity)

C. The IT function's Processes and Procedures might not be thoroughly documented – (How Does IT Operate?)

It's support may be driven in IT by "Everybody Knows"

A Look at the IT Systems and Are We Checking an Area Which is "subliminal" in its presence in M-1003 Audits

Second….

- **What do we look for and how do we get a view of the level of control and of support ?**

- **We need to look at the Supplier's Business Structure & Support Situation**

  (small with limited IT support or large with an internal staff)

And then we can identify how to inquire about:

a. How to confirm/assess our AAR data is being well managed…

b. And be ready to share some guidance towards compliance

Moving Forward into the site visit setup & the Audit…

…. In order to overcome the “surprise” request for IT personnel’s specific attendance at various times during the audit …

a. Clearly include “IT” in the attendee listing

b. Include a reference to their role in
Document Control-Sec.2.7.1,2,3 and
Records-Sec.2.17.3.4 and
Chapter 7 support

c. Mention that you will include a review of their documented IT Departmental procedures during the Audit.

- A Possible Paradigm Conflict??....

Working on M-1003 Sections …

During the Review of 2.7 Document Control Section , and 2.17 Record Keeping …

- **Add IT into the participating departments list confirming a clear inclusion of IT**

And

They should bring their printed SOPs and examples of such support activities as:

- **Design/Technical/Business Software Releases –**
- **Changes through Updates**
- **Changes to "code" – Documents with signed approvals and showing from X to Y**
- **Software "self-recording change tracking library" with approval signatures**
- **Reports identifying who did the "User" Testing for Existing Software's changes & updates? and who are the authorized approvers?**

AND **who of the actual users who tested the Revisions? Did they have comments?**

Document Control – IT

- Now that you have “primed the pump”….
- As you get into the M-1003 sections … then what??

Ref: Documentation & SOPs – for IT’s Self-Control Management:

1. *Any Existence of IT Policies and IT Procedures – documented overview covering: Business/MRP Systems Structure & Back-up Practices & branched modules i.e. CAD*
   - I.T.’s Classification of their own Documents and Records
2. Any SOP for “System Keeper” staff assignments for the company’s System of Documents and Records in ERP/MRP/Engineering Drawings/Specifications/QC data, etc.
3. Any SOP for Authorization Levels SOP for Releases, Code &/or Screen Changes
4. Technical software changes for released designs, specifications etc.
5. Work Instructions Change Requests/Releases for instructions to use the software & MRP for Work Orders, Receiving, Shipping screens etc. written and controlled by IT

IT Support & Good Practices Guidelines… FYI to Check

Basic Overview : IT related key points from an AAR point of view to be check & asked about:

- **Their elements of data integrity: Are they at 100%? …. Ask:**

  Do their data characteristics = attributable, legible, contemporaneous, original and accurate (ALCOA+) at 100%?

  (For an AAR review -2 key points: What are their data's adherence to: Attributable & Accurate)

- **An exploration of overlooked/unaddressed guidance/procedure/instructional documents that define IT's practices, performance & control expectations**

  (including what we would ask for inspect for and why)

- **Confirm existence of documentation for: How IT and their software addresses recall handling and recall reporting and product complaint trending statistical reports**

- **How does IT support dealing with supplier performance measures, including the typical supply chain red flags and unfavorable performance trends reporting**

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Record Keeping – Sec 2.17

- The IT team should know and use the following methods for managing the company software in business systems and operating equipment
  - Risk-based Validation Techniques & SOPs for handling new software, brand updates AND especially “changes”

And this applies to any business system, technical software or equipment software , with methods of

- Input trial data or variations of settings (Minimum to maximum trials)
- Results review sampling, (trials with varying levels of input data and varying “users”)
- Test cases (varying experience level end users, applications variations max/min tests)

And verify equipment supplier-provided software validations on “servers” or “The Cloud” sector/address

- For record-keeping “musts” to consider and a part of a SOP:
- which records to retain to prove good data integrity controls,
- Which business systems are incorporating quality audits information
- and what are sampling techniques and developing a media migration strategy

Record Keeping – Sec 2.17

And verify equipment supplier-provided software validations on "servers" or "The Cloud" sector/address …..

- **For record-keeping "musts" to consider and a part of a SOP:**
- **which records to retain to prove good data integrity controls,**
- **Which business systems are incorporating quality audits information**
- **and what are sampling techniques and developing a media migration strategy**

- **The risks and realities of saving the company's true and certified document copies that are scanned and mixed with digital records:**

  - from the basics of true/certified copy and those with legal admissibility

  - to putting together a scanning process for manufacturing records and the true copy requirements from submission guidance

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Chapter 7 Support

Does IT “right now” have a procedure that covers their IT team and cross-functional departmental assignments and skills to “quickly” investigate “system” records for structured template Reports for:

- on-hand inventory - Work-in-process
- their own outbound shipments
- Supplier records for incoming materials and parts
- Returns
- Production Rework
- In-transit shipments

Is the reporting in defined formats OR does the data get printed on large sheets of paper at random…. With no headers, date/time stamp, calculated totals, etc.

- Can they support searching for shipped products as of “today” to address recall handling and reporting and product complaint trending

and Does IT perform any “mock recall reporting” exercises?

Thank you!

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AAR Quality Assurance Auditor and Industry Conference

May 11-12, 2021 Webinar

Locomotive Committee Update

Michael Fore
Director-Technical Services/
Locomotive Committee Manager
Association of American Railroads

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The Locomotive Committee (LC) Mission

- The Locomotive Committee mission is to establish, improve, and maintain locomotive interchange standards and rules. This committee develops and maintains the standards, specifications, and recommended practices in **Section M, *Locomotives and Locomotive Equipment***, of the AAR **Manual of Standards and Recommended Practices (MSRP).** These standards, specifications, and recommended practices are developed to ensure network interoperability and safe, reliable performance.

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The Locomotive Committee - Additional Responsibilities

- The Locomotive Committee provides input to and oversight of the AAR Manual of Standards and Recommended Practices (MSRP) *Section T-Interoperable Fuel Tenders for Locomotives.*

- The Locomotive Committee also provides input to and oversight of the Locomotive Repair Billing and Interchange Rules TAG

  (formerly an AAR committee, now a Locomotive Committee TAG as of 1/1/2021).

The Locomotive Committee's 2021 Membership

• Matthew Findlay (Chair)	CP
• Russell J Kubycheck (Vice Chair) (Associate)	Progress Rail
• Jonathan Fedora	Amtrak
• Michael Iden	ARH
• Beau Price	BNSF
• Robert R Emond	CN
• Timothy Healey	CSX
• Todd Cleve	FEC
• Tammy McKay	G&W
• Greg Avey	KCS
• Ryan F Stege	NS
• Don Silk	PAR
• Grace Butts	UP
• David Kubicek (RR Affiliate)	MNR
• John LaDuc (Associate)	NYAB
• Robbie Quanstrom (Associate)	Wells Fargo
• Lisa Matta (Associate)	Wi-Tronix

Locomotive Committee Activities
Part I

The Locomotive Repair Billing
& Interchange Rules TAG
(1/1/2021)

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Locomotive Repair Billing & Interchange Rules TAG

Mission & Accomplishments –

- Participation in the quarterly locomotive component survey.
- Review and approve the survey results, as need per the LRB & I rules, and publish each quarter the Locomotive Price Master for the repair of locomotive equipment performed by handling carriers.
- Since their December 2017 meeting, the LRB TAG (then a committee) with the assistance of Railinc, has identified and implemented numerous improvements in system functionality while developing and maintaining the business and interchange rules for accurate billing & reimbursement to the Class I carriers utilizing the Locomotive Repair Billing System.
- Additional LRB TAG accomplishments are as follows;
  - Developed and implemented the ability to report and process fragmented air brake inspections as defined by FRA – 2005-21613 waiver to 49 CFR 229.27 & 229.29
  - Assisted the Asset Health Strategy Committee (AHSC) in the implementation of the electronic locomotive daily inspection report AKA the “Blue Card”.
  - Defined the common tasks and implemented the ability to perform and report FRA required Federal Inspection Only (FIO) tasks & activities on the equipment of foreign roads.

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Locomotive Repair Billing & Interchange Rules TAG

Next Steps & Future States

- In addition to a complete LRB system review (scheduled for 3rd Qtr. 2021) with linkages to the Locomotive Management Information System (LMIS) currently being developed by the Asset Health Strategy Committee (AHSC) & Railinc, the LRB TAG has proposed a Railinc hosted, web-based, application portal to expedite the FRA One-Time Movement Authority (OTMA) process for reporting and processing wreck information.

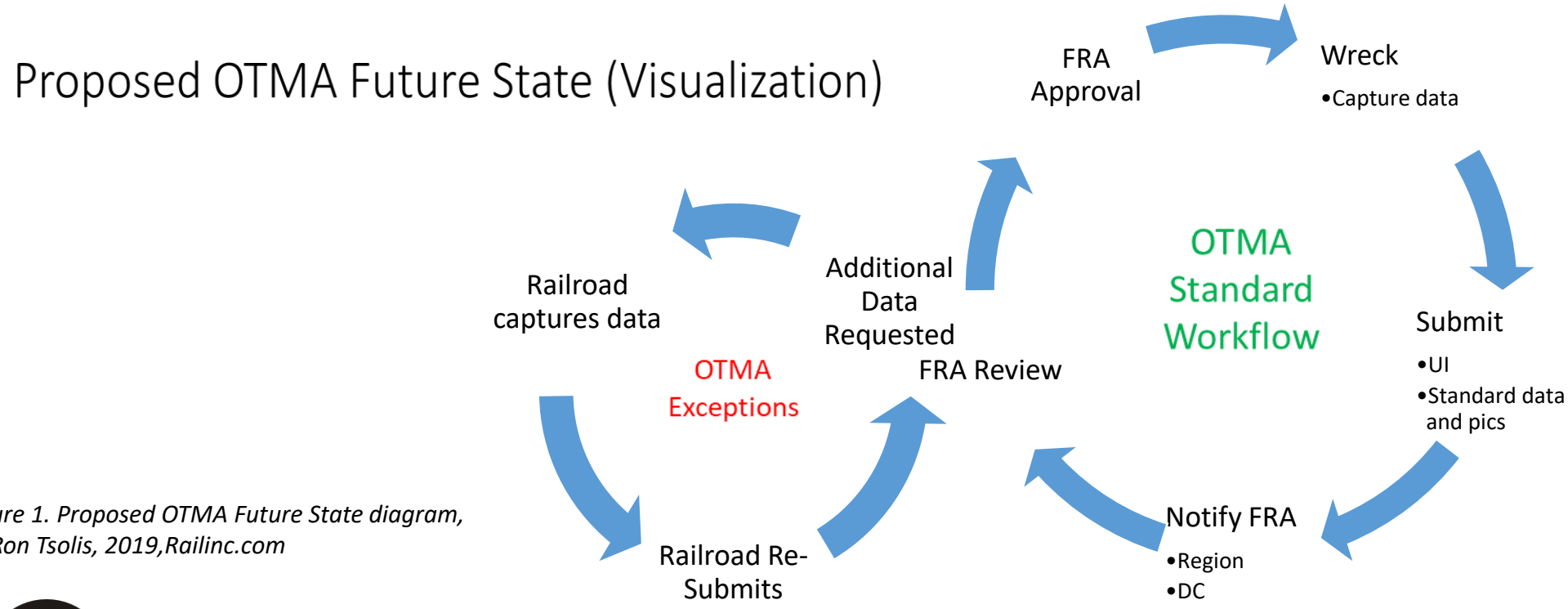

Figure 1. Proposed OTMA Future State diagram, by Ron Tsolis, 2019,Railinc.com

Locomotive Committee Activities
Part II

Section T-Interoperable Fuel Tenders for Locomotives

& the Natural Gas Fuel Tender (NGFT) TAG

Section T-Interoperable Fuel Tenders for Locomotives & the NGFT TAG

- Under Locomotive Committee docket LM-121 – Natural Gas Fuel Tenders, Specification, **M-1004-Specifications for Fuel Tenders** was developed and implemented August 2017 based on the multi-year efforts of the LC Natural Gas Fuel Tender (NGFT) TAG.
- M-1004 currently has specific sections for Liquefied Natural Gas (LNG) and Compressed Natural Gas (CNG) but has sections reserved for other alternative fuels.
- The NGFT TAG has been dormant of late but M-1004, ***Appendix M - Tender Health and Status Protocol*** is being developed under AAR consultant and SME Patrick Student/Gunnison LLC with guidance from the Locomotive (LC) and Railway Electronics Standards Committees (RESC).
- Also, the LC has requested that the Tank Car Committee author the requirements, with LC oversite, for the new Natural Gas Fuel Tender activity code requirements for Appendix B of M-1002. The activity codes are:
  - *B87-Maintenance and Qualification of Fuel Tanks for Locomotive Fuel Tenders*
  - *C12-Maintenance and Qualification of Locomotive Fuel Tender Service Equipment*

Section T-Interoperable Fuel Tenders for Locomotives & the NGFT TAG - Continued

Currently M-1004 and the six (6) supporting standards are only available via AAR implementation Circular Letters.

The first full edition of Section T is expected to be published 3rd Quarter 2021 and will include the following Specification and Standards:

- M-1004 Specification for Fuel Tenders
- S-5025 Gaseous Natural Gas Supply Hose Unit for Natural Gas Fuel Tenders
- S-5026 Heat Exchange Fluid Hose Unit for Natural Gas Fuel Tenders
- S-5027 21-Point Control Plug, Cable Assembly and Receptacle (TC-21 Tender Control Cable)
- S-5028 Safety Appliances for Tank Car-Style Natural Gas Fuel Tenders
- S-5029 Safety Appliances on Fuel Tenders Other Than Tank Car-Style
- S-5030 Natural Gas Fuel Tender Fueling Control Cable (FC-20)

Locomotive Committee Activities
Part III

LC Hot Topics, Docket Items and
Joint Efforts

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Locomotive Committee – Hot Topics, Docket Items and Joint Efforts

- **LM-128 AESS - S-5502 Compliance***
- **LM-139 LC & LMOA Projects Coordination (TAG Liaison & Updates) ****
- **LM-053 Railway Electronics*++**
- What Do the above Locomotive Committee dockets have in common?
  - Battery Health!!!

  The topic also involves the following groups;
  - AAR Locomotive Committee (LC)
  - Locomotive Maintenance Officers Association (LMOA)
    - *An independent volunteer group of industry SMEs*
  - AAR Operating Practices Committee (OPC)
  - AAR Railway Electronics Standards Committee (RESC)

**(Locomotive (LC) & Railway Electronic Standards Committee (RESC) joint topics –*
***(LC & Locomotive Maintenance Officers' Association (LMOA) joint issue)*
++ (Mechanical Committee (MC) Reported topics)

Locomotive Committee – Hot Topics, Docket Items and Joint Efforts – Contd.

- The LC AESS-Battery Health Strategies Task Force worked with LC members and interested parties to include Battery OEMs and LMOA members that monitored Class I locomotive battery life for approximately one(1) year. The result was a presentation to both the LC and the LMOA with short- and long-term recommendations to improve and extend battery life shortened by AESS starts.
- The LC has presented the long-term recommendations to the RESC and will begin discussions on the next steps and timeline towards the development of a “smart” battery and the communications protocol for delivering battery health messages and start/stop instructions to the equipment operator. The OPC will be invited to participate with requests for input, as needed.

Locomotive Committee – Hot Topics, Docket Items and Joint Efforts – Contd.

The long-term recommendations from the AESS-Battery Health Strategies Task Force for a “smart” battery with monitoring and health reporting capabilities.

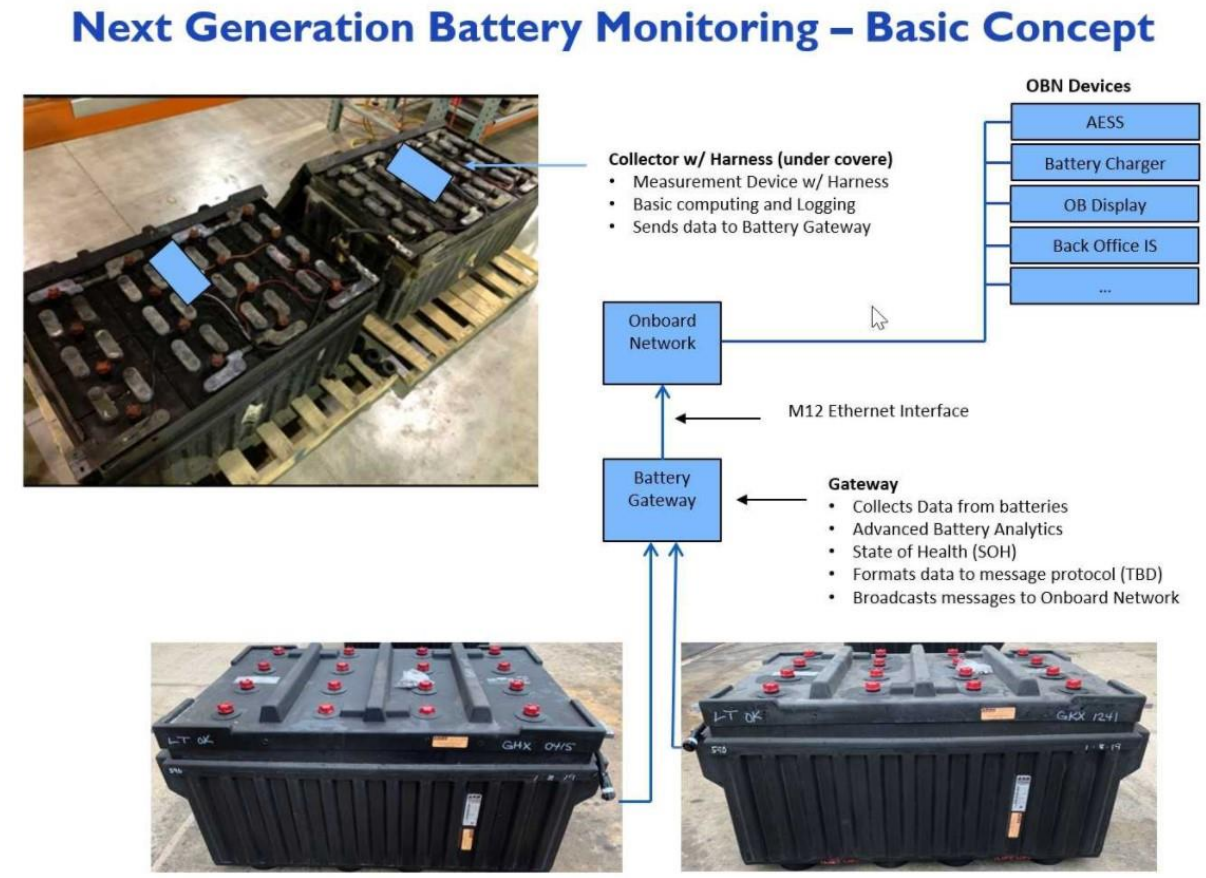

Figure 2. Next Generation Battery Monitoring Concept, by Sid Bakker, 2019, TPSCRail.com

Locomotive Committee –
Hot Topics, Docket Items and Joint Efforts – Contd.

Other Locomotive Committee activities include:

- The LC EPA Electronic Emissions Labels TAG
- Monitoring Canada's recent Locomotive Video & Voice Recorder (LVVR) regulations and the possible effects on interchange
- Alternative locomotive fuels studies, discussions, seminars and updates
  - Hydrogen, Battery & Hybrids
    (some joint FRA-DOE funding involved)

Thank you!

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AAR Quality Assurance

33rd Annual QA Auditor & Industry Conference

May 11-12

Virtual

AAR Equipment Engineering Committee (EEC) Update

Jon Hannafious

Senior Manager, AAR EEC

Equipment Engineering Committee Update

- Introduction to EEC
- Recently Implemented Specification
  - M-976 – Truck Performance for Rail Cars
- Recently Implemented Rule Changes
  - Field Manual Rule 81 - Tank Cars - Correct Repair
- Work in Progress
  - Standards - End of Car (EOC) Energy Management

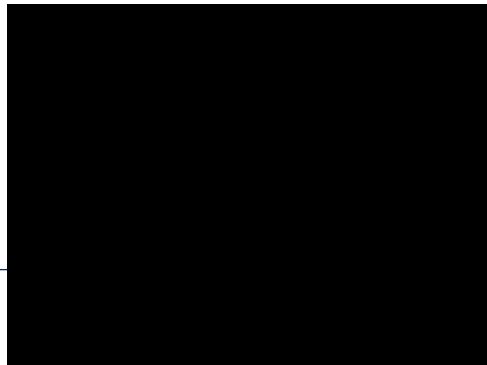
[redacted]

Equipment Engineering Committee

- This committee develops and maintains design and operation standards for freight cars and their components.
- Certify new car manufacturing facilities
- Approves Rule 88 projects (new cars, rebuilds, modifications, increased life)
- Approves component designs including: draft gears; cushion units, truck systems (side bearings, friction wedges)
- Oversight Committee for BSC, WABL, CSTCC, & SEFCC

Members

TTX (Chair)
GATX (Vice Chair)
Amtrak
BNSF
CN
CP
CSX
Greenbrier
KCS
NS
Progress Rail
Trinity Rail
UP

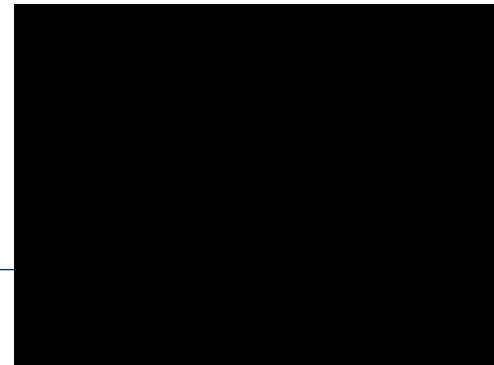


Recently Implemented Specification

M-976 – Truck Performance
for Rail Cars

Specification M-976 - History

- M-976 – Truck Performance for Rail Cars
  - **Adopted 2002, Effective January 1, 2003**
  - Effective at the same time as S-286 – Free/Unrestricted Interchange for 286,000 Lb. Gross Rail Load Cars
    - S-286 requires K Bearings (or G or M)
    - S-286 requires M-976 testing approval
  - Tests must be successfully completed under “challenging circumstances” and are thus approved for any application
    - E.g. Twist and Roll under high center of gravity hopper car
  - Mandatory



Specification M-976 - History

- M-976 – Truck Performance for Rail Cars
  - Included rolling resistance test for economic reasons
    - Huge benefit in wheel/rail life, energy savings
    - Performance improvements came from
      - Truck warp resistance (truck remains square)
      - Ability to steer (from bearing adapters with steering pads)
  - Rolling resistance tests have been a challenge to conduct
    - Rail friction difficult to control, and wind is a factor
  - Added loaded hunting in 2017 and a new worst-case car (286k intermediate length covered hopper – grain

Specification M-976 - History

- M-976 – Truck Performance for Rail Cars
  - Approved Trucks are listed in Rule 46

RULE 46

Table 2

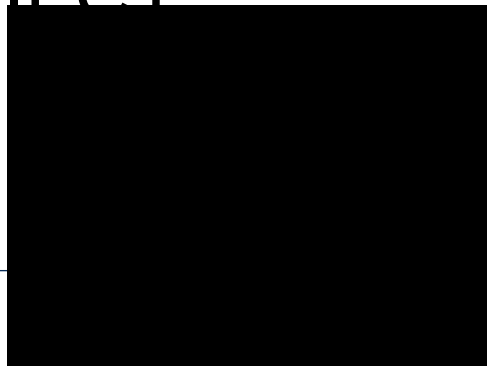
Approved M-976 Truck Systems

Truck Design	Motion Control	Ridemaster	Barber S-2-E
Outer Load Springs	(7) D5	(7) D5	(7) D-5
Inner Load Springs	(5) D5	(5) D5	(5) D-5
Inner Inner Load Springs	—	—	—
Outer Stabilizing Spring	(2) 5062	(2) 5062	(2) B-360
Inner Stabilizing Spring	(2) 5063	(2) 5063	(2) B-361
Inner Inner Stabilizing Spring	—	—	(2) D-6-A
Friction Wedge	ASF PN 17882 SCT 17882	ASF PN 17823 ASC 17823	SCT PN 917or SCT PN 917-C
Adapter Pads	ASF 1771 Adapter with 10601 Pad*	ASF 1771 Adapter with 10454 Pad	AAR Standard with SCT 5578 Pad
	SCT S2-86 6366 Adapter with S2-86 6367 Pad	—	SCT S2-86 6366 Adapter with S2-86 6367 Pad
	—	—	NSC Steel RB Adapter with respective pad

*Cars built with Motion Control trucks prior to January 1, 2009, had ASF 10454 adapter pads applied when built new. These trucks may continue in service with the ASF 10454 pads or may be converted by car owner authority to the ASF 10601 pads.

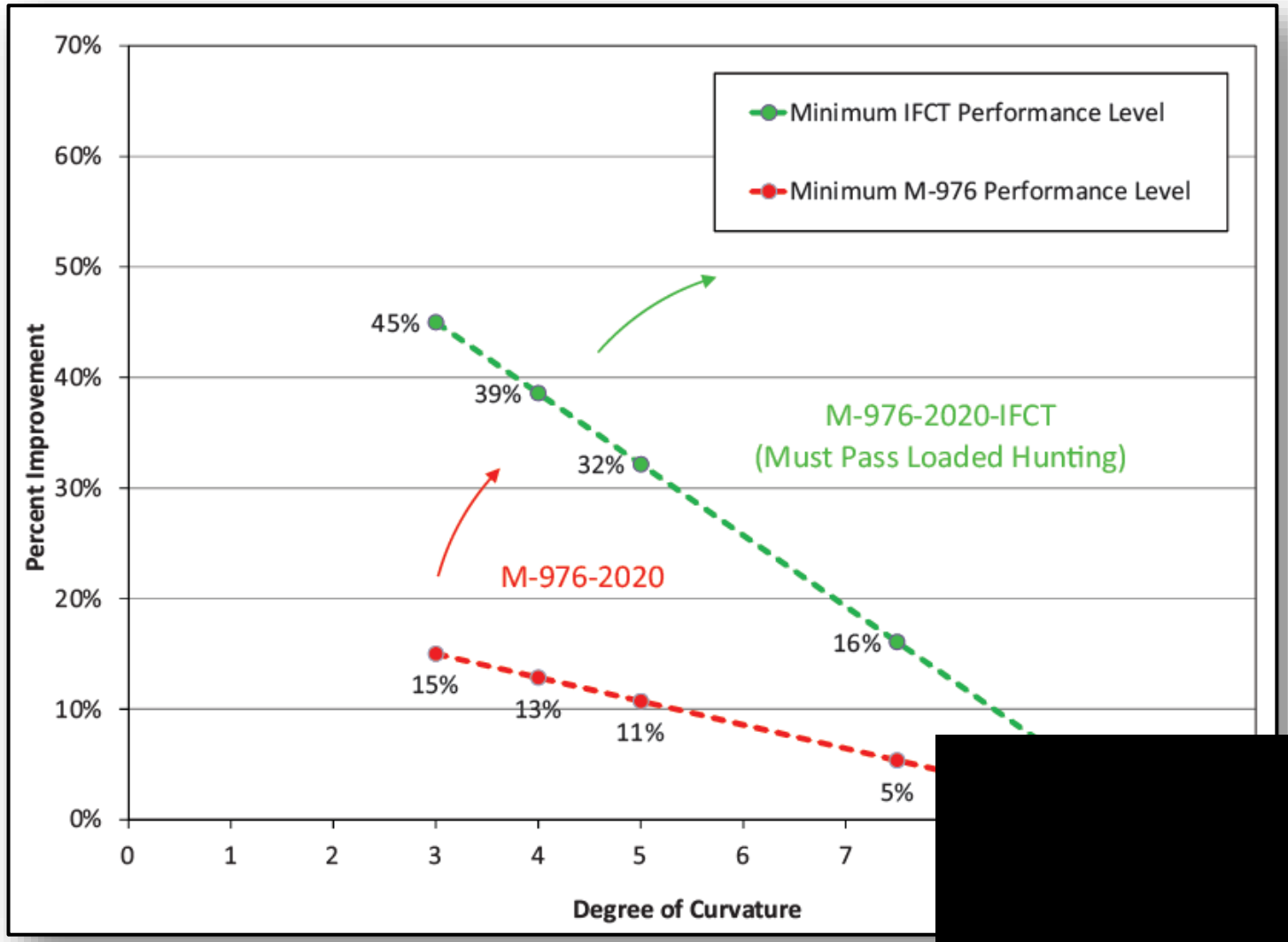
Specification M-976 - Update

- M-976 – Latest update in April 2020
  - Replaces the rolling resistance test with a more repeatable method termed the Traction Ratio from instrumented wheelsets
  - The Traction Ratio is compared to the traction ratio of a standard three-piece truck, and the percent improvement is noted.
  - New level of performance from the AAR Strategic Research Program – termed Integrated Freight Car Truck – IFCT



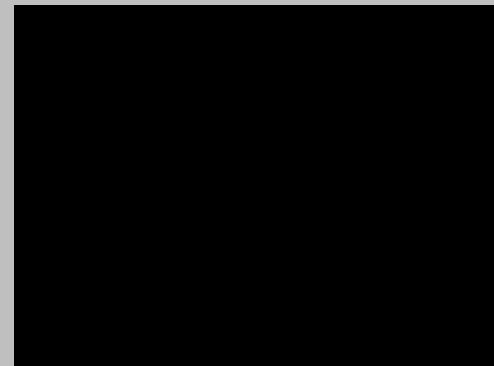
Specification M-976 - Update

- M-976 – Levels of Performance
  - M-976-2020 Same as before, but now approved by Traction Ratio Test
  - M-976-2020-IFCT is not mandatory, is not economically justified in all cases



Recently Implemented Rule

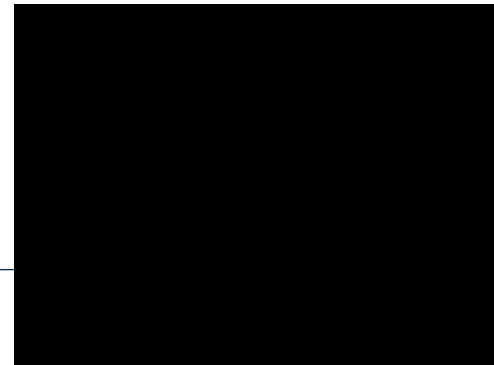
Field Manual Rule 81 - Tank Cars - Correct Repair



Rule 81 - Tank Cars – 2020 Version Correct Repair

- Correct Repairs were limited to:
  - End Platform Safety Railing
  - Facility performing welding on the tank itself must be performed by shops approved per AAR M-1003 (Specification for Quality Assurance) and M-1002 (Specification for Tank Cars)

- No other guidance was offered for Non-M-1002 facilities working on tank cars



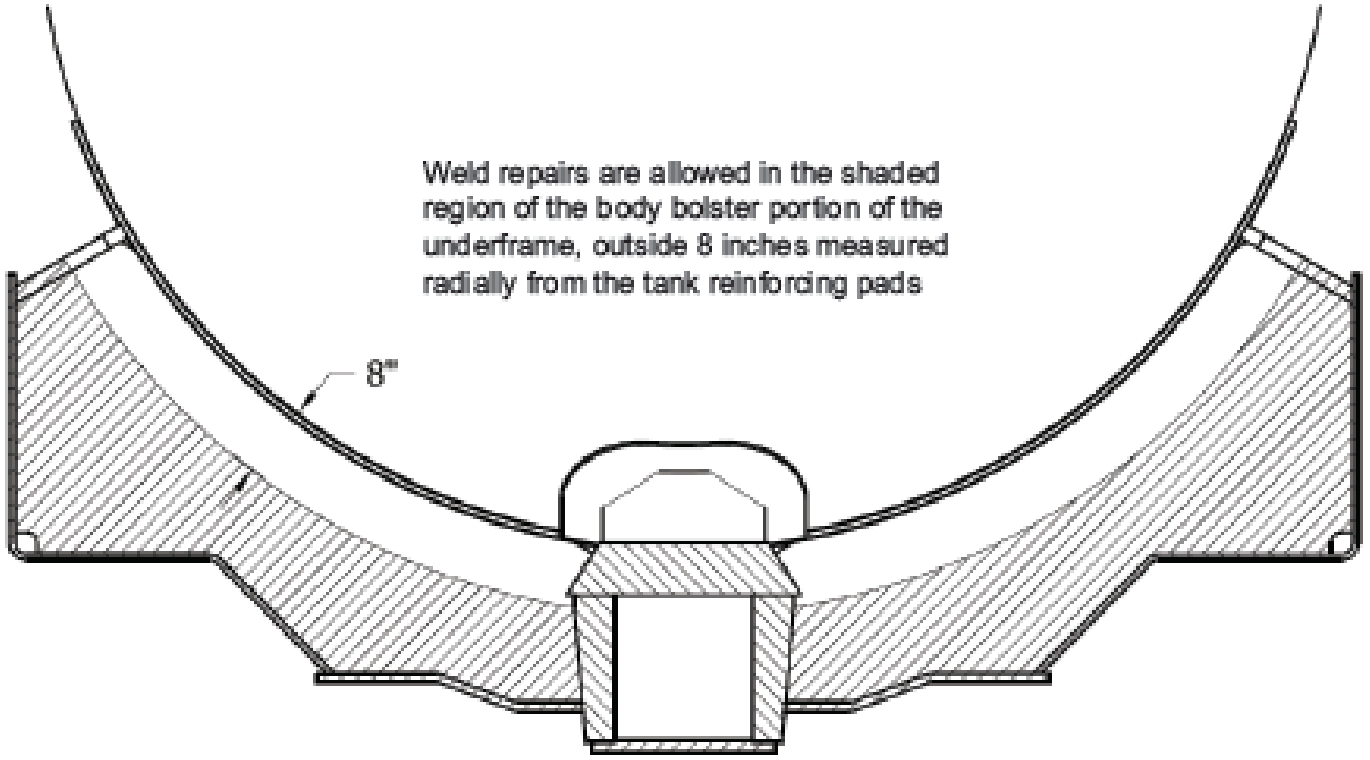
Rule 81 - Tank Cars – 2021 Correct Repair Updates

- Provides guidance for welding repairs on Tank Cars by non-M-1002 Approved Facilities.

- Welding by M-1002 Approved Facilities is not limited by the Field Manual.

Rule 81 - Tank Cars – 2021 Correct Repair Updates

- Welding of body bolster portion of underframe

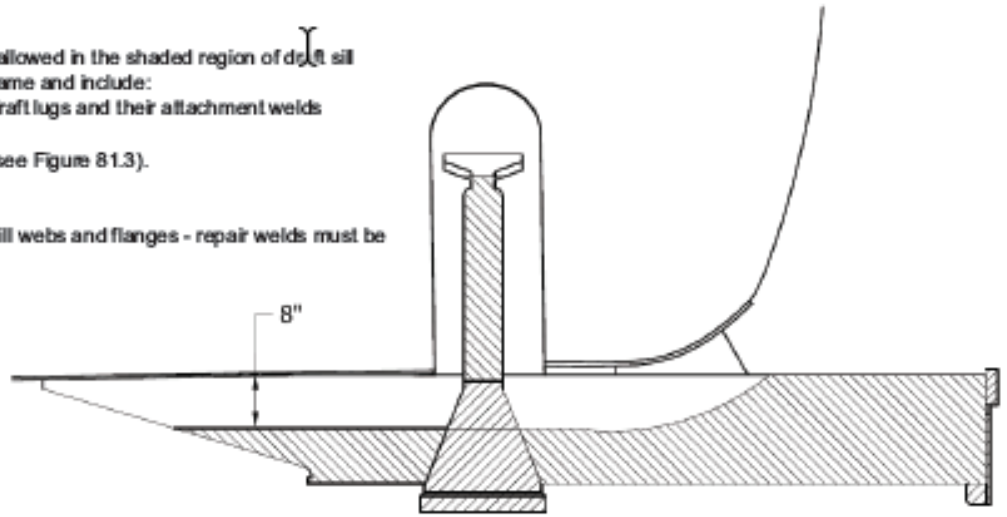


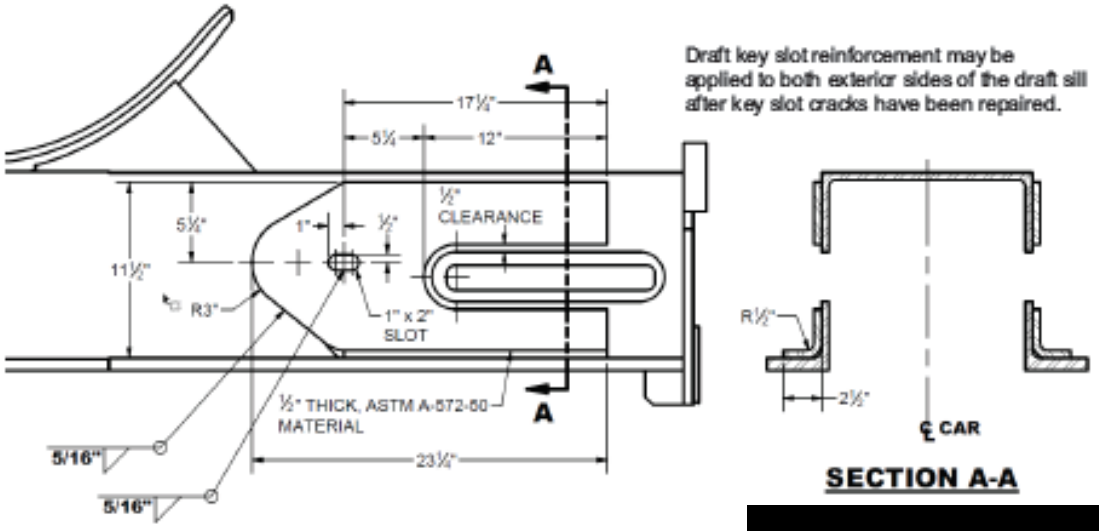
Rule 81 - Tank Cars – 2021 Correct Repair Updates

- Welding of draft sill portion of underframe

FIGURE 81.2

Weld repairs are allowed in the shaded region of draft sill portion of underframe and include:
- Front and rear draft lugs and their attachment welds
- Strikers
- Draft key slots (see Figure 81.3).
- Coupler carriers
- Center plates
- Cracks in draft sill webs and flanges - repair welds must be full penetration.





Rule 81 - Tank Cars – 2021 Correct Repair Updates

- Improved guidance on repair of safety railing

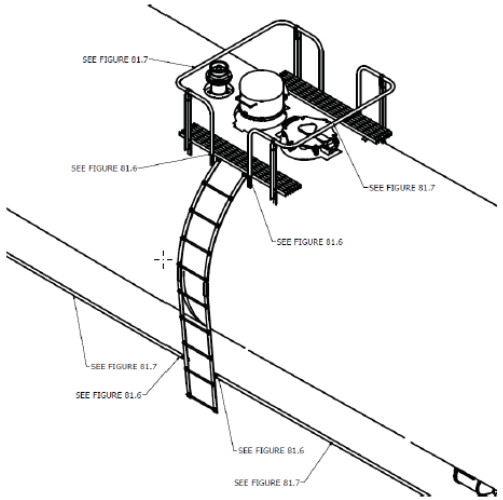


FIGURE 81.5

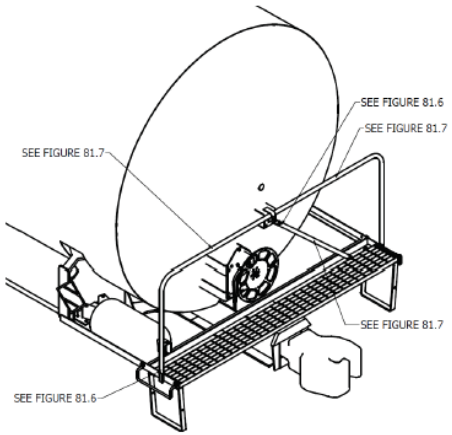


FIGURE 81.6

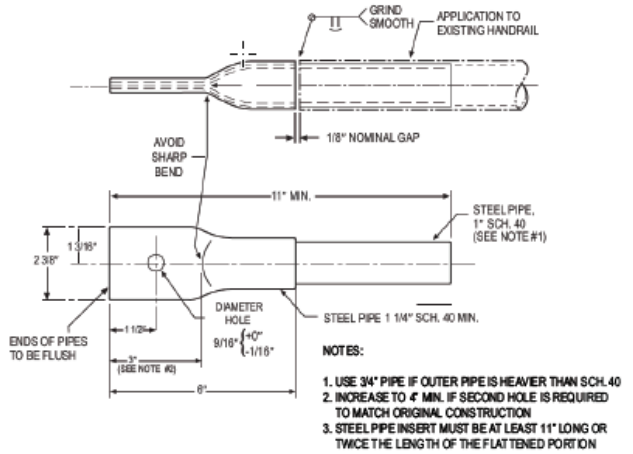
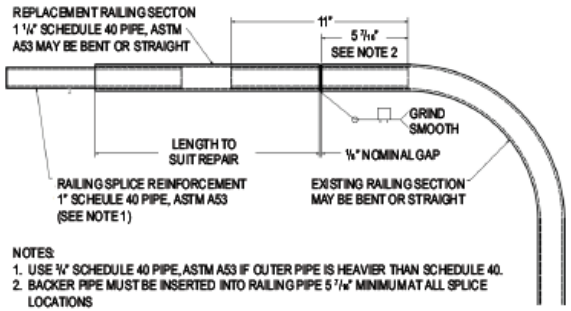
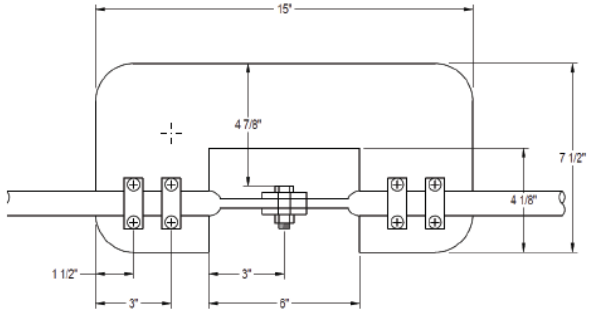


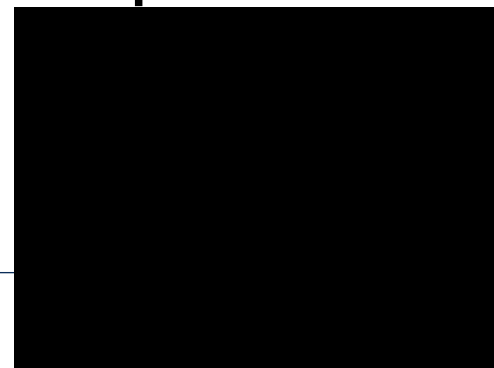
FIGURE 81.7





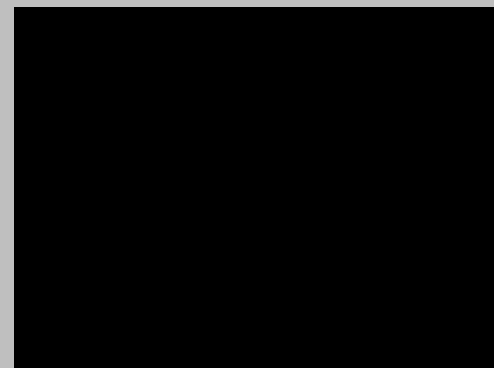
Rule 81 - Tank Cars – 2022 Planned Updates

- Cause For Attention section will be added, though much of it is scattered throughout existing rules. Examples at Any Time:
  - Leaking (Rule 88)
  - Not equipped with long travel CCSBs (Rule 90)
  - Shell or head having cuts or burns caused by contact with the wheels (Rule 1)
  - Jacket, shell, or head bent, cut, or gouged (Rule 95)
- Also will add Cause for Attention when car is on Shop or Repair Track for Any Reason.



Work in Progress

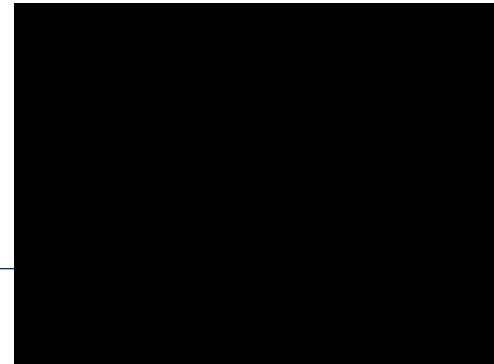
End of Car Energy Management



End of Car Energy Management Systems Update

- Existing Specifications for Draft Gears (Year Adopted)
  - M-901E (1959), M-901G (1964), M-901K (1988)
  - AAR Approved Draft Gears are listed in Rule 21

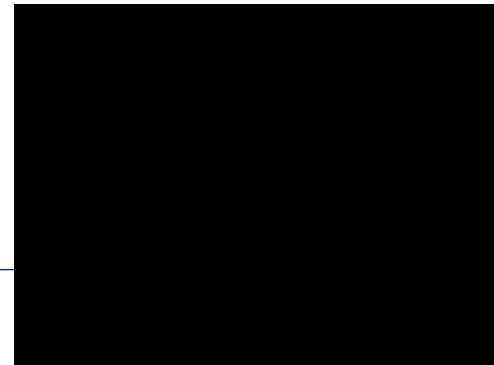
- Existing Specifications for Cushioning Devices (Year Adopted)
  - M-921B Cushioning Devices, End-of-Car (1989)
  - M-921D Cushioning Devices, End-of-Car - Motor Vehicle (1993)
  - M-921E Cushioning Devices, Active Draft End - Motor Vehicle (2000)
  - M-921F Cushioning Devices, Active Draft End of Car (2004)
  - AAR Approved Cushion Units are listed in Rule 59



End of Car Energy Management Systems Update

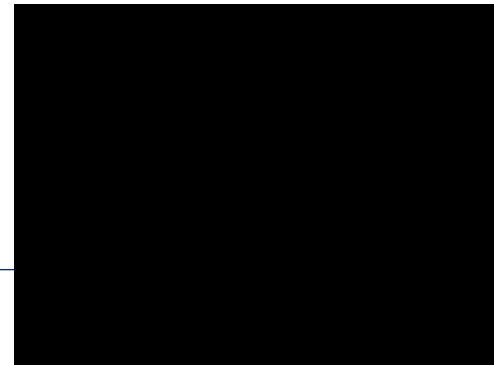
- Industry has decades of experience with current systems, however:
  - Cars have gone from 177,000 GRL to 286,000 GRL
  - Train length has gone from perhaps 60 car trains to 200 car
  - Railroads have proprietary train make up and handling rules for cushioned cars
  - Damaged goods continues to need attention

- Last few years, EEC has had requests for approval of end-of-car systems that offer different performance – Characteristics are not described by current specifications



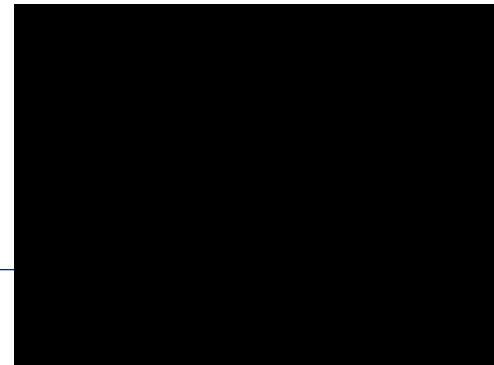
End of Car Energy Management Systems Update

- Friction Cushioning System
  - Makes use of existing CN patent (open)
  - Several different configurations with some common features
    - Two draft gears in each end of car's draft pocket (4 gears per car)
    - Both gears are engaged in buff (e.g. 3.25" of travel times 2 = 6.5")
    - End gear only is engaged in draft (3.25")
    - 2,000+ car sets in service – Railroad selected service
      - Initial cars have over 300,000 miles



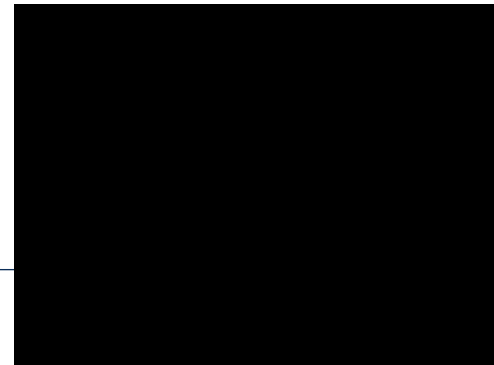
End of Car Energy Management Systems Update

- Service challenge for any new device – Where can they be installed?
  - Damage prevention committees are seeking guidance – as their rules often reference cushioned cars
- Industry guidance is needed for repairs (Field Manual)
- Eventual industry guidance is needed for approval (Specifications)
- Guidance is needed for Umler registrations (Temporary fix in place)



End of Car Energy Management Systems Update

- EEC Task Force Created - End of Car Energy Management Task Force
  - Current members are only Railroads and Car owners due to proprietary nature of new systems
  - Started meeting late 2020 – currently focused on reviewing specifications and directing AAR funded testing
  - Will work to involve suppliers as soon as possible

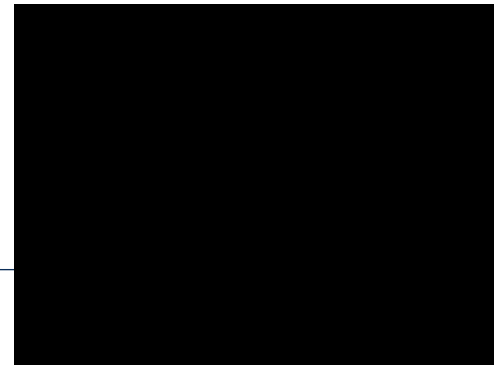


End of Car Energy Management Task Force

- How can we evaluate systems for the two main scenarios discussed
  - Yard impact
  - Over-the-road
- Testing for Yard impacts is currently done by AAR Damage Prevention Group
- Testing for over the road performance is cost prohibitive
  - Entire train of cars must be equipped with same draft system.
  - Train must be instrumented, operated in different scenarios, tested, and results analyzed
- Answer may be in modeling using AAR Train Operations and Energy Simulator (TOES)
  - Predicts forces, speed, acceleration, etc. for each car/draft system i

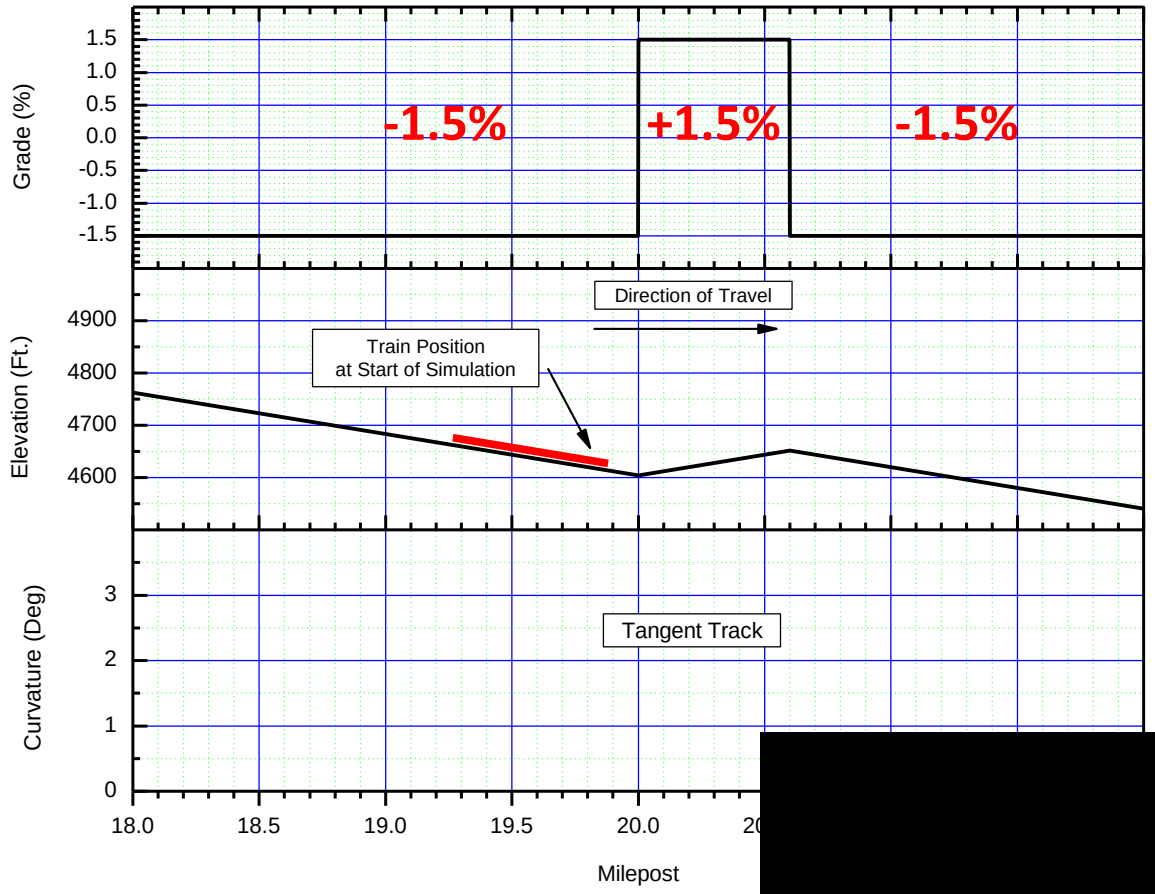
End of Car Energy Management Task Force

- Issues with modeling when comparing draft systems
  - Train handling is influenced by the draft systems in the train.
    - A train equipped with all cushion unit cars would be handled different than one equipped with all draft gears
    - Optimizing train handling for each system makes comparison of the model output difficult because the inputs are different
  - The Task Force looked for a way to eliminate variables
  - Settled on a simulation which has no handling (no locomotives, no braking)

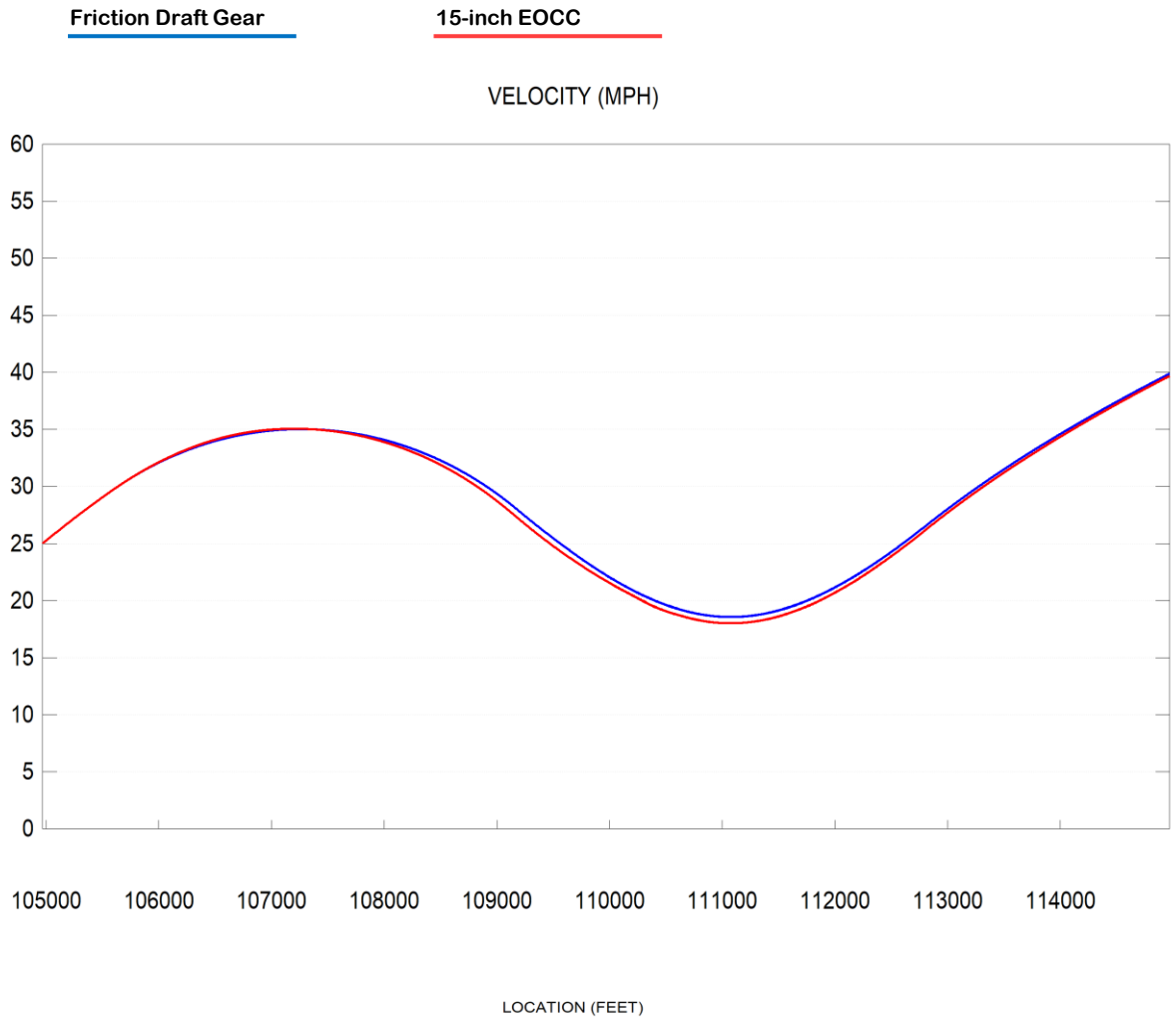


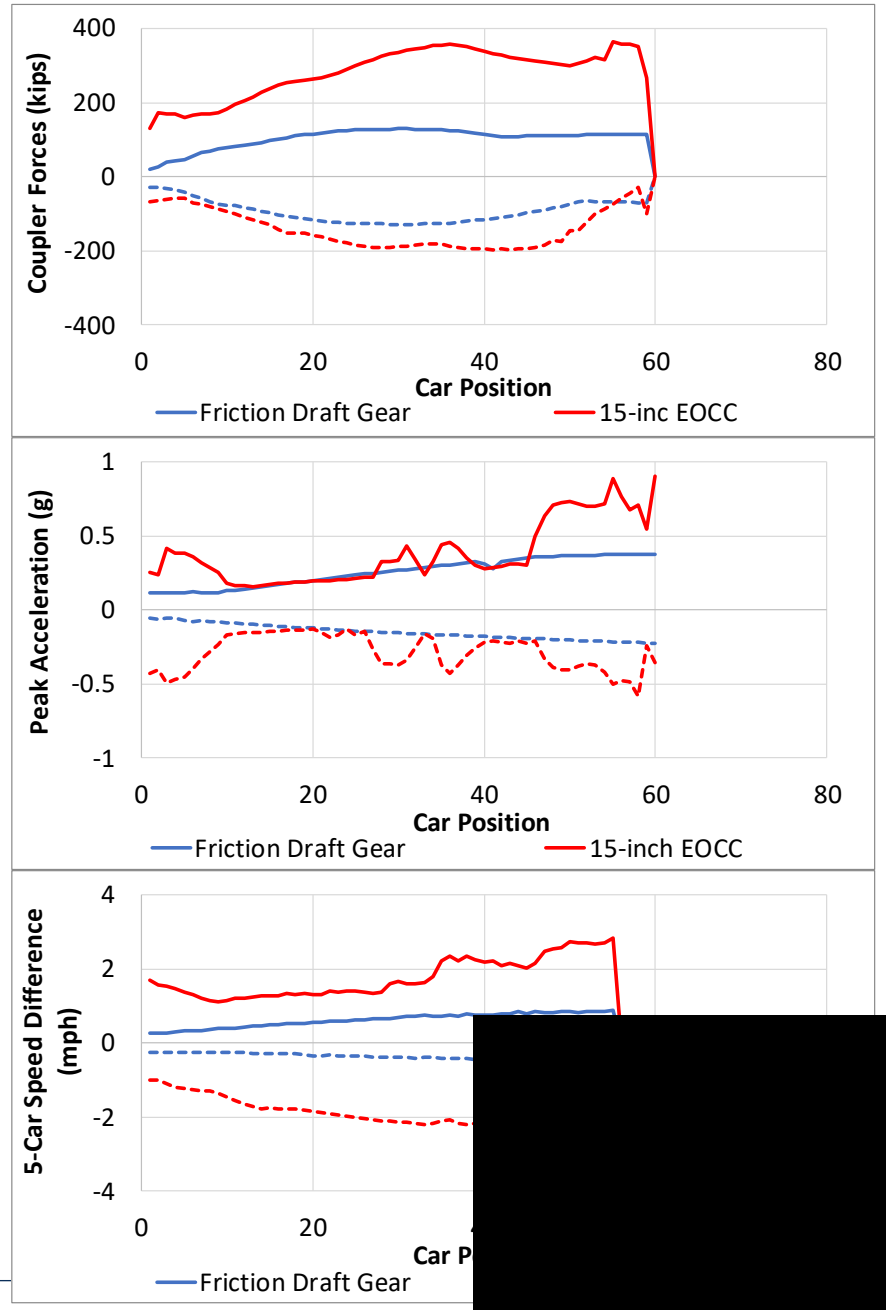
Drifting Simulations to Evaluate Draft Systems

- Block of 286,000-pound cars equipped with a single draft system type
  - No locomotives, No brakes
- Block of 60 cars allowed to “drift” through grades
  - Block starts on -1.5% descending grade
  - Track changes to +1.5% ascending grade
  - Track changes back to -1.5% descending grade
- Intended to create train slack action



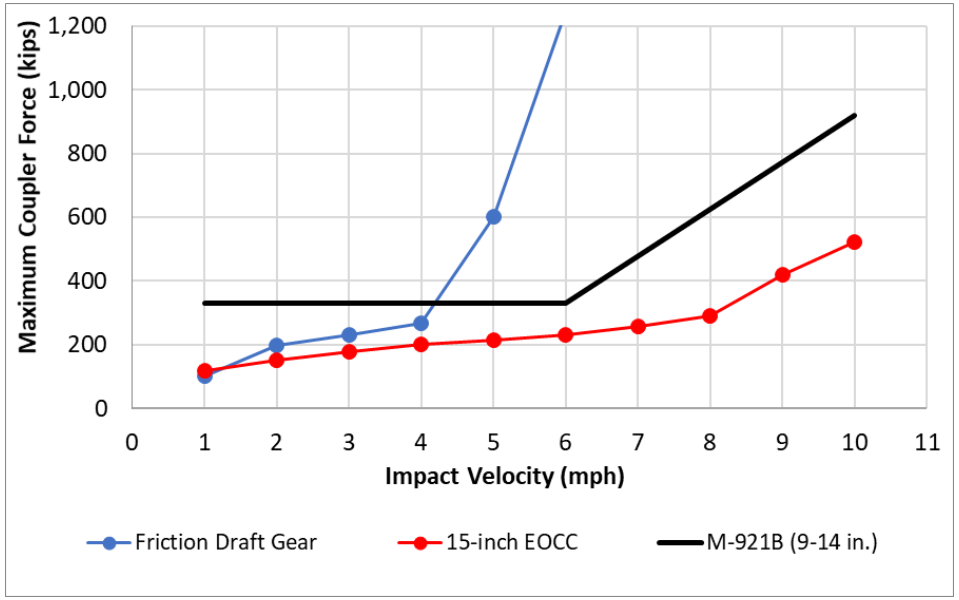
Example Drift Simulation Results

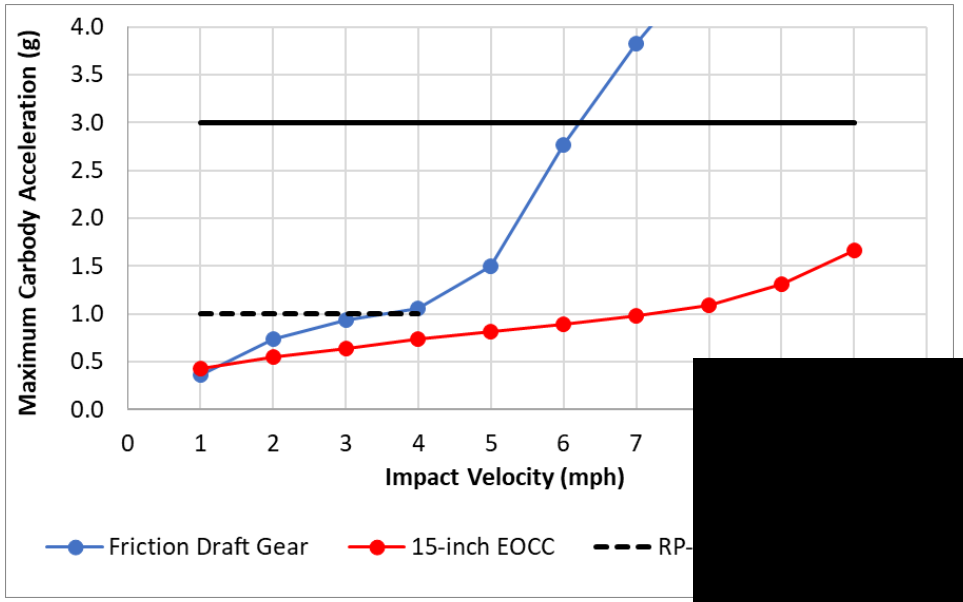




Example Yard Impact Results

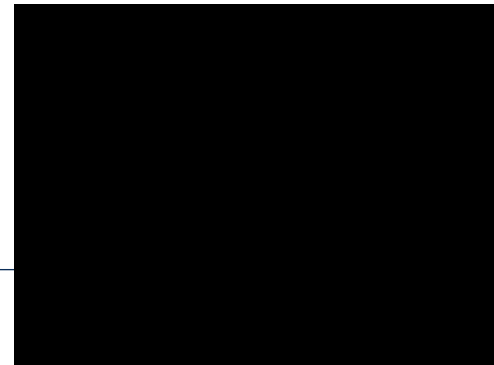
- Yard Impact simulations shown at right for 15-inch EOCC and Standard Draft Gear
  - Maximum Coupler forces
  - Maximum Car body Acceleration





End of Car Energy Management Task Force

- Task Force is planning to make a new standard that might include the following approaches:
  - Lab testing of the End-of-Car device to characterize its performance
  - Testing of Yard Impact Performance
  - Modeling of over-the-road Performance
  - Perhaps from the above testing and modeling, provide a rating for use by railroads
    - Yard Impact Performance
    - Over-the-road Performance



Thank you!

AAR Quality Assurance
55500 DOT Road
Pueblo, Colorado 81001
www.aar.com

AAR Quality Auditors and Industry Conference

May 11-12, 2021

Webinar

AAR Tank Car Committee

Kenneth Dorsey

Executive Director of Tank Car Safety

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Agenda

- Tank Car Committee
  - Mission Statement
  - Delegation of Authority
  - Expertise and Resources
  - Tank Car Facility
  - Activity Demonstration
  - Useful Links

TCC Mission Statement

- The Committee is responsible for development and publication of mandatory specifications for the design, construction, maintenance and safe operation of all tank cars used for rail transport of commodities in North America. Under formal delegations of authority from the U. S. Department of Transportation (DOT) and Transport Canada (TC), the Committee is also responsible for reviewing applications for construction, conversion or alteration of tank cars for compliance with federal regulations, for reviewing proposed changes in those regulations, and for approving the use of tank cars for a commodity service other than that specifically authorized.

Delegations of Authority

- Under formal delegations of authority from the U. S. Department of Transportation and Transport Canada, the Committee is also responsible for reviewing applications for construction, conversion or alteration of tank cars for compliance with federal regulations, for reviewing proposed changes in those regulations, and for approving the use of tank cars for a commodity service other than that specifically authorized

Expertise and Resources

- Participants in the Tank Car Committee discussions include representatives of the railroads, all the tank car builders, interested shipper organizations, valve manufacturers, material suppliers and government observers
- Technical expertise in tank car matters that is unmatched anywhere
- Over 140 years of study, experience, research and testing
- Application of best practices to produce tank cars that perform well in service with maximum safety and efficiency with reasonable costs

Tank Car Facility

49 CFR 179.2 Tank car facility means an entity that manufactures, repairs, inspects, tests, qualifies, or maintains a tank car to ensure that the tank car conforms to this part and subpart F of part 180 of this subchapter, that alters the certificate of construction of the tank car, that ensures the continuing qualification of a tank car by performing a function prescribed in parts 179 or 180 of this subchapter, or that makes any representation indicating compliance with one or more of the requirements of parts 179 or 180 of this subchapter.

TP14877-3 Tank Car Facility (Installation pour wagons-citernes)

a. An entity that manufactures, repairs, inspects, tests, qualifies, maintains, or modifies a tank car or service equipment including entities that

i. install, qualify, or repair interior linings and coatings in tank cars when such linings and coatings are intended to protect the tank car tank against the corrosive action of the dangerous goods; or

ii. remove and replace tank car service equipment or change gaskets, including replacing pressure seals/O-rings on vacuum or pressure-relief devices, eduction pipe removal and replacement or eduction pipe gasket removal and replacement;

Field Manual Rule 81

Activity Demonstration

- Preferred- Actual demonstration on a tank
  - Must included the entire activity
  - Must demonstrate the incorporation of the QA program
  - Must included any required approvals

- Accepted (in Most Cases) - Demonstration on a fixture
  - Must included the entire activity
  - Must demonstrate the incorporation of the QA program
  - Must included any required approvals

Useful Links

- Free Helpful Links:
  PHMSA Interpretations:
  https://www.phmsa.dot.gov/regulations/title49/b/2/1

  AAR Standard Structure:
  http://www.aar.com/standards/MSRPs/MSRP-A1.pdf

  How to Use the Federal Regulations:
  https://hazmatonline.phmsa.dot.gov/services/publication_documents/howtouse0507.pdf

- AAR New and Events:
- https://www.aar.org/news/

Questions

Kenneth Dorsey
Executive Director of Tank Car Safety
kdorsey@aar.org

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Thank you!

AAR Quality Assurance
55500 DOT Road
Pueblo, Colorado 81001
www.aar.com

RSI-100 Voluntary Best Practice

Supplier Requirements

Date: May 12, 2021

Location: Webinar

Goals of this Module

- Why was it created;
- Who created it;
- When does it apply;
- Where can it be found;
- Define what tank car products consists of;
- Define the supplier requirements:
  - Review the 8-PCP plans;
  - Review Schedule A's CTC minimum requirements;
  - Explain supplier audit requirements;
  - Incorporation of this standards requirements into QMS's; and
  - Implement training to this standard.

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Federal Enforcement: 49 CFR 179.7(b) 4, 5 & (f) of AAR Certified Tank Car Facilities

- (4) Procedures to ensure that the fabrication and construction materials received are properly identified and documented. (**Note**: this applies to purchasing/subcontracting and incoming inspection. *If your procedures do not address your incoming inspection requirements, the FRA violation will reference this section*)
- (5) A description of the manufacturing, repair, inspection, testing, and qualification or maintenance program, including the acceptance criteria, so that an inspector can identify the characteristics of the tank car and the elements to inspect, examine, and test at each point. (**Note**: This applies to Production, Inspection, and Test Planning, *If your PITP doesn't identify how you meet this, the FRA violation will reference this section*)
- (f) No tank car facility may manufacture, repair, inspect, test, qualify or maintain tank cars subject to requirements of this subchapter, unless it is operating in conformance with a quality assurance program and written procedures required by paragraphs (a) and (b) of this section. (**Note**: *If a facility identifies their incoming inspection criteria and are not following them, the FRA violation will reference this section*)

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M-1003 Quality Requirements

- 2.9 Purchasing and Contracting
  - 2.9.2 *Purchasing documents shall contain* data clearly describing the items ordered, including the following, where applicable:
  - 2.9.2.1 *The type, class, grade, or other precise identification, including AAR specification, drawings, or other technical specifications*.
  - 2.9.2.2 *The title or other positive identification*—and applicable issues—of specifications, drawings, process requirements, inspection instructions, and other relevant technical data, including requirements for approval or qualification of items, procedures, process equipment, and personnel.
- 2.10 Incoming Inspection
  - 2.10.1 Inspect, test, and identify incoming items as required by the inspection and test plans.
  - 2.10.2 *Check the evidence provided by subcontractors and suppliers* as a means of verifying quality per the requirements of paragraph 2.10.1.

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Task Force Members and Contributors

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Jason Riggs - UTC
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Lee Verhey - RSI
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Other Contributors:

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Kaleb Hoyt - Midland
James Frew – VSP
Ken Campbell - UTC
Tim Schaffer - Akso Nobel

RSI Facilitator and TF Leader:

John Byrne

Applicability

01

3.1. This standard applies when referenced in a product specification, order, standard, or written contract.

02

Note: A facility has the option to implement this standard into their QAP or determine their own critical to quality (CTQ*) criteria for their parts and materials.

03

*Critical to Quality Characteristic is an attribute or variable of a product (part, assembly, sub-assembly), that has a direct and significant impact on conformance of the product.

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Key Definitions

- 4.5. *Product* means an item, or service purchased (machining, forming, burning, pressing) or otherwise provided to a certified facility.
- 4.7. *Purchaser* means a certified facility that acquires a product from a certified or non-certified facility.
- 4.11. *Supplier* means a person, company, or organization that provides products to a certified facility (purchaser), and includes an assembler, distributer, fabricator, or manufacturer of a product.

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Supplier Responsibilities

- Must maintain a QMS;
- Document the individual(s) responsible for compliance;
- Maintain the facility to prevent damage and deterioration;
- Must perform the determination and review activities required by the PCP's; and
- Must also ensure that their vendor supplied products conform to the quality requirements.

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It all Starts with the Purchase Order!

You don't end right if you don't start right!

- Many companies use corporate purchasing;
- Contract review must be a part of the purchase order acceptance;
- Develop a written procedure stating how the facility complies;
- Identify who is responsible for compliance be identified;
- Training to the standard;
- P.O. reference to the PCP(s) for conformance to the quality requirements;
- Establish a system of review to ensure that the P.O.'s meet the specified requirements; and
- RSI-100 Schedule B certificate of conformance requirements.

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Purchase Order Requirements

- Avoid general ambiguous statements on purchase orders such as: “*Acceptance and Rejection Criteria per FRA Requirements*”

- What do statements like those mean to your supplier?

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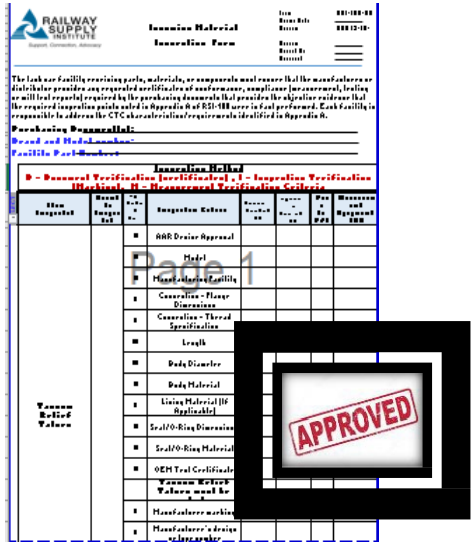
Purchasing Requirements:

- Purchaser's M-1003 QAP Must Detail:
- *How the facility complies with the RSI-100 standard;*
- *Who at their facility responsible*
- *Train* RSI Form 100-04 documentation
- *Approve PCP used by a supplier*
- Purchase Order documentation requirements



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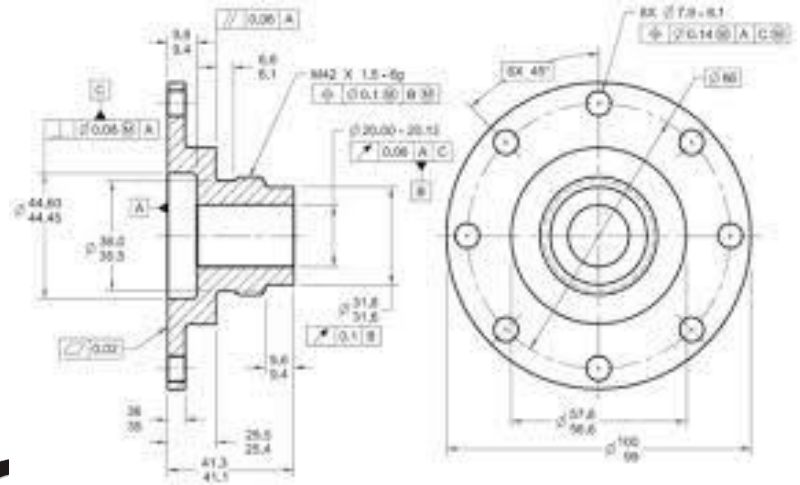
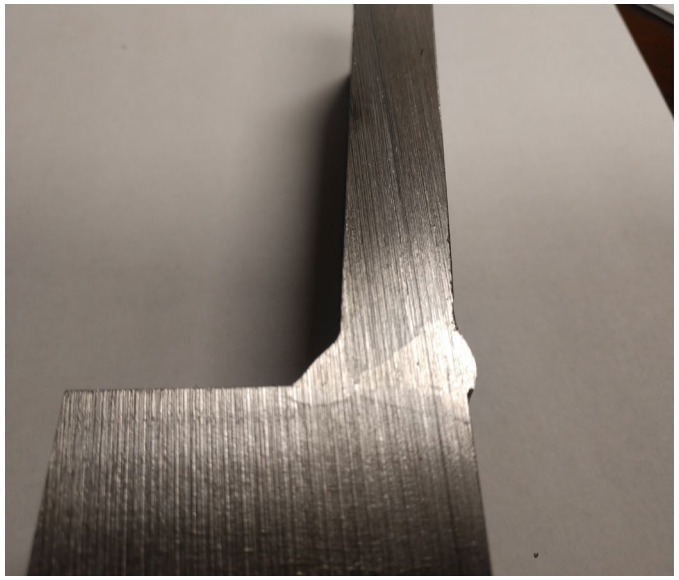
RSI-100 Responsibilities

- *Document* Who is responsible compliance with the RS1-100 standard, both purchaser and supplier;
- *Verification* per PCP, prevent damage and deterioration
- *Purchased products conform* to the specified requirement
- *Certificate of Conformance* to the PCP's

Purchasing Requirements:

- Purchase Order - drawing, instruction, and statement of work
- Specify material and grade requirement
- Identify any testing requirements
- Association of American Railroad's (AAR's) MSRP, Section C, Part III, M-1002
- Approved supplier list
- Serialize - Manway covers, Valves and fittings plates , record retention
- Inspection requirements, minimum, Schedule A





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Product Conformance Plans (PCP's) (* If Required)
Table 1

PCP *Product* Category	1	2	3	4	5	6	7	8
Products Manufactured by Machining or Cutting	X			*				
Products Manufactured by Welding	X	X		*				
Products Manufactured by Casting	X	X	X	*				
Products that Include Lining or Coating				X				
Gaskets and Sealing *Products*	X				X			
Valves and Instruments	X	*	X	*		X		*
Fasteners							X	
Pressure Retaining Tank Car Tank Components	X	X		*				X

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PCP 1 Requirements

- *Certification* provided with each shipment, *attesting that the product conforms to the specified quality requirement*.
- *Statements of conformity must contain the name and title of the person certifying that the product conforms to the specified quality requirement*.
- Initial, and if production continues *periodic audits* of the supplier's quality management system *by the purchaser or an independent third party*. This audit must be documented using RSI-100-01 - Supplier QA Program Checklist.
- A quality management system *audit is not required* for suppliers that have AAR M-1003, ISO-9000, or other high reliability quality management systems such as automotive, medical, aerospace, etc. *This does not relieve the certified facility of process compliance assessments as defined in RSI-100-02.*

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RSI-100-01

RAILWAY SUPPLY INSTITUTE — Support, Connection, Advocacy	RSI-100-01 Supplier Quality Assurance Program Checklist	Form: RSI-100-01 Revision Level: D Date: July 1, 2019 Approved by: John Byrn

Company:		**Prepared by:**	
PCPs:		**Date:**	

Item	Element	Audit-OK		Objective Evidence (Complete for Each Response)
		Yes	No	
1	Contract Review			
1.1	Does the *supplier* have a program for the review of contracts to ensure that the *supplier* has the people, processes, and equipment to produce a *product* to the specified *quality requirement*?	☐	☐	

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RSI-100-01 Consists of 13 Audit Elements

- Contract Review
- Design Control
- Material Receipt
- Material Control
- Measuring and Test Equipment
- Inspection and Test Plan
- Document Control
- Nonconformance Control
- Corrective Actions
- Training
- Product Certification and Release of Product
- Shipping
- Record Keeping

RSI-100-02

RAILWAY SUPPLY INSTITUTE Support, Connection, Advocacy	RSI-100-02 Process Compliance Assessment Checklist	Form: RSI-100-02 Revision Level: D Date: August 31, 2 Approved by: Joh

Purchaser/Facility :			**Supplier:**			**Locatio n:**	
Product:			**PCP :**			**Date:**	
Prepared by:							

Item	**Requirement**	**Result**			**Objective Evidence**
		Pass	**Fail**		
1.0	Purchaser – All PCPs				
1.1	Has the purchaser provided the design to the supplier? (10.2.1)	☐	☐		

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RSI-100-02 Consists of 10 Assessment Sections

1.0 Purchaser – All PCP's

2.0 Purchaser – PCP's 2 and 3 (components manufactured by welding or casting)

3.0 Supplier Requirements – All PCP's

4.0 Supplier Requirements – PCP 2 and 3 (components manufactured by welding or casting)

5.0 Supplier Requirements – PCP 3 (components manufactured by casting)

6.0 Supplier Requirements – PCP 4 (components that include lining or coating)

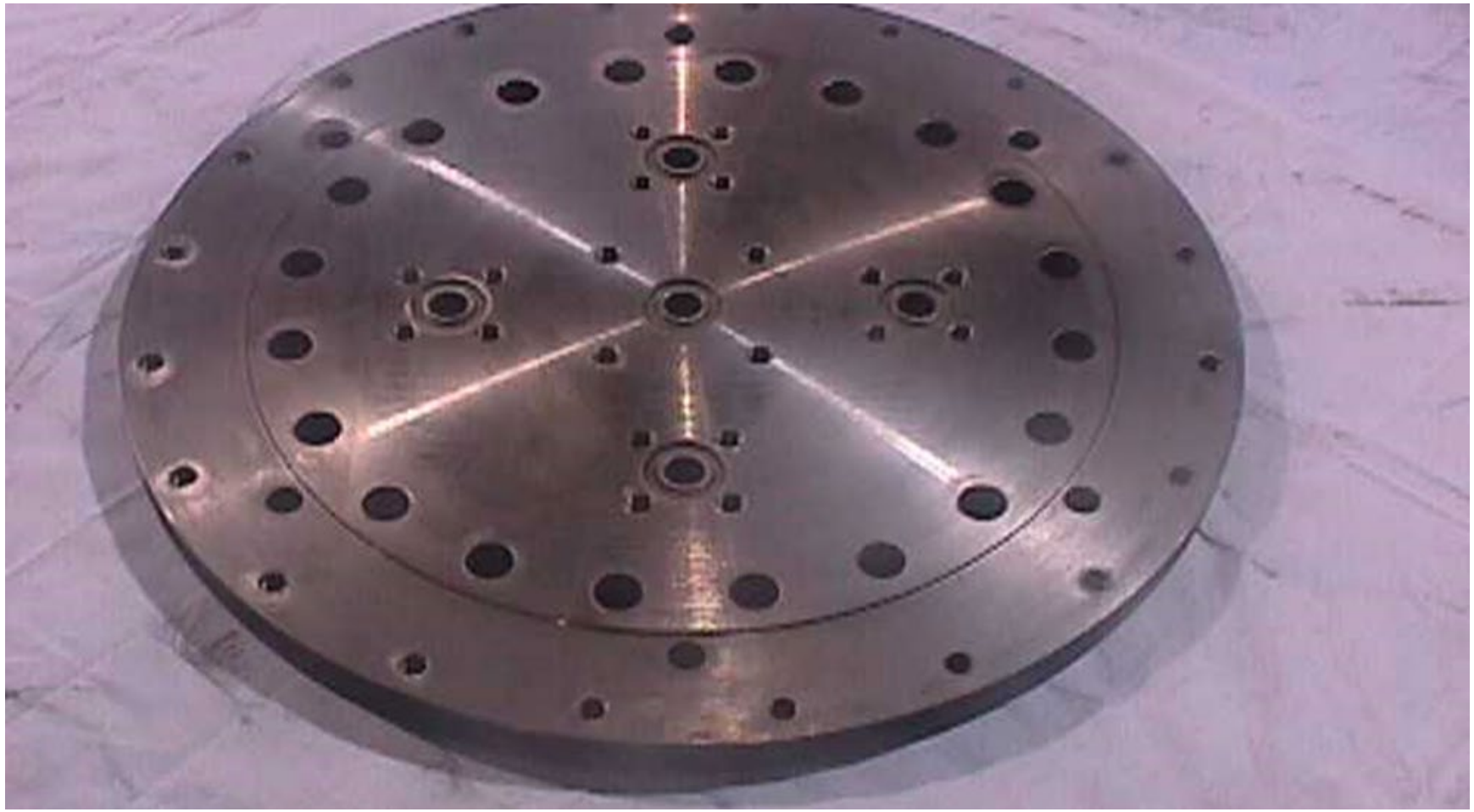
7.0 Supplier Requirements – PCP 5 (gasket and sealing components)

8.0 Supplier Requirements – PCP 6 (valves and instruments)

9.0 Supplier Requirements – PCP 7 (fasteners)

10.0 Supplier Requirements PCP 8 (Pressure Retaining Tank Car Tank Components)

PCP 1 – Fittings Plate



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PCP 1 – Manufacture vs Distributor

CLOSURES and FITTINGS - CTQ INSPECTION CRITERIA *D – Document Verification (certificates); I – Inspection Verification (Marking); and M – Measurement Verification Criteria*				
Item and PCP(s)	**Inspection Criteria**	**Manufacturer**	**Distributor**	**Facility**
Fittings Plate with no nozzles **PCP 1 (4 if required)**	AAR Device Approval (If Contractually Specified)	**D**	**D**	**D**
	Material Specification	**D**	**D**	**D**
	Thickness	**M**	**M**	**D**
	Sealing Style (Opening Style, Flat Face, Raised, or Tongue and Groove)	**M**	**M**	**D**
	Gauge tapped threads	**M**	**M**	**M**
	Machined Characteristics / Gasket Surface / fitting holes/bolt holes	**M**	**M**	**I &M**

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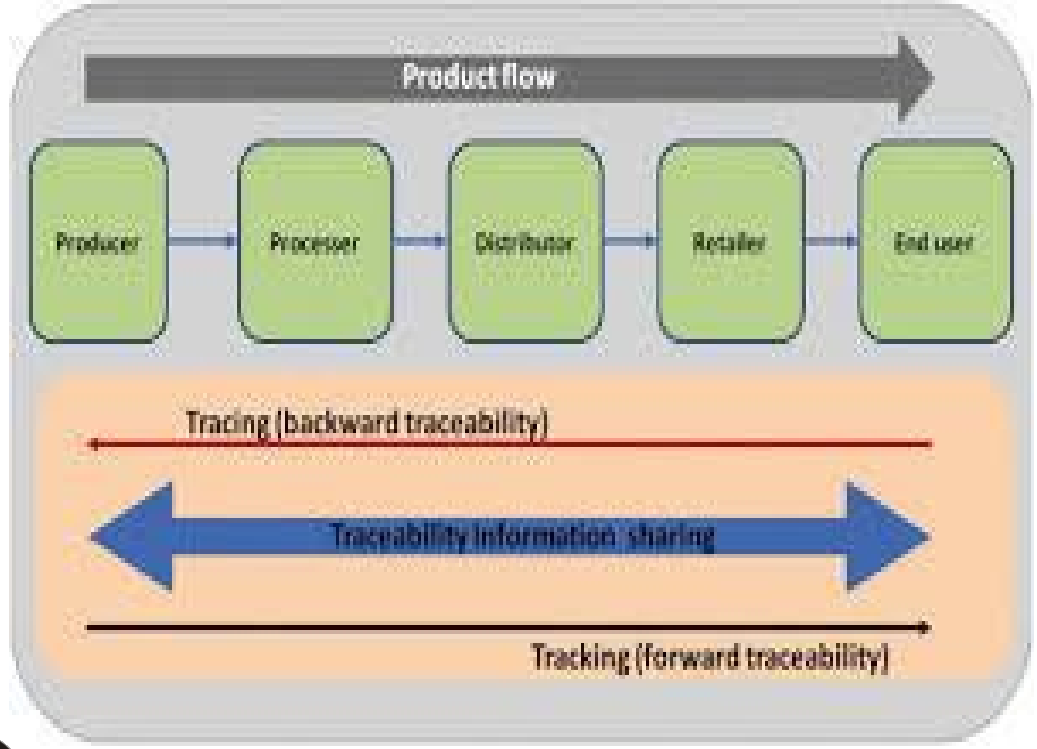
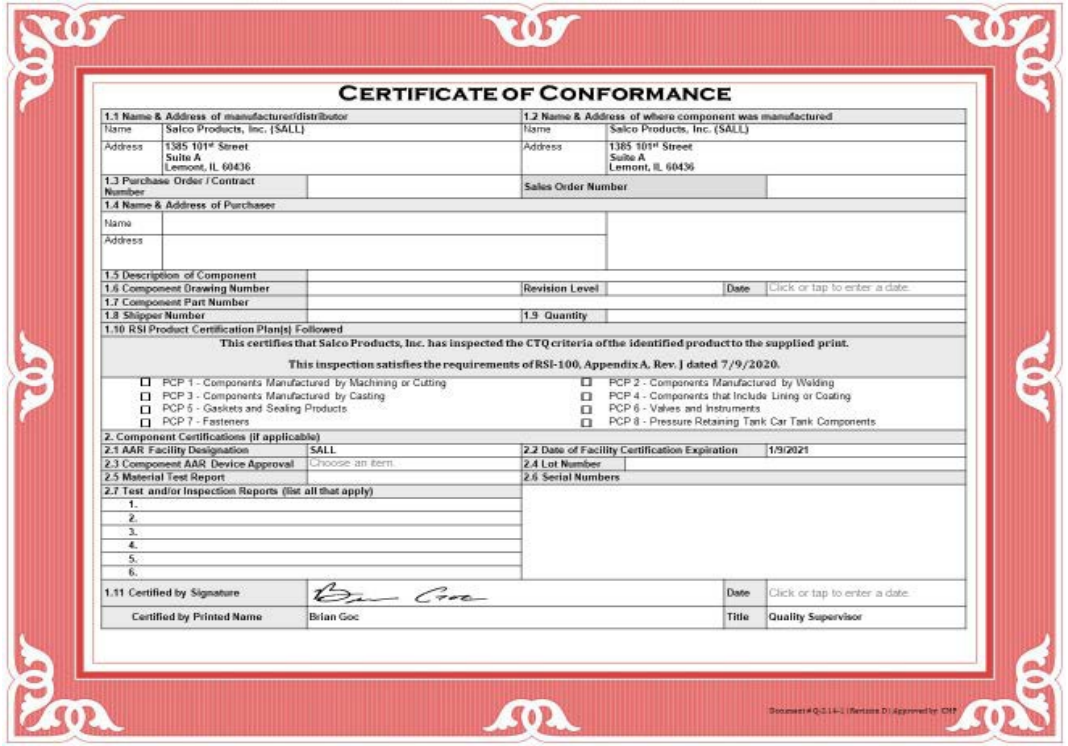
Schedule A – Manufacturer vs Distributor:

- Flow down of responsibilities, traceability, the distributor is responsible for ensuring that all requirements of the PCPs are met.





CERTIFICATE OF CONFORMANCE

1.1 Name & Address of manufacturer/distributor		1.2 Name & Address of where component was manufactured	
Name	Salco Products, Inc. (SALL)	Name	Salco Products, Inc. (SALL)
Address	1385 101st Street Suite A Lemont, IL 60436	Address	1385 101st Street Suite A Lemont, IL 60436
1.3 Purchase Order / Contract Number		Sales Order Number	
1.4 Name & Address of Purchaser			
Name			
Address			
1.5 Description of Component			
1.6 Component Drawing Number		Revision Level	Date: Click or tap to enter a date.
1.7 Component Part Number			
1.8 Shipper Number		1.9 Quantity	
1.10 RSI Product Certification Plan(s) Followed			

This certifies that Salco Products, Inc. has inspected the CTQ criteria of the identified product to the supplied print.

This inspection satisfies the requirements of RSI-100, Appendix A, Rev. J dated 7/9/2020.

- ☐ PCP 1 - Components Manufactured by Machining or Cutting
- ☐ PCP 2 - Components Manufactured by Welding
- ☐ PCP 3 - Components Manufactured by Casting
- ☐ PCP 4 - Components that Include Lining or Coating
- ☐ PCP 5 - Gaskets and Sealing Products
- ☐ PCP 6 - Valves and Instruments
- ☐ PCP 7 - Fasteners
- ☐ PCP 8 - Pressure Retaining Tank Car Tank Components

2. Component Certifications (if applicable)			
2.1 AAR Facility Designation	SALL	2.2 Date of Facility Certification Expiration	1/9/2021
2.3 Component AAR Device Approval	Choose an item.	2.4 Lot Number	
2.5 Material Test Report		2.6 Serial Numbers	
2.7 Test and/or Inspection Reports (list all that apply)			
1.			
2.			
3.			
4.			
5.			
6.			
1.11 Certified by Signature	Brian Goc	Date	Click or tap to enter a date.
Certified by Printed Name	Brian Goc	Title	Quality Supervisor

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PCP 1 & 2 - Hinged and Bolted Manway Cover (Fabricated & Welded)

PCP 1 and 2

CLOSURES and FITTINGS - CTQ INSPECTION CRITERIA *D – Document Verification (certificates); I – Inspection Verification (Marking); and M – Measurement Verification Criteria*				
Item and PCP(s)	**Inspection Criteria**	**Manufacturer**	**Distributor**	**Facility**
Hinged and Bolted Manway or Fill Hole Cover (Fabricated) PCP 1, & 2 (4 if required)	AAR Device Approval (If Contractually Specified)	**D**	**D**	**D**
	Material Specification	**D**	**D**	**D**
	Thickness (Dished, Flanged, or Grooved)	**M**	**M**	**I**
	Nozzle Dimensions	**M**	**M**	**M**
	Sealing Style (Opening Style, Flat Face, Raised, or Tongue and Groove)	**I**	**I**	**I**
	Bolt Pattern	**M**	**M**	**D**
	Weld Size and Type	**I**	**I**	**I**
	Hinge Position	**M**	**M**	**I**
	Bolt Slot Opening Dimensions	**M**	**M**	**M**
	Gasket Groove Dimensions (I.D., O.D., Finish, and Profile)	**M**	**M**	**M**
	Special Features (Single Bolt "Kelso" or Submarine Style "Baier")	**M**	**M**	**I**

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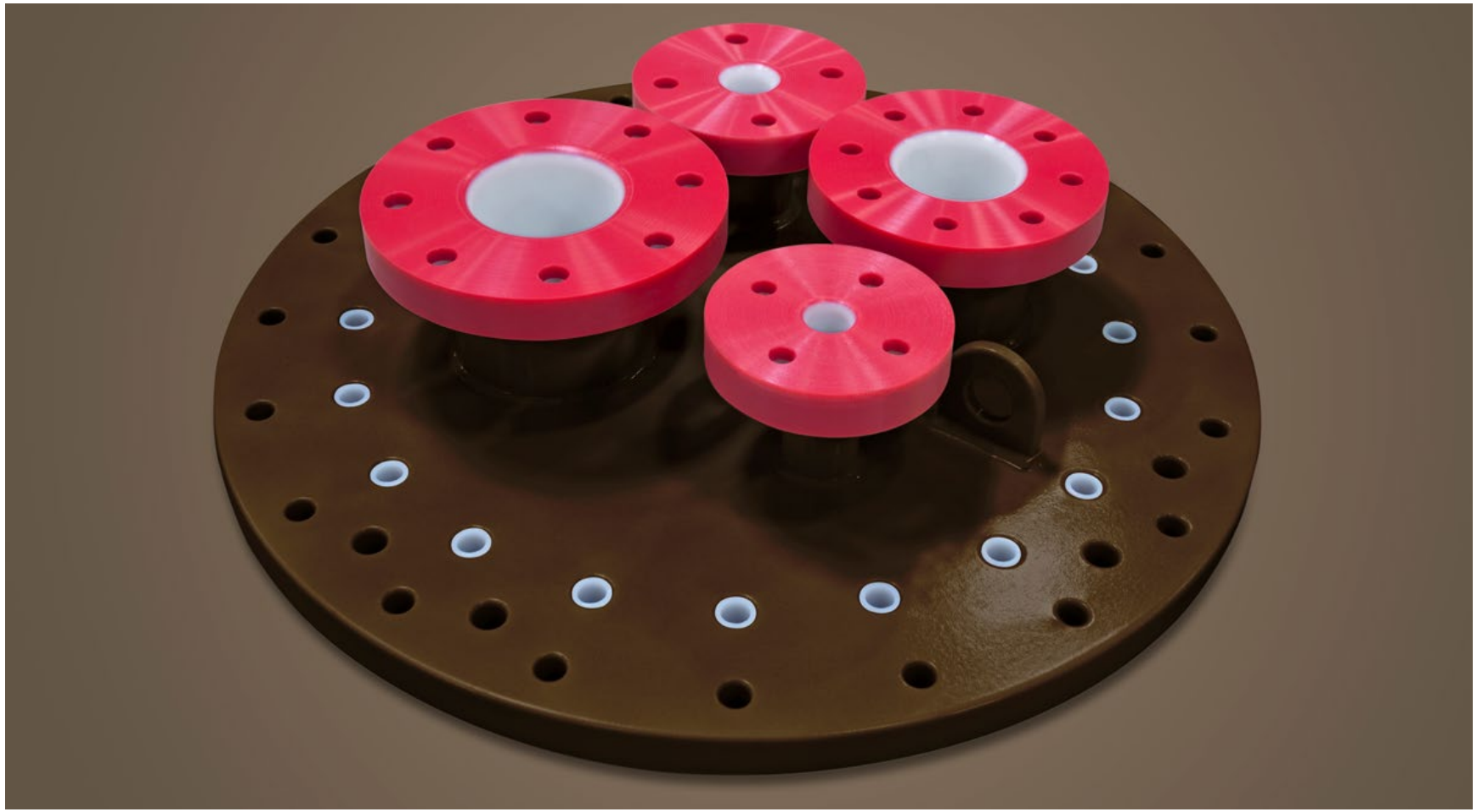
PCP 1, 2 & 4 - Fittings Plate w/Nozzles and Coating



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PCP 1, 2 & 4

CLOSURES and FITTINGS - CTQ INSPECTION CRITERIA *D – Document Verification (certificates); I – Inspection Verification (Marking); and M – Measurement Verification Criteria*				
Item and PCP(s)	**Inspection Criteria**	**Manufacturer**	**Distributor**	**Facility**
Hinged and Bolted Manway or Fill Hole Cover (Fabricated) PCP 1, & 2 (4 if required)	AAR Device Approval (If Contractually Specified)	**D**	**D**	**D**
	Material Specification	**D**	**D**	**D**
	Thickness (Dished, Flanged, or Grooved)	**M**	**M**	**I**
	Nozzle Dimensions	**M**	**M**	**M**
	Sealing Style (Opening Style, Flat Face, Raised, or Tongue and Groove)	**I**	**I**	**I**
	Bolt Pattern	**M**	**M**	**D**
	Weld Size and Type	**I**	**I**	**I**
	Hinge Position	**M**	**M**	**I**
	Bolt Slot Opening Dimensions	**M**	**M**	**M**
	Gasket Groove Dimensions (I.D., O.D., Finish, and Profile)	**M**	**M**	**M**
	Special Features (Single Bolt "Kelso" or Submarine Style "Baier")	**M**	**M**	**I**

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Vacuum Relief Valve – Screwed and Flanged PCP 1, 3 & 6, (PCP's 2, & 4 if required)

Screwed

Flanged

PCP 1, 3 & 6, (PCP's 2, & 4 if required)

VALVES AND INSTRUMENTS - CTQ INSPECTION CRITERIA *D – Document Verification (certificates); I – Inspection Verification (Marking); and M – Measurement Verification Criteria*				
Item and PCP(s)	**Inspection Criteria**	**Manufacturer**	**Distributor**	**Facility**
Vacuum Relief Valves PCP 1, 3 & 6 (2 & 4 if required)	AAR Device Approval	**D**	**D**	**D**
	Model	**I**	**D**	**D**
	Manufacturing Facility	**D**	**D**	**D**
	Connection – Flange Dimensions	**M**	**D**	**I**
	Connection – Thread Specification	**M**	**D**	**I**
	Length	**M**	**D**	**M**
	Body Diameter	**M**	**D**	**M**
	Body Material	**D**	**D**	**D**
	Lining Material (If Applicable)	**D**	**D**	**I**
	Seal/O-Ring Dimensions	**M**	**D**	**D**
	Seal/O-Ring Material	**D**	**D**	**D**
	OEM Test Certificate	**D**	**D**	**D**
	Vacuum Relief Valves must be marked as following: • Manufacturer marking • Manufacturer's design or type number • Serial number • Type of trim and body material • Vacuum set pressure	**I**	**I**	**I**

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PCP 7 Fasteners

PCP 7 - Fasteners

FASTENERS - CTQ INSPECTION CRITERIA *D – Document Verification (certificates); I – Inspection Verification (Marking); and M – Measurement Verification Criteria*				
Item and PCP(s)	**Inspection Criteria**	**Manufacturer**	**Distributor**	**Facility**
Eyebolts PCP 7	Material Specification	**D**	**D**	**D**
	Marking	**I**	**I**	**I**
	Thread Specification	**M**	**M**	**D**
	Overall Length	**M**	**M**	**M**
	Length of Threads	**M**	**M**	**M**
	Length of Shoulder	**M**	**M**	**M**
	Diameter	**M**	**M**	**M**
	Nut length across flats and thickness	**M**	**M**	**M**
	Nut style square/hex	**M**	**M**	**M**
	Eyelet ID/OD	**M**	**M**	**M**
Nut PCP 7	Material Specification	**Per ASME B18.18, Category 2. ASTM F1470, ASTM 370 ASTM F788**		**D**
	Marking			**I**
	Thread Specification			**D**
	Length across flats			**M**
	Thickness			**M**
	Style (Square or Hex)			**I**
Washer PCP 7	Material Specification	**Per ASME B18.18, Category 2. ASTM F1470 ASTM 370 ASTM F788**		**D**
	Marking			**I**
	Inside Diameter			**M**
	Outside Diameter			**M**
	Thickness			**M**
	Flatness			**M**
	Style (Flat or Spring or Lock)			**I**

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PCP 8 – Pressure Retaining Tank Car Components

Sumps, Nozzles, Tank Shell/Head Material

- In addition to the requirements of PCP 1 any pressure retaining components manufactured by welding are subject to the certification requirements of PCP 2; and
- Supplier must certify that all welding performed follows the Association of American Railroads (“AAR”), Manual of Standards and Recommended Practices, Section C, Part III, M-1002, Appendix W.

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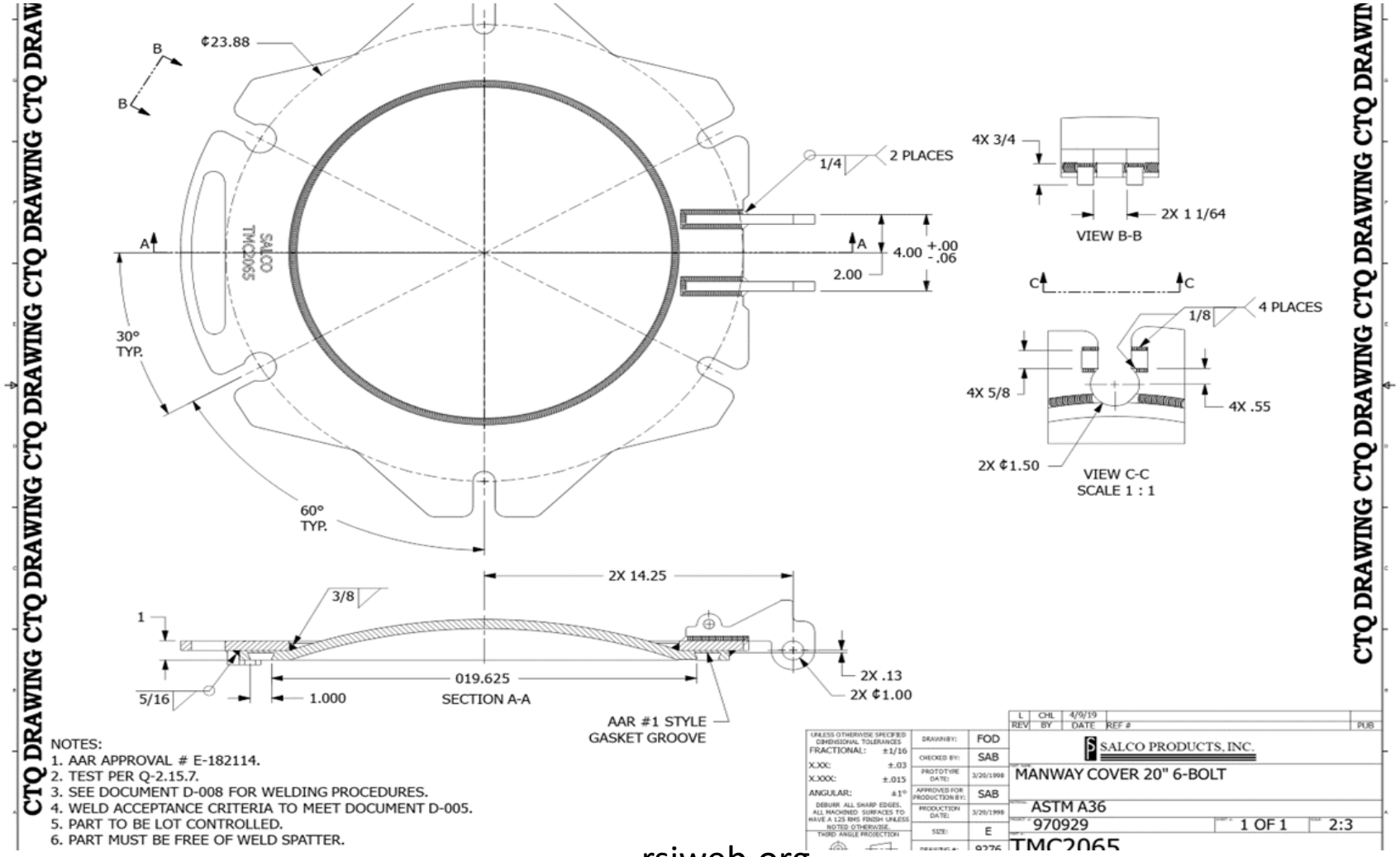
CTC Drawing Example



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PCP 1 and 2

CLOSURES and FITTINGS - CTQ INSPECTION CRITERIA *D – Document Verification (certificates); I – Inspection Verification (Marking); and M – Measurement Verification Criteria*				
Item and PCP(s)	**Inspection Criteria**	**Manufacturer**	**Distributor**	**Facility**
Hinged and Bolted Manway or Fill Hole Cover (Fabricated) PCP 1, & 2 (4 if required)	AAR Device Approval (If Contractually Specified)	**D**	**D**	**D**
	Material Specification	**D**	**D**	**D**
	Thickness (Dished, Flanged, or Grooved)	**M**	**M**	**I**
	Nozzle Dimensions	**M**	**M**	**M**
	Sealing Style (Opening Style, Flat Face, Raised, or Tongue and Groove)	**I**	**I**	**I**
	Bolt Pattern	**M**	**M**	**D**
	Weld Size and Type	**I**	**I**	**I**
	Hinge Position	**M**	**M**	**I**
	Bolt Slot Opening Dimensions	**M**	**M**	**M**
	Gasket Groove Dimensions (I.D., O.D., Finish, and Profile)	**M**	**M**	**M**
	Special Features (Single Bolt "Kelso" or Submarine Style "Baier")	**M**	**M**	**I**

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Inclusion of any Required AAR Approval's

APPLICATION FOR RENEWAL OF APPROVAL FOR PRESSURE RELIEF DEVICES, VALVES, CLOSURES, AND FITTINGS

1. AAR APPROVAL No. E202141
2. Date of Application 10/01/2019
3. Previous AAR Approval E-099034
4. Applicant: Salco Products Inc.
5. Address: 1385 101st Street, Suite A, Lemont IL 60439
6. Drawing No. D13087 7. Latest rev. Q 8. Date of latest rev. 02/08/2018
9. Description of device: Vacuum Relief Valve 2 12" 10. Device ID No. VVN25S41XXA

CERTIFICATION: The subject device is **unchanged** from the previous approval, and conforms with the latest revision of AAR Specifications for Tank Cars, Appendix A. The device conforms with drawing listed above.

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AAR Certified Companies

AAR Registry of M-1003 Certified Facilities

Important Note: If a facility is listed in the Registry, its M-1003 Certification is current even if the facility's certification expiration date has passed. From time to time, the renewal of a facility's certification becomes delayed for reasons beyond the facility's control and in that case the certification is considered current.

Export Registry

QA Code	Facility Name	Facility Location	Activity Description	Expiration Date
SALL x	Salco Pro x	x	x	x
SALL	Salco Products, Inc.	Lemont, Illinois	C4a - Assemble and Qualification of Tank Car Service Equipment C4m - Manufacture and Qualification of Tank Car Service Equipment C5 - Maintenance and Qualification of Tank Car Service Equipment	1/9/2021

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Vacuum Relief Valve Certificate of Test Example

Vacuum Relief Valve
Certificate of Test

Procedure: Q-2.15.7-2
Revision Level: B
Approved by: J. Pasqua 219702

This document certifies that the below stated part number(s) and serial number(s) have been tested in accordance with AAR, *MSRP, Section C-III, Specification for Tank Cars, M-1002* and applicable Salco Products, Inc. Quality Procedures.

Part Number:	
Serial Number:	
Location:	
Temperature Range:	
Temperature During Testing:	
Pressure Medium:	
Positive Pressure Range:	
Set Positive Test Pressure:	
Vacuum Pressure Range:	
Set Vacuum Test Pressure:	
Gasket Material:	
Test Date:	

Printed Name:
Signed Name:
NDT Level:
Date:

DRAFT

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Coating Certificate of Conformance Attests to:

- The statement of conformity must detail product characteristics (*e.g.*, drawing / material specification, NACE/SSPC Standards, etc.). The PCP must include the following activities as a minimum:
  - Inspection and documentation of the pre-surface preparation process.
  - Inspection and documentation of the surface preparation process.
  - Inspection and documentation of the post-surface preparation process.
  - Inspection and documentation of the application process
  - Documentation of the inspection and testing processes confirming conformance to the applicable specification/standard.
  - Documentation of the curing process/methods used.
  - Post-curing documentation of the inspection and testing processes confirming conformance to the applicable specification/standard.

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RSI-100 Schedule B

RAILWAY SUPPLY INSTITUTE Support, Connection, Advocacy	Product Conformance Certification Documentation Requirements	RSI-100 Schedule B Revision Level: 1 Date: 1/4/2021 Approved By: J. Byrne

1. The supplier's product conformance certification document must (at a minimum) contain the following information:

   1.1. Name and Address of manufacturer/distributor
   1.2. Name and address of facility where component was manufactured
   1.3. Purchase document reference (Contract/Order Number)
   1.4. Purchaser Name / Facility / Delivery Address
   1.5. Description of component
   1.6. Component Drawing Number with Revision Level and Date
   1.7. Component Part Number
   1.8. Shipping Document Reference
   1.9. Quantity of Parts Delivered
   1.10. RSI-100 Product Conformance Certification Plan(s) followed (Statement of Certification)
   1.11. Signature of Certifying Individual and Date
   1.12. Printed Name of Certifying Individual and Title

2. Additional requirements (if applicable)

   2.1. AAR Facility Designation
   2.2. Date of AAR Facility Certification Expiration
   2.3. Component AAR Device Approval
   2.4. Batch or Lot Number
   2.5. Material Test Report
   2.6. Component Marking /Serial Numbers
   2.7. Tests and/or Inspection Reports

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PCP Certificate of Conformance Conforms to RSI-100 Schedule B

CERTIFICATE OF CONFORMANCE

1.1 Name & Address of Manufacturer/Distributor		1.2 Name & Address of where component was manufactured	
Name	Salco Products, Inc.	Name	Salco Products, Inc.
Address	-	Address	-

1.3a Purchase Order/Contract Number		1.3b Sales Order Number	
1.4 Name & Address of Purchaser			
(a) Name			
(b) Address			
1.5 Description of Component			
1.6a Component Drawing Number		1.6b Revision Level	1.6c Drawing Date
1.7 Component Part Number			
1.8 Shipper Number		1.9 Quantity	

1.10 RSI Product Certification Plan(s) Followed

This certifies that Salco Products, Inc. has inspected the CTQ criteria of the identified product to the supplied print.
This inspection satisfies the requirements of Product Quality Certification, RSI-100 Original Issue, dated 9/21/2020.

☐ PCP 1 - Components Manufactured by Machining or Cutting	☐ PCP 5 - Gaskets and Sealing Products	1.10b Customer not Party to RSI-100
☐ PCP 2 - Components Manufactured by Welding	☐ PCP 6 - Valves and Instruments	
☐ PCP 3 - Components Manufactured by Casting	☐ PCP 7 - Fasteners	☐
☐ PCP 4 - Components that Include Lining or Coating	☐ PCP 8 - Pressure Retaining Tank Car Tank Components	

2. Component Certification (if applicable)			
2.1 AAR Facility Designation	None	2.2 Date of Facility Certification Expiration	None
2.3 Component AAR Device Approval	-	2.4 & 2.6 Lot/Serial Number(s)	
2.5 Material Test Report	☐ Yes (attached) ☐ No (on file)		
2.7 Test and/or Inspection Report (list all that apply)			

1.11a Certified by Signature		1.11b Date	1/7/2021
1.12a Certified by Printed Name	-	1.12b Title	-

Document #: Q.2.14-1, Revision: A, Approved by: CMP

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Summary

- RSI-100 is a recommended practice, and its usage is voluntary
- It is available free of charge on RSI's web site at: https://www2.rsiweb.org/forms/store/ProductFormPublic/rsi-100-product-conformance-certification
- It is intended to provide the tank car repair shops guidance to meet 49 CFR 179.7(b)4 and 179.7(b)5's and M-1003's 2.9 and 2.10's requirements.
- RSI-100 includes:
  - RSI-100-01 Supplier Quality Assurance Program Checklist
  - RSI-100-02 Process Compliance Assessment Checklist
  - RSI-100-04 Training Record
  - RSI-100-05 Incoming Material Inspection Form (for use at AAR M-1002/M-1003 certified facilities)

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Summary

- The person or persons responsible for RSI-100's management must be identified;
- Training must be performed per Table 2;
- Contract review of P.O.'s;
- Documentation provided must meet Schedule A requirements; and
- Certificate of Conformance must meet Schedule B requirements.
- Certificates of Conformance's or "Customer not Party to RSI-100".
- Purchase Orders must state the documentation required
- Consignment Material will require the same documentation

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Questions?

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Thank you!

AAR Quality Assurance
55500 DOT Road
Pueblo, Colorado 81001
www.aar.com