Pipeline Research Council International

Incident Data Analytics at PRCI

Data Institute

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PRCI

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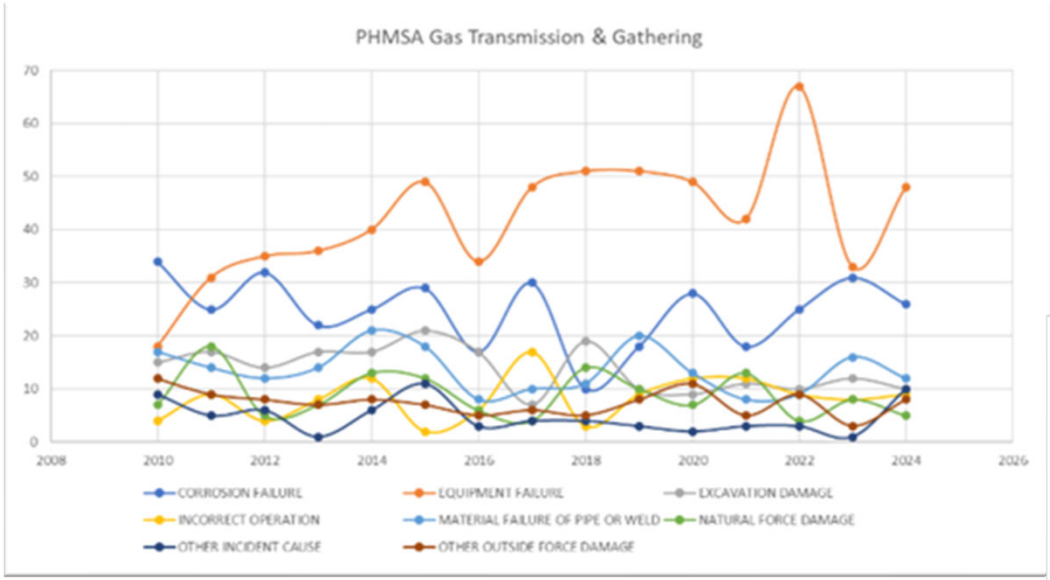
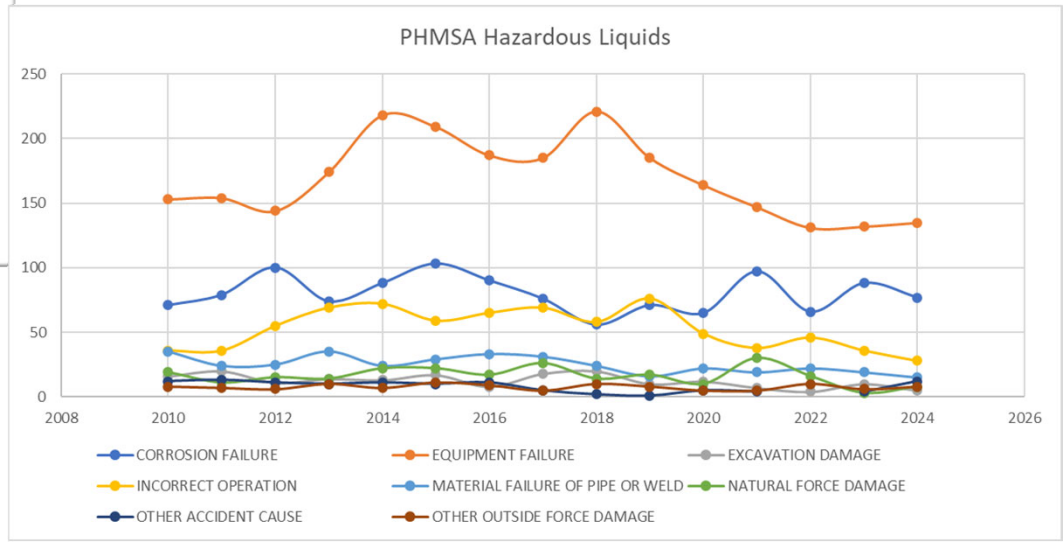
LEADING PIPELINE RESEARCH

All data – Facilities and Pipeline





When all data is together Equipment failure dominates. But analysis is too broad – needs sub-division, trending, normalizing etc for better analysis.

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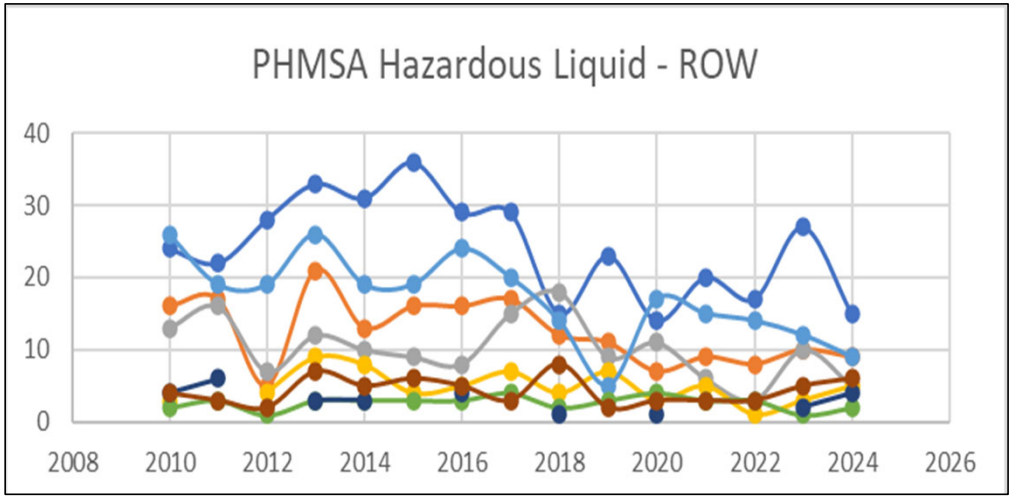
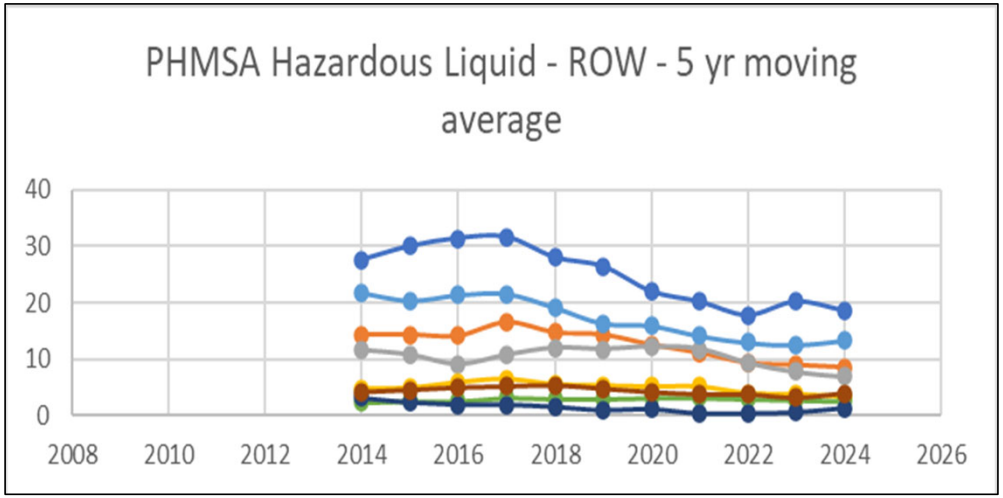
PHMSA Hazardous Liquids (2010 to 2025) – ROW - Trending – Removing Noise





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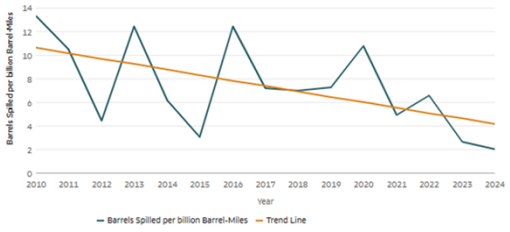
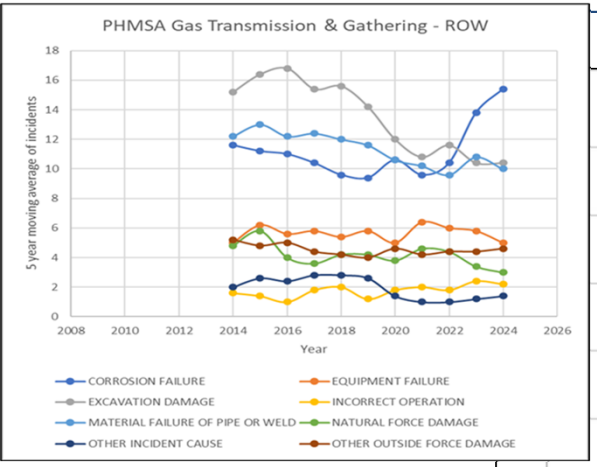
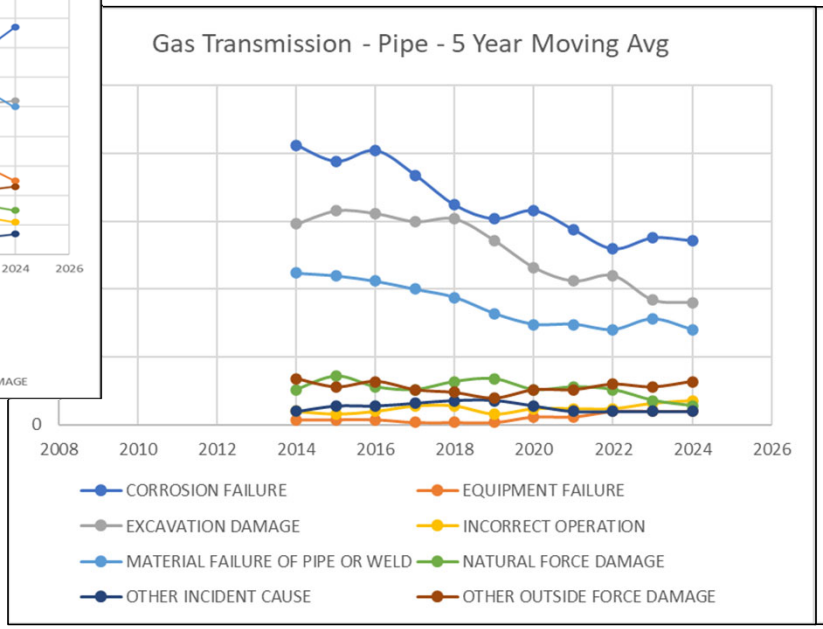


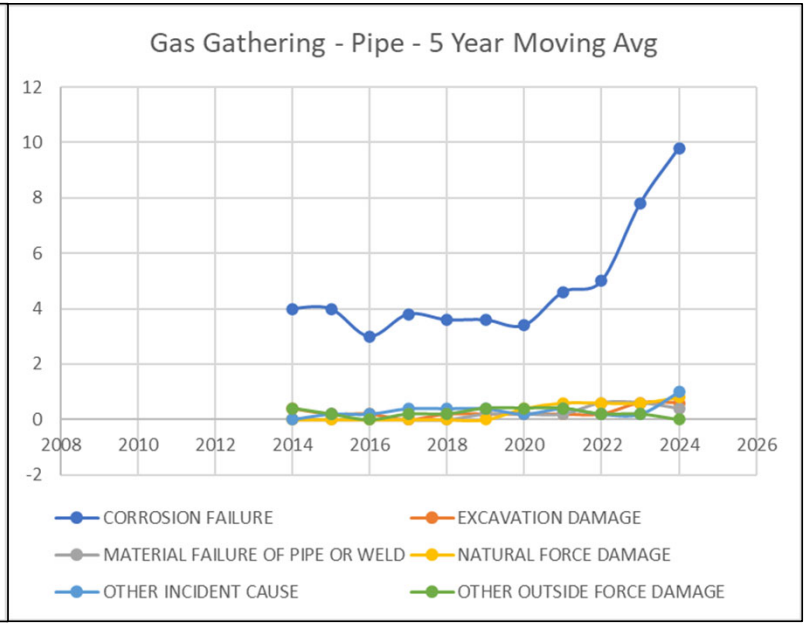
The volume spilled rate per billion barrel-miles transported has fluctuated since 2010.

Liq ROW:
Historically and lately Corrosion, Mat. (incl.cracks) dominates on ROW but has a recent downward trend.

Gas Transmission vs Gas Gathering for pipe

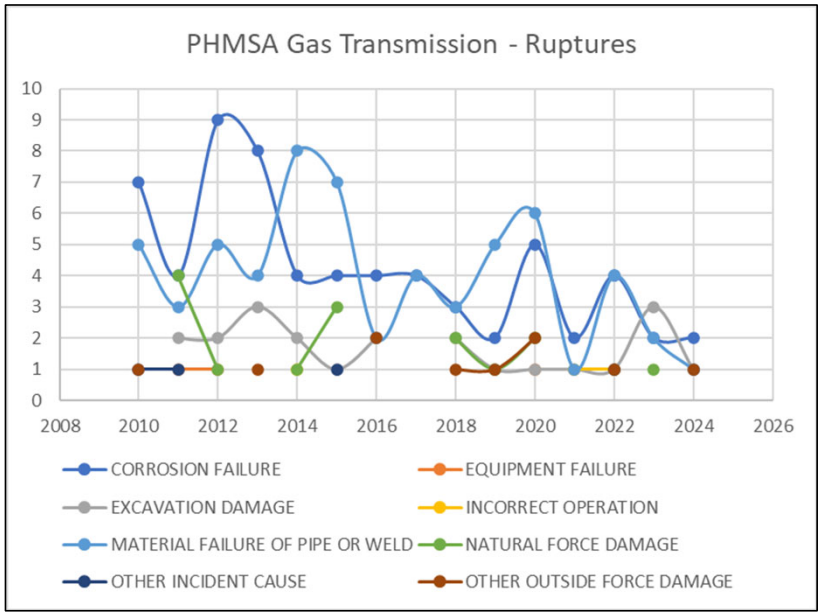


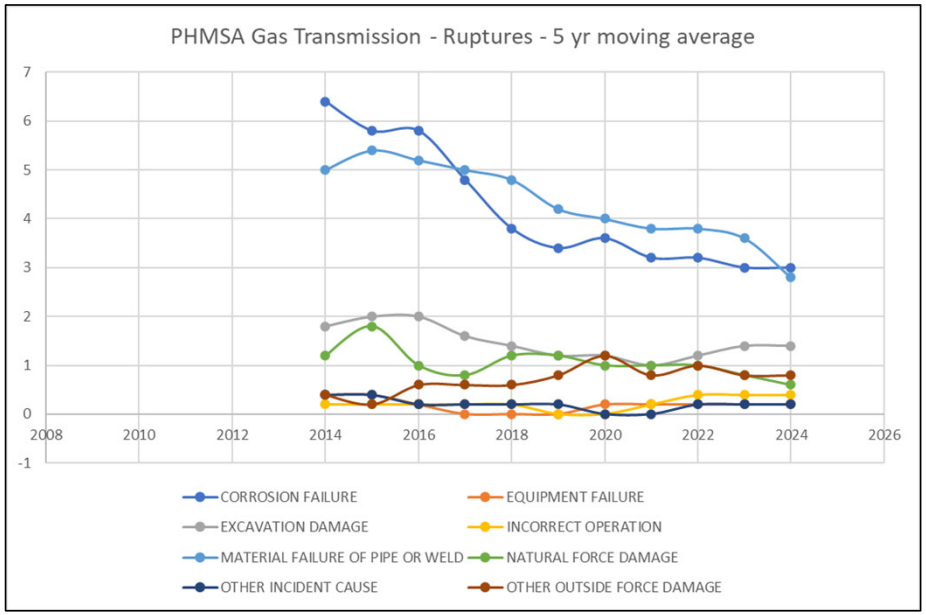




Gas Transmission – dominated by Corr, Exc. dam., and Mat. Failures all trending down
Gas Gathering – Dominated by Corrosion and trending up (particularly onshore)

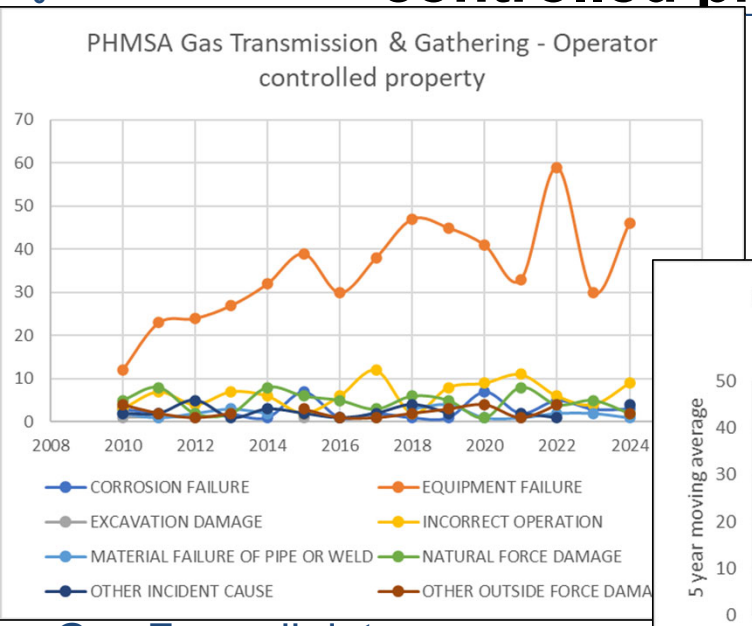
Gas Transmission - Ruptures

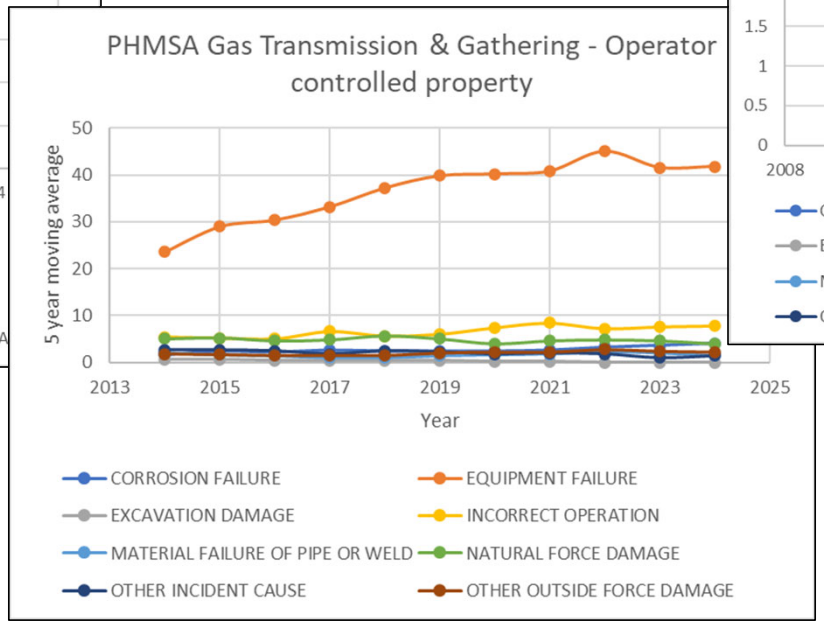


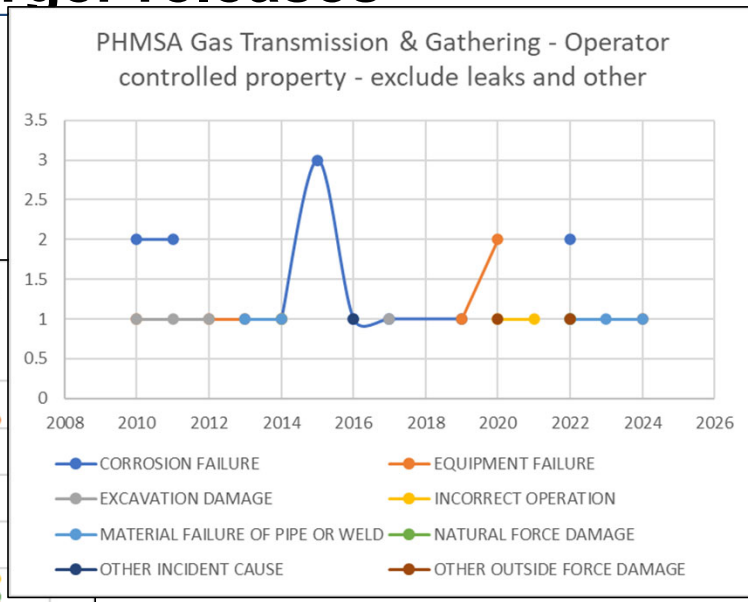


Gas Transmission Ruptures:
Corrosion & Mat Failures dominate but have a downward trend.

Gas Transmission & gathering(2010 to 2025) – Operator controlled property – trend and larger releases



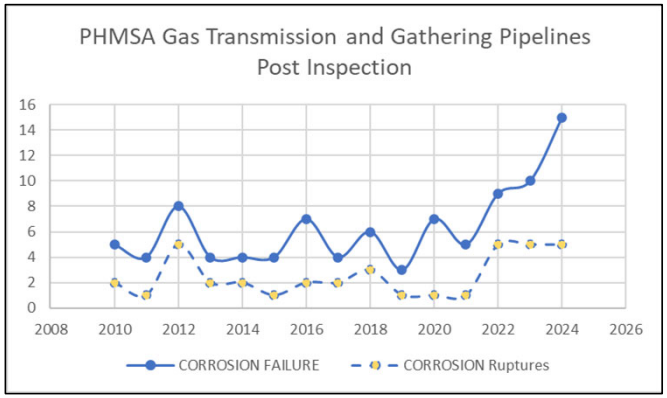


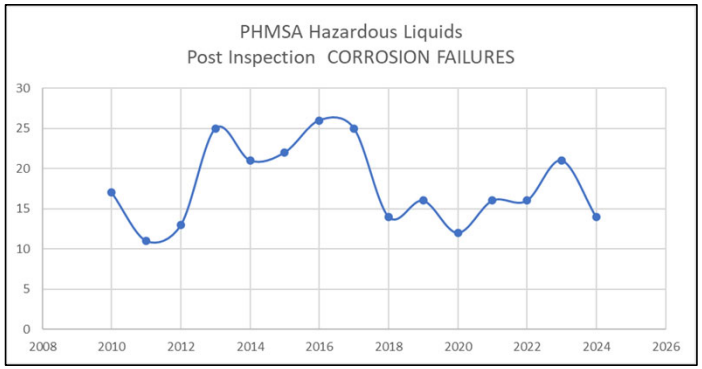


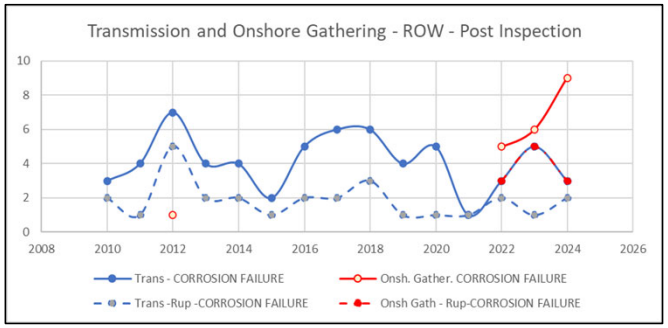
Gas Fac.: all data - Equipment failure dominates. Equipment failure is a broad category with leaks and other (mostly relief valve and venting…)

When leaks and other are removed – no highly dominant causes – Corr and Exc

Post ILI trends – not normalized

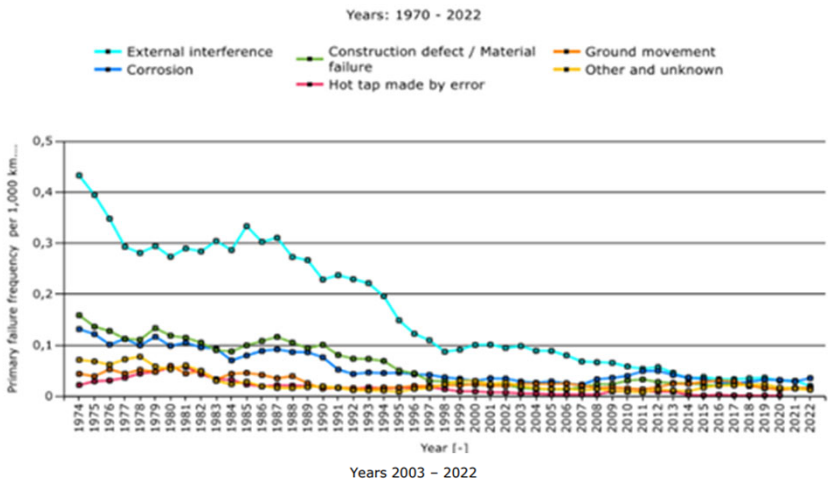


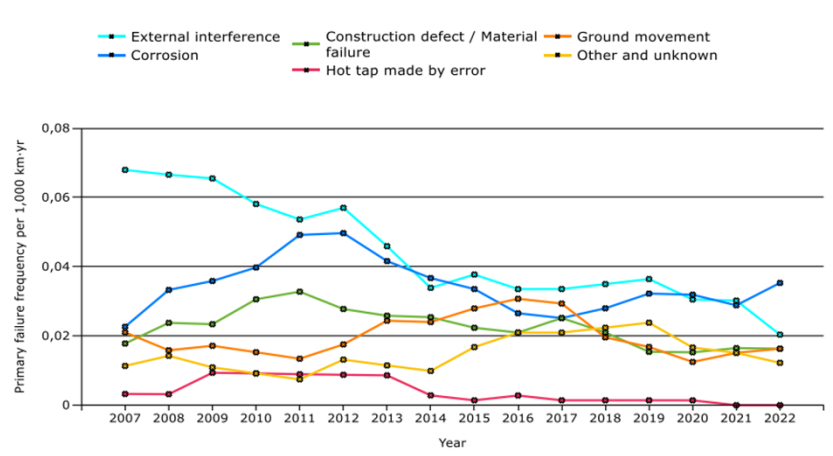


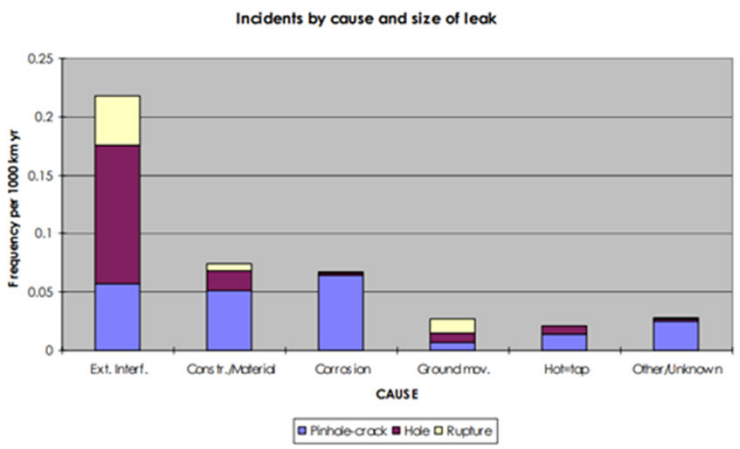


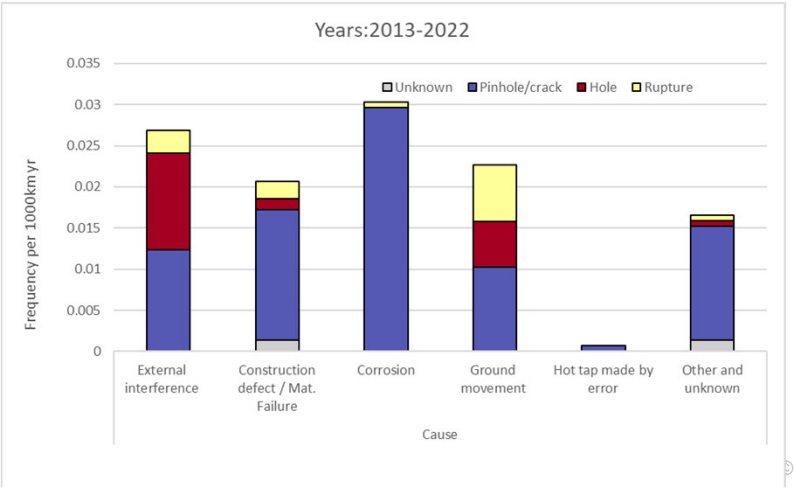
Gas and Liq: Investigate Post ILI Corrosion failures and ruptures. Normalizing data will give better view.

EGIG Trends









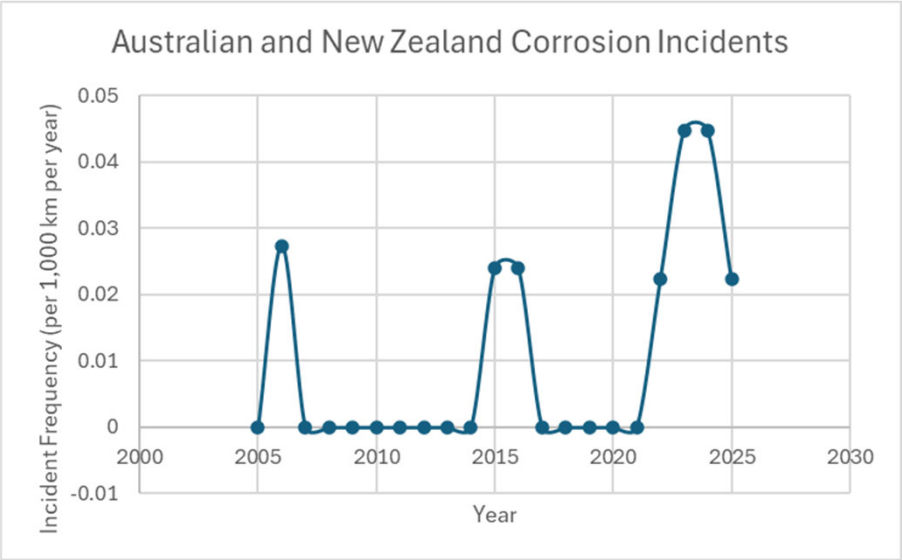
Historically EGIG Top Threats:

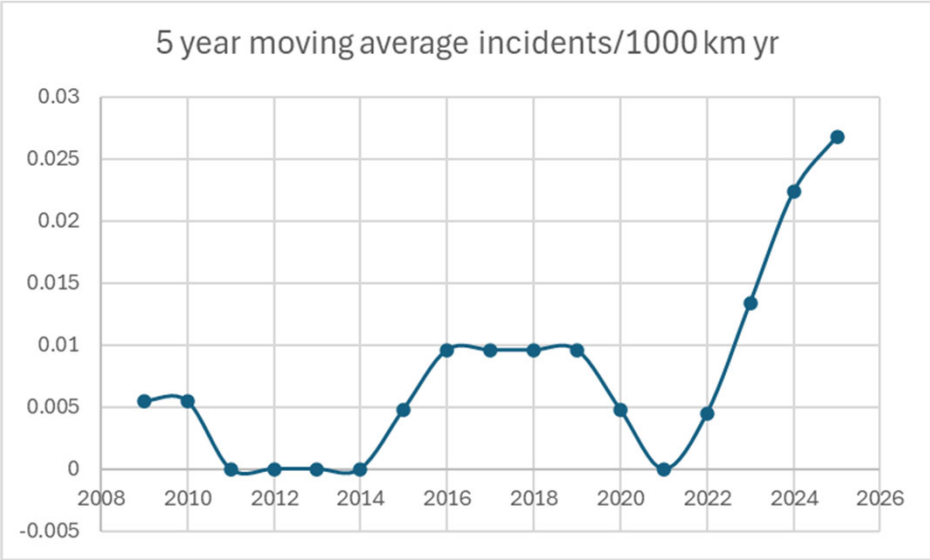
1. External Interference - leading
2. Construction / Material Threats
3. Corrosion

More Recent Trends (lower than historical):

1. External Corrosion (mostly leaks- 2 ruptures)
2. External Interference
3. Ground Movement

Australia and New Zealand

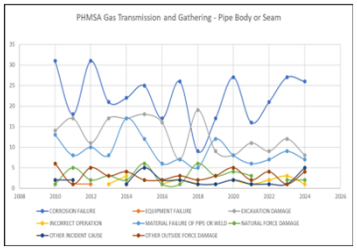


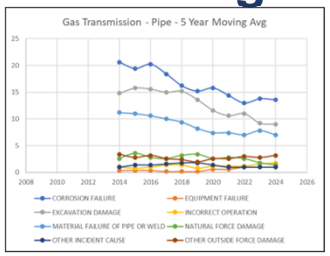


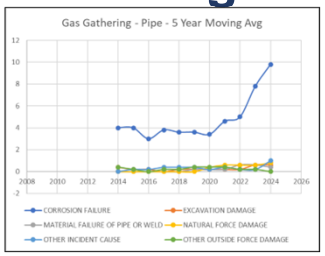
Safety and Performance Data Analytics

Three kinds of Lies: Lies, Damned Lies, and Statistics ~ Twain/Disraeli

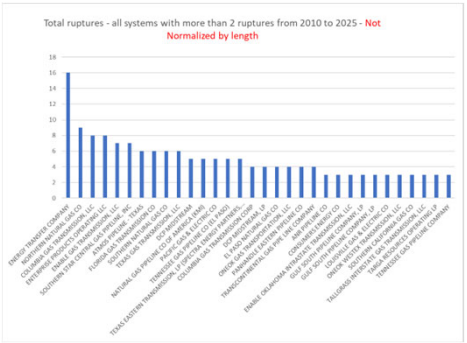
- **Enable user defined slicing and dicing for meaningful data analytics**



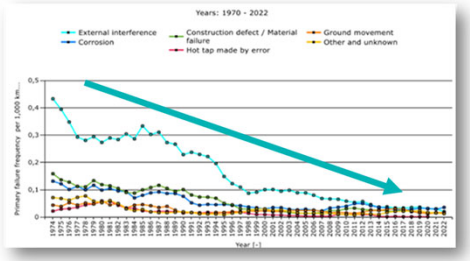




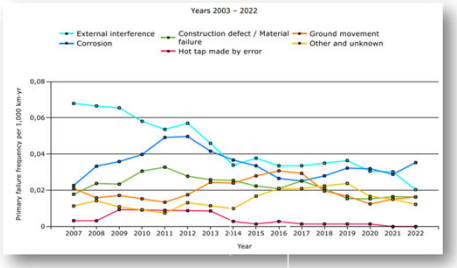
- **Enable company performance data analytics and further sharing by members**
- **See International trends and learn early and drive R&D**



Looking at 50 years of Data



More Recent Data - 20 years



Know your stats, so no one can fool you!

thank you

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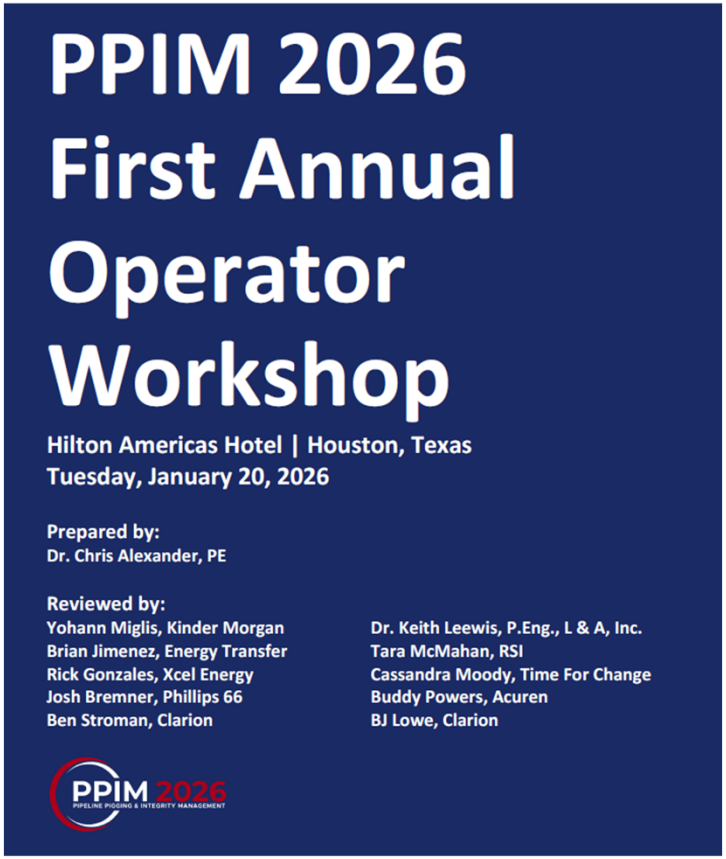
Pipeline Research Council International

PPIM Operator Workshop - SWOT Analysis

SWOT Analysis of Inspection, Materials, Engineering, and Assessment practices in pipeline industry. Gaps:

1. Lack of standardized data integration and risk frameworks.
2. Non-standardized NDE validation and feedback loops.
3. Workforce and knowledge-transfer challenges.
4. Procurement practices misaligned with integrity outcomes.



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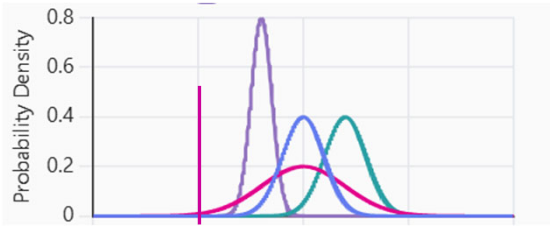
Value Stories 1 of 4

- Material properties have different distributions based on manufacturer, process, and vintage
- If an operator is missing material properties regulators require industry minimums(worst case) to be used in engineering assessments(EAs) - this will lead to many more remedial actions



- PRCI Material property data base collates data from many operators and can establish different distributions for each category
- With data for actual vintage and manufacturer EAs will safely give fewer remedial actions.
- Historically 100+ of digs have been avoided saving +$10 M

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Value Stories 2 of 4

- Pipeline burst tests required for validating assessment models cost around $30 to $50 k each
- Original Psqr project had 30 data points
- In the Peer review project the SMEs were able to find 160 other tests to extend the validation and build industry confidence
- Some of the data from historical PRCI projects were never stored
- PRCI members can save millions of dollars(~5 M in above case) by reusing burst tests as appropriate to verify models and processes and improve safety with wider testing

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Value Stories 3 of 4

- PRCI member had a “Complex Corrosion” failure in 2009 and shared that information with PRCI members
- Other members who had similar failures also shared and built a “Complex Corrosion Criteria” based on those failures.
- This work was published and shared
- One operator used this criteria and identified a dig. While they were in the field for the dig the ground shook and, as they bolted, it ruptured!
- Sharing does help us discover potential failures which cost $1Million* to 1.5 Billion*

* PHMSA Data

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Value Stories 4 of 4 - Know your own stats to counter misinterpretation

- **Many misinterpretations are used to drive regulations and actions**
- **Cased crossings failures – assumed to be shorted, and asked to clear 100s, but data showed that the ruptures were not shorted and that ILI can adequately inspect cased pipe**
- **Counter misinterpretations to reduce unfounded drivers and knee jerk reactions that drive unreasonable actions and reputational issues.**

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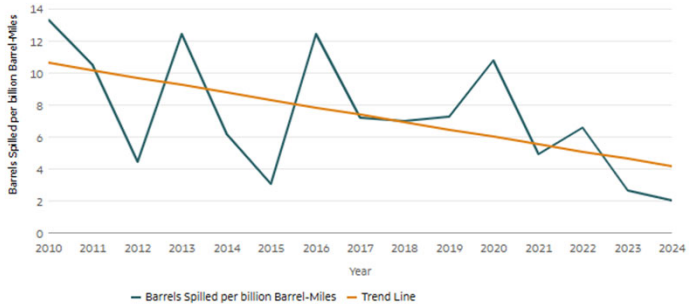

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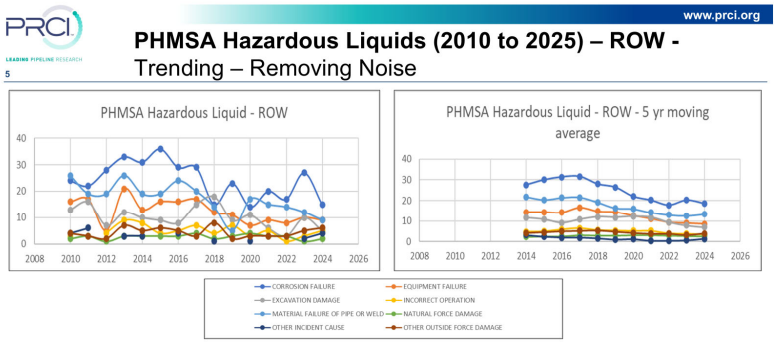

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