Pipeline Research Council International, Inc.

Integrity Assessment of Difficult to Inspect Pipelines Evaluating Select Areas Using High Resolution NDE

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Agenda

- **Pipelines 101**
  - Major threats to pipes
  - Integrity Management Systems

- **PRCI Research of NDE Technologies**
  - Current industry needs
  - State-of-the-art of available technologies
  - Remaining gaps

- **PRCI Technology Development Center (TDC)**
  - About PRCI
  - TDC Overview
  - How to get involved
Major Threats to Pipes

- **Why we require inspection technologies**
  - Buried Pipelines are subject to a wide array of threats.
  - The Code of Federal Regulations states that an operator **must identify and evaluate all potential threats** to each pipeline segment as listed in ASME/ANSI B31.8S,
  - Threats are grouped under the following four categories:
    1. Time dependent threats such as *internal corrosion*, *external corrosion*, and *stress corrosion cracking*
    2. Static or resident threats, such as *fabrication or construction defects*
    3. Time independent threats such as *third party damage* and outside force damage
    4. Human error

- **Operators are seeking technologies that can monitor and assess the threat level on their pipeline systems**
  - The goal is **100%** product containment
Major Threats to Pipes (2)

- **Product Releases** (gas or liquid)
- **Pipe Material Characteristics** (metal grade, toughness, etc.)
- **Stress-Corrosion Cracking**
- **Surface Deformation** (dents & gouges)
- **Corrosion Pitting and MIC**
- **Material and Weld Defects**
- **External and Internal Metal Loss**
Stress Corrosion Cracking

External Corrosion

Dents & Gouges
Integrity Management Systems

- Currently there are only three acceptable methods for assessing the integrity management of a pipeline:
  - In-line inspection
  - Hydrostatic test
  - Direct Assessment

- PRCI study seeks to advance the SOTA for integrity management of difficult to inspect pipelines by identifying NDE technologies capable of monitoring the health of the pipe and detecting anomalies in the pipe surface.
Current Industry Needs

- **Readiness level of pipe wall NDE technologies**
  - Deployed Inside, Outside and Above the Pipe
    - *Identify widest range of pipeline configurations for deployment*
    - *Deployment risks*
  - Leverage what integrity condition data NDE can provide

- **Integrity Assessment Processes**
  - Full Coverage Inspection vs Partial Inspection
  - How long do we have before ILI conversion or replacement?
    - *Objective not to replace ILI*

- **Validation**
  - Risk of falsely accepting a pipeline as Fit for Service
    - *Conclusions conservative and consistent with ILI or Hydro?*
Applications and Limitations noted for each technology and sensor

- Screening or High Res NDE
- Bare pipe? Thru coatings
- Speed and coverage

Technology Readiness

Focusing on pipe wall
- Not CP or coatings
Choose the correct NDE tool for the job

**Pipe Wall Screening for TML’s**
- Inside the pipe
- On the pipe
- Over the pipe

**High Res NDE at TML’s**
- High Accuracy, Large Samples, minimum surface prep

With Permissions from
1) i2pipelines
2) Innspection
3) Speir Hunter
4) Halfwave
5) Sonomatic
6) Tracerco
7) ApplusRTD
Remaining Gaps

- Improve detection and sizing capabilities of NDE technologies
- Continuous Monitoring of pipe system for leaks
- Provide information on the health of the system
- Detect metal characteristics
About PRCI

- PRCI is a research consortium of the world’s leading pipeline companies, and the vendors, service providers, equipment manufacturers, and other organizations supporting the industry

- 35 Energy Pipeline Operating Companies
  - 20 Natural Gas Transmission; 8 Liquid
  - 7 Liquid/Natural Gas

- 35 Associate Members & Technical Program Associate Members

- PRCI executes a member-directed R&D portfolio
  - Over $10MM of annual research budget
Technology Development Center - TDC
Pull Test Strings

Liquid Test Loop

Pipe Warehouse & Testing Space
1,158 total pipe samples; pipe size range from 2” to 52”
How to get Involved

Visit www.prci.org (or TDC@PRCI.ORG)

Click on “TDC” tab at top of page

Click on “Services” button

Under “pipe inventory & Warehouse” heading, click on “Request a pipe sample”
Questions?
Thank you

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