

Pipeline Research Council International, Inc.

Pipeline Safety Focus New Research Efforts to Improve Safety A Panel Discussion

*Pipeline Safety Trust Annual Conference
October 18-19, 2018
New Orleans, LA*



LEADING PIPELINE RESEARCH



Pipeline Research
Council International

LEADING PIPELINE RESEARCH

MISSION & STRUCTURE

Our Mission

To collaboratively deliver relevant and innovative applied research to continually improve the global energy pipeline systems.

Who We Are

PIPELINE

- Natural Gas
- Crude Oil & Petroleum Products
- Biofuels
- CO₂
- Related Facilities

RESEARCH

- Knowledge
- Technology
- Deployment & Transfer
- Innovation

COUNCIL

- Forum for Ideas & Opportunities
- Peer-based
- Industry-driven
- Source of Research Inventory

INTERNATIONAL

- North America
- Europe
- South America
- Asia
- Australia

PRCI Membership

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- **32 Energy Pipeline Operating Companies**
 - 17 Natural Gas Transmission; 7 Liquid
 - 8 Liquid/Natural Gas

- **4 Pipeline Industry Organization (PIO) Members**
 - American Petroleum Institute (API)
 - Association of Oil Pipe Lines (AOPL)
 - Canadian Energy Pipeline Association (CEPA)
 - Operations Technology Development (OTD)

- **34 Associate Members & Technical Program Associate Members**
 - Australia, Canada, China, Europe, Japan, U.S.

- **Worldwide Research Organization**
 - 45 North American Companies (U.S. & Canada)
 - 25 Non-NA (Australia, Brazil, China, Europe, India & Japan)



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RESEARCH OVERVIEW

Research Objectives

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1. **Develop and/or validate technology and analytical processes**
 - Capable of confirming pipeline material properties for pipeline integrity assessments
2. **Develop and enhance In-Line Inspection (ILI) technology**
 - Reliably detect, size and characterize specific indications that may be harmful to the integrity of the pipeline
3. **Develop, evaluate and enhance Non-Destructive Evaluation (NDE) technologies and operator & data analyst performance**
 - Focused on assessing the integrity of pipelines and associated infrastructure from outside or above the pipeline or facility.
4. **Confirm the fundamental integrity and safe operation of vintage pipelines**
 - Executed by expanding the applicability and reducing the uncertainty of Fitness for Service methodologies, including defining critical feature dimensions, associated models & response criteria.
5. **Develop, demonstrate and validate repair systems**
 - Including those that can be deployed on in-service facilities. Determine the useful life and safe operating envelopes of such repair systems.
6. **Develop, demonstrate and validate intrusion monitoring and surveillance technologies**
 - Enhance detection of third-party activities, ground movement and interferences potentially affecting pipeline infrastructure.
7. **Reduce all product leaks and equipment emissions from all parts of the hydrocarbon transport and storage infrastructure**
 - Developing, demonstrating and validating processes and technologies to detect, quantify and mitigate such releases
8. **Improve the efficiency, operational flexibility and availability of compressor & pump station, measurement and storage facilities**
 - Reduce the lifecycle cost of these facilities as flow patterns and market demands shift. Reduce custody transfer uncertainty and better identify trace gas constituents
9. **Define, understand and improve the key practices, including models, involved in the design, construction and integrity management of pipelines and related facilities.**

Technical Committees

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- **Design, Materials & Construction**
- **Corrosion**
- **Integrity & Inspection**
- **Surveillance, Operations, & Monitoring**
- **Compressor & Pump Station**
- **Measurement**
- **Underground Storage**
- **Subsea (New in 2019)**



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2017-19 ACTIVITIES

Sampling of 2017-19 Activity

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■ Design, Materials & Construction

■ *Substandard Properties In Pipeline Flanges And Fittings*

• Potential Impact of Results for the General Public:

- Aimed at improving pipeline safety by addressing failures of pipeline fittings and flanges known in the industry and identified by PHMSA and Canada's National Energy Board (NEB) that have been attributed to mechanical properties that do not meet specified minimums.
- The goal of the work product will be to influence revisions to CSA-Z245.11 and .12, and of MSS-44 and MSS-75 (both referenced by ASME B31.4 and B31.8) to include requirements and technical guidance to address this issue.

■ *Modernize the Assessment of River Crossings (Co-Funding with PHMSA)*

• Potential Impact of Results for the General Public:

- Intends to supplement guidance from API Recommended Practice (RP) 1133
 - » *API RP 1133 – "Managing Hydrotechnical Hazards for Pipelines Located Onshore or Within Coastal Zone Areas"*
- Expand and improve the capabilities of existing tools available to assess and monitor pipeline river crossings.
- Develop and adapt risk screening tools through advances in engineering analysis that are field validated.

Sampling of 2017-19 Activity

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■ Corrosion

- *Vapor Corrosion Inhibitors (VPI) Effectiveness for Tank Bottom Plate Corrosion Control*
 - Potential Impact of Results for the General Public:
 - VCIs are a viable alternative corrosion control measure, and could also be used in combination with cathodic protection.
 - Increased focus on better corrosion control for the pipeline industry

Sampling of 2017-19 Activity

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■ Integrity & Inspection

- *Integrity Assessment of Difficult to Inspect Pipelines Evaluating Select Areas Using High Resolution NDE - Extended Evaluation*
 - *Potential Impact of Results for the General Public:*
 - Better ways to evaluate Difficult To Inspect pipes for remaining life

Sampling of 2017-19 Activity

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■ Surveillance, Operations, & Monitoring

■ *The Use of Unmanned Aircraft Systems (UAS) for Pipeline Monitoring and Surveillance*

• Potential Impact of Results for the General Public:

- Verifying the use of long-range UAS for pipeline patrol
- Emphasis on the safe operation of larger UAS platforms flying Beyond Visual Line of Sight (BVLOS) of the pilot operator, which is a necessary capability for covering thousands of miles along relatively narrow right-of-way (ROW) corridors

Sampling of 2017-19 Activity

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■ Compressor & Pump Station

■ *Controlling Emission of Hazardous Pollutants, Enhancing Engine Reliability and Emission Compliance*

• Potential Impact of Results for the General Public:

- Since the change in ambient NO₂ standards by the US Environmental Protection Agency (USEPA) in 2010, it has been increasingly challenging to verify compliance at some compressor station facilities by utilizing the “AERMOD” tool.
- PRCI coordinated with others to gather a comprehensive dataset that included ambient NO, NO₂, and ozone measurements at four locations around a compressor station, parametric emissions from the compressor units, and meteorological conditions.
- Continued coordination with USEPA modeling team to work on validation and potential changes to the USEPA AERMOD tool.

Sampling of 2017-19 Activity

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■ Measurement

- *Development of a Standardized Test Protocol for Ultrasonic Meters*
 - Potential Impact of Results for the General Public:
 - Development a standardized test protocol for the calibration of ultrasonic meters with a corresponding database to capture the calibration data and associated meter diagnostics information.
 - Better measurement means better information for custody transfer as well as in any modeling used for leak determination

Sampling of 2017-19 Activity

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■ Underground Storage

- *Methane Leak Detection and Quantification Systems for Underground Storage Facilities*
 - Potential Impact of Results for the General Public:
 - Testing to demonstrate the ability of sensors to continuously monitor the magnitude of emissions, allowing operators to understand the impact of operational activities on emissions and track the benefit of emissions mitigation efforts
- *Evaluation of Well Casing Integrity Management for Underground Storage Wells (Co-Funding with PHMSA)*
 - Potential Impact of Results for the General Public:
 - Provide the industry a better understanding of the current state of the storage well logging tool technologies and their performance, factors affecting the tool response, and the suitability of available methods to calculate remaining casing strength.
 - Understanding will reduce uncertainty in the evaluation of storage well casing integrity through accurate assessment of reliability, leading to improved decisions regarding well interventions and allowable operating parameters.



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**TECHNOLOGY
DEVELOPMENT
CENTER**

Technology Development Center (TDC) Houston, TX

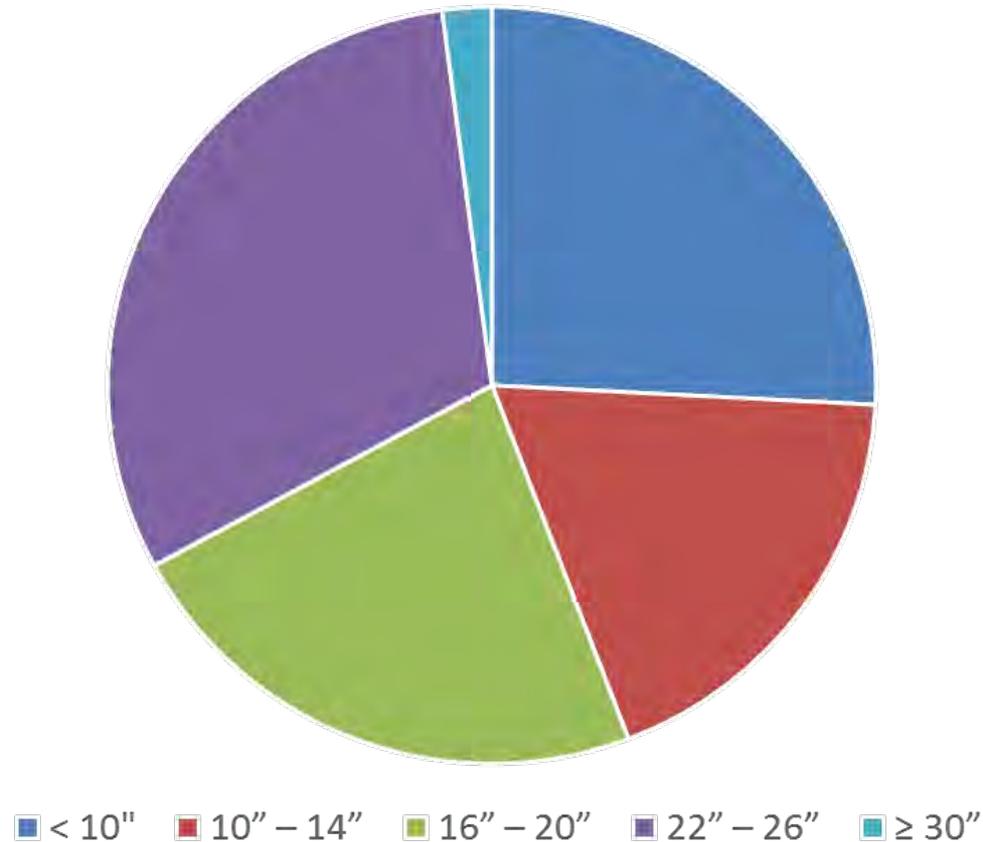
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TDC Pipe Sample Distribution By Diameter

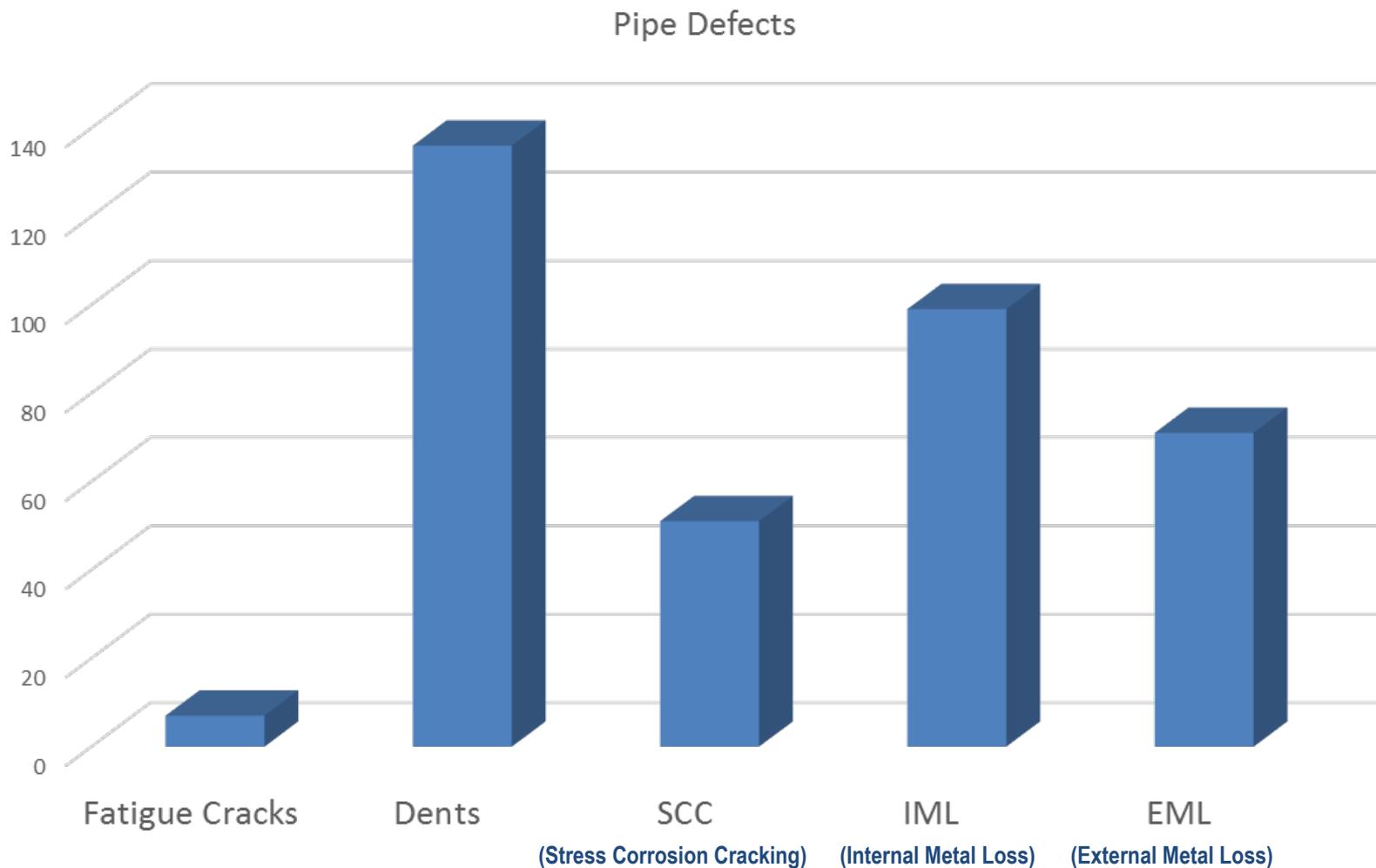
Total Pipe Samples: 1,158

Inventory By Diameter



TDC Pipe Inventory – By Flaw Type

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PRCI's Value Proposition

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- **Demonstrated, Positive *Benefit:Cost* Results**
- **Highly Leveraged Research Investment**
- **Earliest Access to, Understanding of, & Confidence in Research Results**
- **Ability to Shape the Research Agenda**
- **Sustain & Expand the Members' & Industry's Knowledge Base**
- **Participate in a Global Consortium of Ideas & Solutions**
- **Enhance the Public's Perspective**



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**More Information Through
“Year In Review” Publications:**

<https://www.prci.org/About/YearsinReview.aspx>

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