CRUG-2011 Workshop

How does an Operator Select a Composite Repair System Including Any Internal Company Requirements

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El Paso Corporation provides natural gas and related energy products in a safe, efficient, and dependable manner.
Repair System

Repair or replacement required upon discovery of a leak, imperfection or defect that impairs the serviceability of a pipeline

Damages: Corrosion, dents, scratches, gouges, SCC, etc.

Imperfections: Laminations, hard spots, cracks

Discovery could be a result of Pipe Inspection, ILI, Corrosion Surveys, Leak Surveys

CFR requires integrity management of the pipeline against the threats identified in B31.8S
49 CFR 192.713 Requirement

- Cutout and replace
- Use method that reliable engineering tests and analyses show can permanently restore the serviceability of the pipe.

Accepted Pipeline Repair methods

- ASME B31.8S
- Details of methods in “PRCI’s Pipeline Repair Manual”
El Paso Pipeline Group 2010 Repairs

- Composite Sleeve, 357, 45%
- Blending / Grinding, 134, 17%
- Replacement, 164, 20%
- Welded Sleeve, 137, 17%
- Other, 6, 1%
- Mechanical Clamp, 1, 0%
Typical Repair System Used

- **Dents or Mechanical Damage**
  - **Composite** or **Weld Sleeve (Type A)** if plain dent, no stress risers
  - **Weld Sleeve (Type B)** if accompanied with stress riser, weld, seam

- **Corrosion**
  - **Recoat**
  - **Composite** – Regulation allow up to 80% metal loss
  - **Weld Sleeves**

- **Manufacturing defects**
  - **Long Seam – Weld Sleeve**
  - **Other surface defects : Lamination, Cracks – Weld Sleeve**

- **Construction imperfections**
  - **Defective Girth weld – Weld Sleeve**
  - **Wrinkles – Composite (with certain limitations)**
Operators Expectation of Repairs

Effectively meet the regulation and restore integrity of the pipeline

Repair System expectation:
- Easy to Procure & Design
- Reliable & Permanent – Test Results
- Easy to install
- Its an OQ Task – Training, Qualification records
- Installation training for Company or representatives
- Cost
Composite Repair Requirements

- Compatible to pipeline steel and coating
- Permanent Repair - permanently restore the serviceability of the pipe
- Qualification Testing
  - Strength - Long-term
  - Cathodic Disbondment
- Surface Preparation – Clean metal
- Installation Procedure Training
  - Employee & or Contractors
Composite Repair Requirements

Other Design Consideration
- Impact resistance – damage prevention
- Pipe Reinforcement – Axial, Bending
- Coating, UV,
- ILI recognition
- Water and harsh environment

Quality Assurance – Key hold points

Cost – Material, Labor & Time for application
Design & Testing Standard

- No design or testing defined in codes
- ASME PCC-2 – A common ground for testing & design
- Testing through JIP advantageous
  - Common testing procedure
  - Easy to compare and understand performance
  - Ease of design & performance document retrieval in case of audits.
Composite Repair System

Why is it more popular now

- Codes & Standards accept composite repairs as alternative methods
- Easy to procure and store
- More repairs due to Pipeline Integrity Rule
  - Scheduled Inspection and Maintenance
  - Required Re-Inspections
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Questions....

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