Quality Assurance Auditors & Industry Conference
February 2023 | New Orleans, LA

2.10 Incoming Inspection

John “Scott” Gronberg

Watco

MxV Rail is a subsidiary of the Association of American Railroads (formerly TTCI)

MxV RAIL

Auditing Incoming Inspection

The Requirements

Before We Start, Keep in Mind

- **Oftentimes, opportunities identified during the audit of this element may ultimately fit better in another element.**
  - 2.5 Production Inspection and Test Planning
  - 2.7 Document Control
  - 2.8 Measure and Test Equipment
  - 2.9 Purchasing and Subcontracting
  - 2.13 Inspection Status
  - 2.16 Preservation Packaging and Shipping
  - Nonconformance Control
  - Statistical methods

2.10 The Facility shall do 3 things

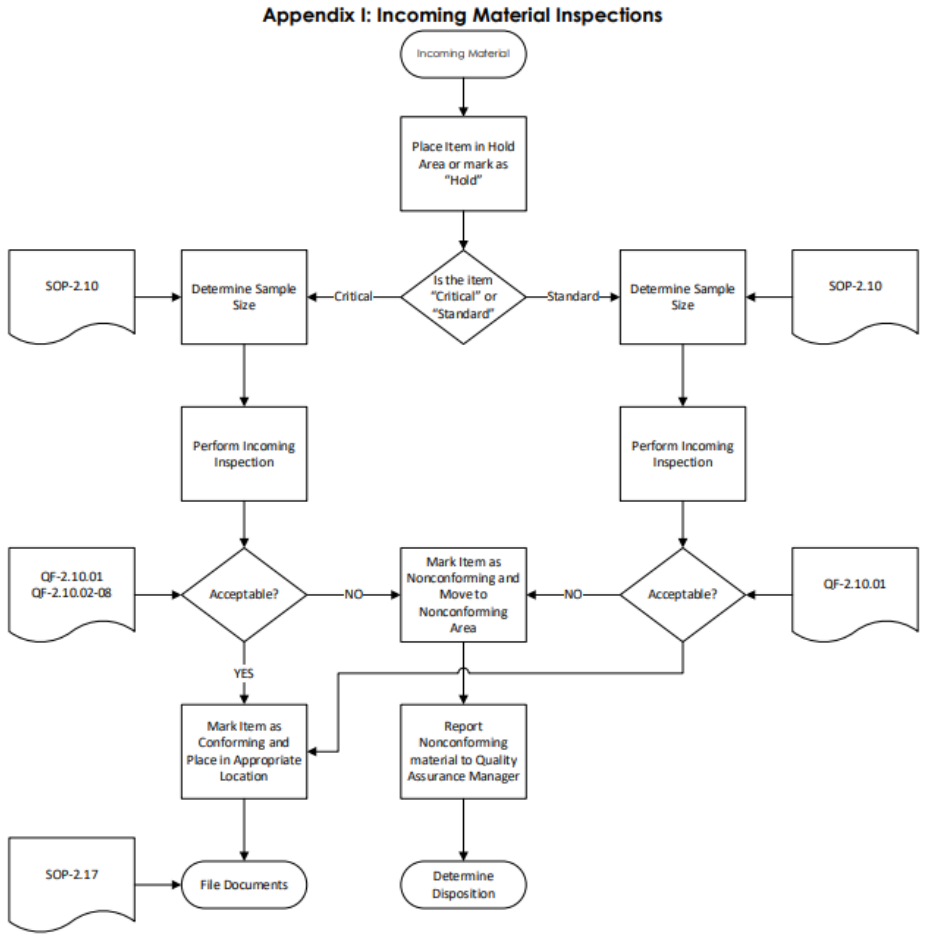
- **2.10.1 Inspect, test and identify incoming items as required by the inspection and test plans.**
- **2.10.2 Check the evidence provided by subcontractors and suppliers as a means of verifying quality per the requirements of 2.10.1**
- **2.10.3 Hold incoming items until the required inspection and tests are completed or the necessary inspection and test reports are received and verified (except when released under positive recall)**

Inspect, Test and Identify

What are they looking at and how are they looking at it?

How do they Inspect and Test Identify?

- **The Production Inspection and Test Plan must address Incoming Inspection**
  - It is our road map and theirs
  - How well are they staying on the road?
  - The flow, procedures and forms, how well do they know the process?



How do they Inspect and Test Identify?

- **Suppliers**
  - Approved Vendors list
  - Customer supplied/consignment materials
  - Intercompany interchange
  - Credit card purchases, how are they handled received?
  - Subcontractors - They are a supplier of labor and materials
    - Are the key considerations identified?
      - NDT qualification, M-1002 and ASNT-TC-1A (Check the Paperwork)
      - Is the B-1 current if applicable?
      - Calibration of their equipment.
      - Records; What are they keeping how is it organized?

How do they Inspect and Test Identify?

- **Sampling**
  - Are they using statistically based sampling for multiple quantities?
  - 2.20.1.3 - Use statistical methods to evaluate and control the variability of processes and key quality characteristics.
  - Some common statistically based sampling plans
    - C=0 Sampling plan: A sampling plan based on lots or batches and AQL's where no nonconformances accepts the lot and one nonconformance rejects the entire lot requiring evaluation to determine actions.
    - ANSI/ASQ Z1.4: A sampling plan that provides accept/reject based on AQL's percent nonconforming or nonconformities per unit.

TABLE 1

Critical Material Index Value 1.0 (ass. AQL)			Standard Material Index Value 4.0 (ass. AQL)		
Lot Size	Number to Inspect	Ac - Re	Lot Size	Number to Inspect	Ac - Re
1	All	0/1	1	All	0/1
2 to 8	All	0/1	2 to 8	3	0/1
9 to 15	13	0/1	9 to 15	3	0/1
16 to 25	13	0/1	16 to 25	3	0/1
26 to 50	13	0/1	26 to 50	5	0/1
51 to 90	13	0/1	51 to 90	6	0/1
91 to 150	13	0/1	91 to 150	7	0/1
151 to 280	20	0/1	151 to 280	10	0/1
281 to 500	29	0/1	281 to 500	11	0/1
501 to 1200	34	0/1	501 to 1200	15	0/1
1201 to 3200	42	0/1	1201 to 3200	18	0/1
3201 to 10,000	50	0/1	3201 to 10,000	22	0/1

How do they Inspect and Test Identify?

- **Component dimensions, component ID/markings**
  - Are they physically checking dimensions if applicable?
  - Are drawings supplied to the receiving personnel?
  - Is the measure and test equipment calibrated as required per 2.8?
  - Component ID if applicable being verified and checked against the markings on the component?
  - Is the data on the certificate of test checked against the markings on the component?
  - Reconditioned Components properly marked with recon facility

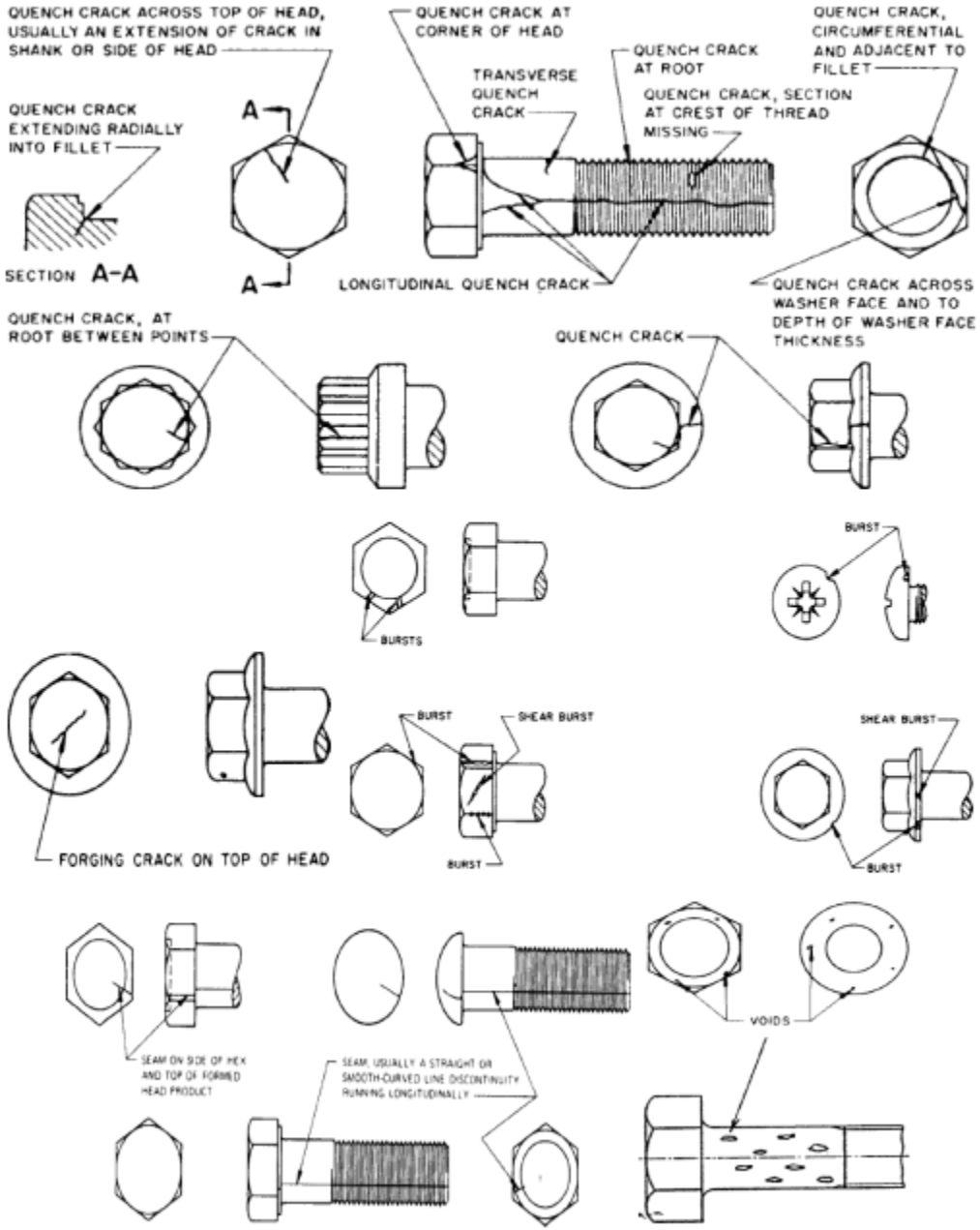
How do they Inspect and Test Identify?

- **Material specification, grade and condition**
  - Verified against purchase order and packing slip
  - Are there thresholds of acceptable condition
  - Are certificates supplied checked against the markings
  - Threaded fastener grade and grade markings
  - Thread pitch, how are they checking
  - Mill test reports
    - Verifying heat numbers? How?
    - Tensile, yield , elongation, chemical composition, charpy Impact?

How do they Inspect and Test Identify?

- **Some additional considerations**
  - Protections/packaging in place?
  - What if there not? Do they address what to do?
  - Date of manufacture/shelf life?
    - Coatings
    - Rubber parts
  - Do they know how to check the date of manufacture?
  - Defect identification what's condemnable?

FASTENER DEFECTS



And Lastly, Don’t Forget to Check…

- Are their forms and receiving documents current?

Check the Evidence

What confirms what they ordered is what they received

Check The Evidence Theirs is Ours

- **Purchase orders, packing slips**

Check the Evidence

- Inspection and test documents

Check The Evidence

- Drawings
- Specifications

Check the Evidence

- **Special Considerations and Specifications**

  8.1. Material is ASTM A572 Gr. 50 modified to 70,000 psi tensile and rolled to match tank diameter.

- **A572 Gr. 50 minimum tensile is 65,000 psi**
  - Hopefully, this was identified in Contract Review
  - Then Communicated to Purchasing and the Supplier
  - And communicated to Incoming Inspection; our last stop gap

Check the Evidence

- **Mill Test Reports (MTR's)**

Tank shell material chemical analysis, tensile, Charpy impact test

5.4 Chemical Composition

The steel must conform to the chemical composition requirements prescribed in Table M.2. All of these elements, and any others intentionally added, must be reported on the Material Test Certificate. No intentional additions of boron are permitted.

Table M.2 Chemical requirements for AAR TC128 Grade B steel

Element	Heat Analysis	Product Analysis
Carbon (max %)	0.24	0.26
Manganese (%) (≤ 3/4 in. thick)	1.00–1.65	1.00–1.70
(> 3/4")		
Phosphorus (max %)	0.025	0.025
Sulfur (max %)[a/]	0.009	0.009
Silicon (%) (≤ 3/4 in. thick)	0.15–0.40	0.13–0.45
(> 3/4 in. thick)	0.15–0.50	0.15–0.50
Vanadium (max %)	0.080	0.084
Copper (max %)	0.35	0.35
Nickel (max %)	No limit	No limit
Chromium (max %)	No limit	No limit
Molybdenum (max %)	No limit	No limit
Aluminum (%)[b/]	0.015–0.060	0.015–0.060
Niobium (max %)	Per ASTM A20	Per ASTM A20
Titanium (max %)	0.020	0.020
Boron (max %)	0.0005	0.0005
Nitrogen (max %)	0.010	0.012
Tin (max %)	0.020	0.020
CEq (max %)	0.53	0.55
Cu + Ni + Cr + Mo (max %)	0.65	0.65
Nb + V + Ti (max %)	0.11	0.11
Ti /N (max ratio)	4.0	4.0

[a/] 0.015 maximum is allowed for cars ordered before July 1, 2015

[b/] A minimum of 0.015% must be acid-soluble.

Designation: A20/A20M – 20

Standard Specification for General Requirements for Steel Plates for Pressure Vessels[1]

This standard is issued under the fixed designation A20/A20M; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope*

1.1 This general requirements specification[2] covers a group of common requirements that, unless otherwise specified in the applicable product specification, apply to rolled steel plates for pressure vessels covered by each of the following product specifications issued by ASTM:

Title of Specification	ASTM Designation[A]
Pressure Vessel Plates, Heat-Treated, Carbon-Manganese-Silicon Steel	A537/A537M
Pressure Vessel Plates, Alloy Steel, Quenched-and-Tempered, Chromium-Molybdenum, and Chromium-Molybdenum-Vanadium	A542/A542M
Pressure Vessel Plates, Alloy Steel, Quenched and Tempered Nickel-Chromium-Molybdenum	A543/A543M

5.5 Tensile Properties

The material as represented by the test specimens must conform to the tensile properties prescribed in Table M.3.

Table M.3 Tensile requirements for AAR TC128 steel

Property		Grade B
Tensile strength, psi (MPa)		81,000 to 101,000 (560 to 695)
Yield strength, psi (MPa)	Min.	50,000 (345)
Elongation in 8 in. (200 mm) %	Min.	16.0[a/]
Elongation in 2 in. (50 mm) %	Min.	22.0

[a/] For material under 5/16 in. (7.94 mm) thick, a reduction of 1.25% must be made from the specified percentage elongation for each decrease of 1/32 in. (0.794 mm) of thickness below 5/16 in. (7.94 mm). For material over 3/4 in. (19.0 mm) thick, a reduction of 0.5% must be made from the specified percentage elongation for each increase of 1/8 in. (3.18 mm) of the thickness above 3/4 in. (19.0 mm). This reduction must not exceed 3%.

2.2 General Requirements

2.2.1 Pressure Tank Car Tanks

2.2.1.1 All steel, single-unit pressure tank car tanks fabricated from plate must be fabricated from fine-grain steels as described by ASTM A516, ASTM A537, or AAR TC128. Heads and shells of pressure tank car tanks constructed of ASTM A516 or AAR TC128 must be normalized, effective January 1, 1989. Tank car heads must be normalized after forming, unless specific approval is granted for a facility's equipment and controls.

2.2.1.2 Effective for cars ordered after August 1, 2005, each plate-as-rolled of ASTM A516, ASTM A302, ASTM A537, and AAR TC128 steel used for pressure tank car heads and shells must be Charpy impact tested transverse to the rolling direction in accordance with ASTM A20. The test coupons must simulate the in-service condition of the material and must meet the minimum requirement of 15 ft·lb average for three specimens at –30 °F, with no single value below 10 ft·lb and no two values below 15 ft·lb. Plates for low-temperature service described in 49 CFR 179.102 that require longitudinal impact testing at –50 °F do not require transverse testing at –30 °F.

Hold Incoming Items

The First Hold Point

Hold Incoming Items

- **2.10.3 Hold incoming items until the required inspection and tests are completed or the necessary inspection and test reports are received and verified (except when released under positive recall)**
- **It is a mandatory hold point!**
- **Where are the holding areas? lets go look…**
- **What if an item is too big? How is that addressed?**

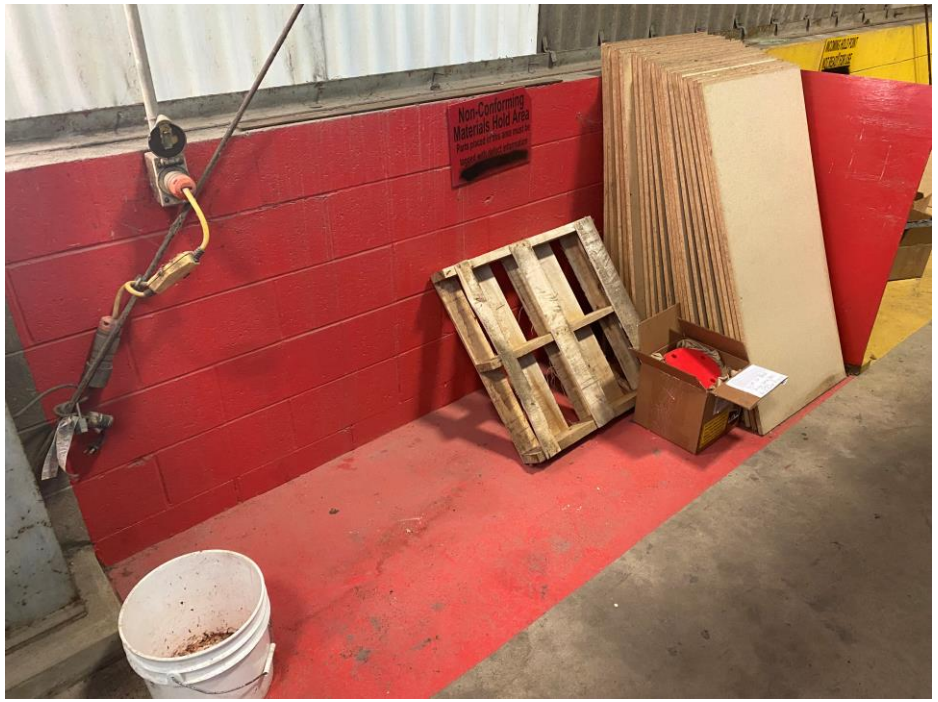
Hold Incoming Items

6. PROCEDURE

6.1. Incoming Material:

6.1.1.Upon arrival, place incoming material into a designated material holding area. If the part or component is too large for the holding area, mark or tag the part or component in a manner that indicates the item is being held for incoming inspection to ensure it is not released prior to the completion of all required incoming inspections and tests.


INCOMING HOLD POINT
NOT READY FOR USE


Non-Conforming
Materials Hold Area

Exploring the Hold Areas

6.2.5. If the material is found unacceptable:

6.2.5.1. Document the complete inspection in the appropriate Critical Material Incoming Inspection Form, QF-2.10.02 through QF-2.10.08 indicating the inspection was completed and nonconforming material was not accepted.

6.2.5.2. Identify the material as nonconforming with the appropriate status indicator.

6.2.5.3. Segregate the material in a nonconforming material location.

6.2.5.4. Report inspection results to Quality Assurance Manager who will coordinate with Purchasing to determine course of action for disposition in accordance with SOP-2.18, "Nonconformance Control".

6.2.5.5. Quality Assurance Manager will coordinate with the Plant Manager and Purchasing to determine if an AAR QA 7.1 will be submitted.

Hold Incoming Items

- **Positive Recall**
  - A term used in quality systems that is part of receiving inspection procedures. It defines the concept that if a manufacturer or producer receives a product or process that requires inspection and wishes to postpone the inspection process, it must have a system in place that will ensure that the postponed inspection will take place at some point prior to final product/process acceptance. Also known as urgent production release.
    - What’s their plan? Where's their hold point?

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Thank you

Association of American Railroads
Quality Assurance Committee