

2018 Pipeline Safety Conference

Welding Issues

2013-2018

Pennsylvania PUC Pipeline Safety

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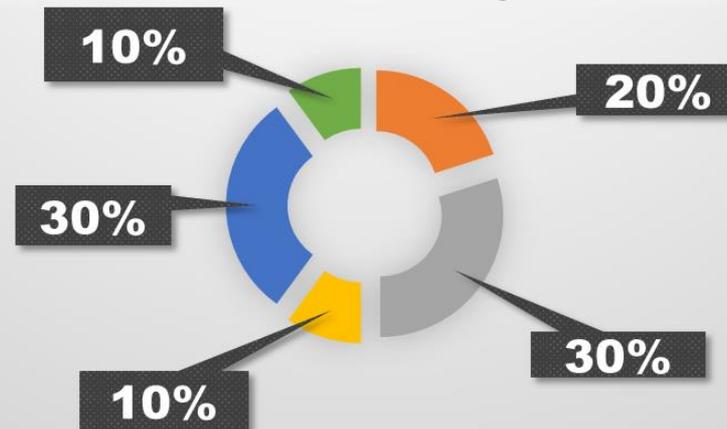
Regulations:

- ▶ Primary job of Pipeline Safety is to enforce:
- ▶ 49 CFR 191 thru 199 and state regulations
- ▶ Specific to welding:
 - 192 Subpart E Welding of Steel in Pipeline
 - 195 Subpart D Construction

 - 192.7 incorporates by reference in whole and in part:
ATSM, ASME, API, NFPA, PPI, NACE, GTI etc.
 - ASME BPVC
 - API 1104
 - Operators Procedures and Processes to meet or exceed the code.

NC Letters 2013-2018

- **192.225 Welding Procedure**
- **192.227 Qualification of welders and welding operators**
- **192.229 Limitation on welders and welding operators**
- **192.241 Inspection and Test of Welds**
- **192.243 Nondestructive Testing**



Welding violations found with both records and in the field inspections

Records:

*192.7 What documents are incorporated by reference partly or wholly in this part?

*API 1104 A or
Section IX of the ASME Boiler and Pressure Vessel Code
(ASME BPVC) or Appendix C Part 192

*Qualifying records for welding procedures. 192.225 and 195.214:..."This record must be retained and followed whenever procedure is used".

Field Inspections:

- ▶ 192.225–Qualified procedure with records
- ▶ 192.227–Welder qualification: Who, what, when, how were they qualified. Do you have records?
- ▶ 192.241–How are welds being tested. Does it meet the appropriate standard?
- ▶ 192.243–NDT records

Common issues found

- ▶ Not following approved procedures
 - Welding rods, speed, amperage, timing between passes, preheat, Shielding from weather...
- ▶ Improper fit-up (misalignment)
- ▶ Improper bevel and wall thickness transitions
- ▶ Improper fit-up of cut induction bends (ovality and out-of-roundness)
- ▶ Lack of inspector oversight
- ▶ Early clamp release

Common issues found...

- ▶ Arc burns due to poor welding practices
- ▶ Incorrect pre-heat or inter-pass temp
- ▶ Inadequate visual weld inspection
- ▶ Improper storage of low hydrogen rods
- ▶ Welding inspectors not in possession of welding procedures, *Must have access.*
- ▶ Use of 'hinging' technique to aid with pipe line-up
- ▶ Pipe size – Hi-Lo alignment issues

Common issues found ...

- ▶ Inadequate defect repair tracking
 - ▶ Incomplete qualification documents for welders
 - ▶ Incomplete qualification documents for procedures
 - ▶ Amps and Volts range
 - ▶ Inadequate defect removal on repair welds
 - ▶ Weld splatter (not using weld shield)–procedural
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PUC inspectors tool kit



Pre-Heating

- ▶ Part of the welding process is pre-heating of the pipe joint prior to beginning welding. Welders have not always ensured that the pre-heating requirements, established and documented in qualified welding procedures, are maintained. Improper pre-heating can lead to weld cracking after the completion of successful nondestructive testing of the weld.

Pre Heat



ISSUE –ARC BURNS

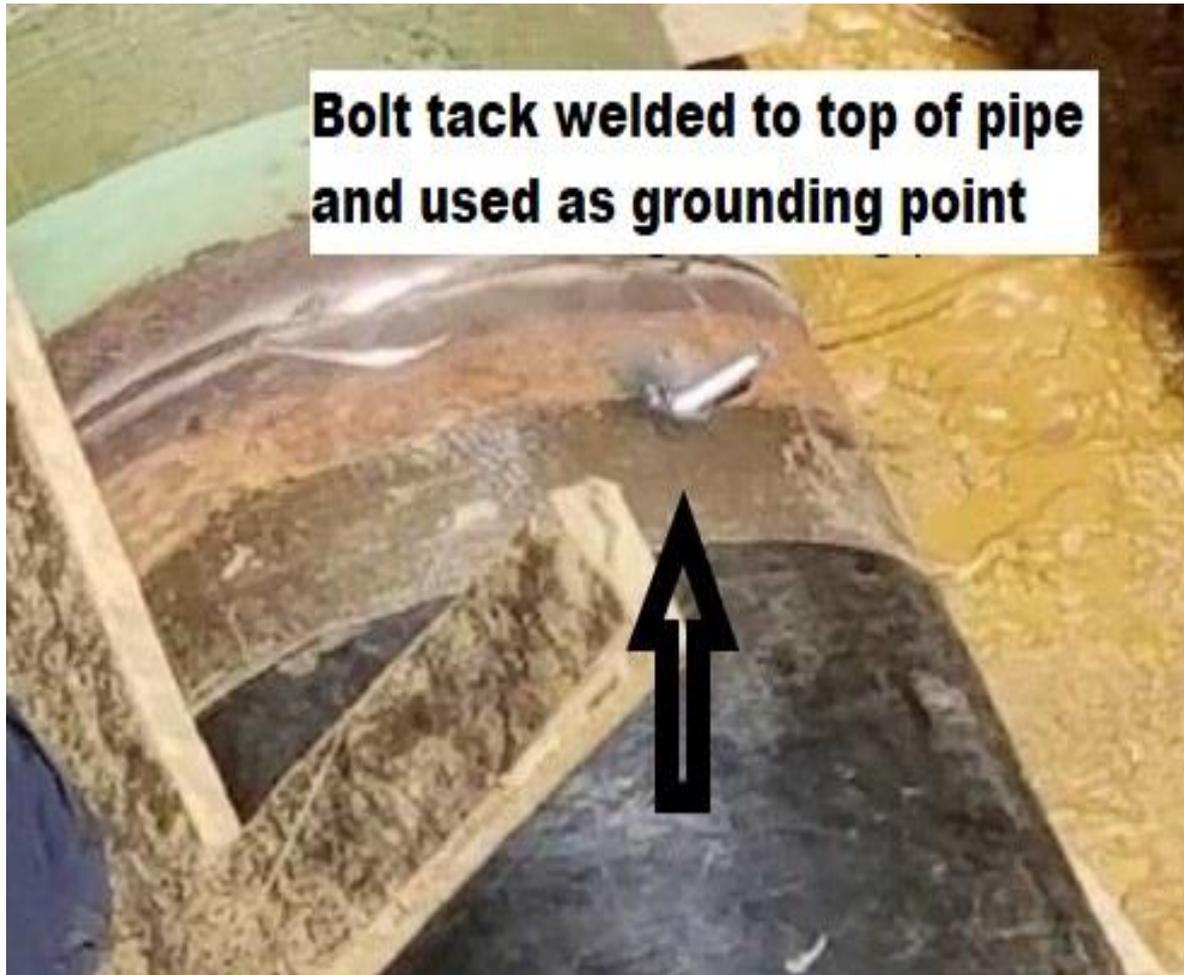
- ▶ Arc burns are not acceptable on certain gas pipeline ($> 40\%$ SMYS) or any liquid pipelines
 - 49CFR 195.226(stricter)
 - 49CFR 192.309

Arc burns should be restricted by procedures (coating damages, molecular structure of the steel and notches in pipe with rapid heating and cooling to base metal)

ISSUES ARC BURNS



ARC BURNS IMPROPER GROUND



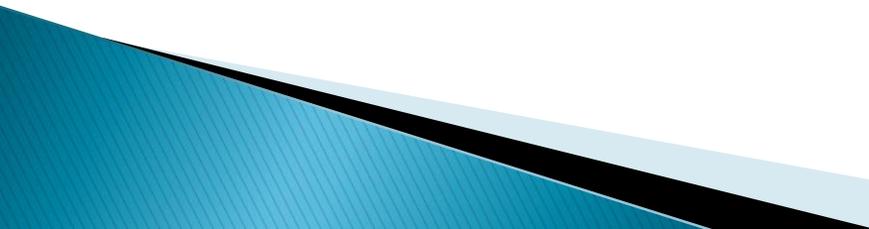


Grasshopper Grounding in weld groove >>>

Weld X Ray



Non Destructive Testing (NDT):

- ▶ Radiographing (by contractor) same weld twice or multiple times and changed weld identification number.
 - ▶ Operator may not be aware
 - ▶ It can be a criminal offense and referred to Office of Inspector General with fines and jail time.
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Summary:

-It's your pipeline, with your name on it, regardless of what errors were made by subcontractors or previous owners.

-Check your records (make sure you have what you think you have)

-Audit field inspectors...



References:

- ▶ **49 CFR Part 192/195 - Transportation Of Natural And Other Gas By Pipeline:**
- ▶ **Minimum Federal Safety Standards**
- ▶ **<http://phmsa.dot.gov/pipeline/tq/regs>**
- ▶ **US Department of Transportation – Construction Issues**
- ▶ **<https://primis.phmsa.dot.gov/construction/docs/ConstructionIssues.pdf>**
- ▶ **Technical Toolboxes In-Service Welding Practices and procedures – Pipeline Council Research Int.**
- ▶ **American Petroleum Institute – API 1104 20th Edition Welding of Pipelines and Related Facilities**
- ▶ **American Society of Mechanical Engineers – ASME B31.8 Gas Transmission and Distribution Piping Systems**

Thank You

