COMMON PIPELINE ANOMALIES
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Better Cleaning, Better ILI Data
Better ILI Data

ILI PERFORMANCE
Methodologies
Calibrate and verify our sizing models

Real Corrosion
Machining
ECM Defects
ILI PERFORMANCE
Methodologies
Process requires quality source data

Machined defects
ECM defects
Pull testing

Signal capture
Parameterization

We are Pipeline Integrity
ILI Solutions-Based Innovation

Caliper Deformation Technology
MFL Multi-Tech Tool
MfL Combo Tool

MfL MULTI-TECH ILI TOOL
MfL Combo Tool

MFL SENSOR DENSITY
RESIDUAL SENSORS

PRIMARY MFL RING
SECONDARY MFL RING
CALIPER
General Corrosion
Pinhole Metal Loss
External Metal Loss
Internal Metal Loss
Laminations

Internal/External Defects
Anomaly sizing required
Variables:
  - Defect Interactions
  - Wall Thickness

Anomaly Classification Chart
Pinhole Metal Loss
- Sized below .394" x .394"
- Not required to be through-hole anomaly
- Edges that drop off quickly
- Smallest defect
- May be associated with MIG

External Metal Loss
- Metal Loss signature (peak) on MFL data set
- No internal surface change measured
Internal Metal Loss

- Metal Loss signature (peak) on MFL data set
- Internal surface change measured

Lamination

- Mid-wall originated anomaly
- Requires internal surface break for classification (MFL technologies)
MFL MULTI-TECH ILI TOOL
RESIDUAL

SECONDARY MFL RING
ENHANCES ANALYSIS

Mill Defects
Heat Affected Zones (HAZ)
• Sharp bipolar signal on the MFL and Residual data sets
• Internal surface change measured
• Non-typical Dent or Metal Loss signature

Heat Affected Zones (HAZ)
• Internal surface change measured
• Metals in close proximity (MFL)
• Can make determination between:
  • Type A Sleeves (Reinforcing)
  • Type B Sleeves (Pressure Containing)
MFL MULTI-TECH ILI TOOL CALIPER

MFL CALIPER SENSORS

CALIPER RING

Dents
Pitting
Pipe Bend Strain
Misalignments
CALIPER RING

Dents
- Dent signature (fairly smooth movement on Caliper and MFL sensors)
- Caliper Sensors show movement in the interior of the pipe

MFL CALIPER SENSORS

CALIPER RING

Gouges
- Pipeline metal has been upset
- Identification of third party damage
GEOMETRIC DETECTION

Dents

Pipe Bend Strain

ID/OD & Pitting

MfL

CALIPER SENSORS

CALIPER RING

Misalignments (Hi-Low Welds)
  - Offset girth welds
**MFL MULTI-TECH ILI TOOL**

**MFL – Multi Data Sets**

- **MFL SENSOR DENSITY**
- **RESIDUAL SENSORS**
- **CALIPER**

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**Dent with Metal Loss**

- Dent signature on Caliper data set
- External Metal Loss signature on MFL data set
- Metal Loss occurs at same position/orientation as Dent

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Expansions

- May occur in complete pipe joint or the middle of a pipe section.

Wrinkles

- All Caliper Sensors move from baseline.
Most dents, especially on large diameter pipeline, will be “Combination Anomalies”; they contain both denting and ovality.
MFL MULTI-TECH ILI TOOL
Internal Metal Loss near Weld

MFL sensor density
Residual sensors

Primary MFL ring
Secondary MFL ring

Gouges

Internal Metal Loss near Weld

Gouges
Data Analysis

Visualize
Multiple sensor displays for each on-board technology.

Report
Easy export of priority feature lists, plots and dig sheets.

Explore
Intuitive navigation of your ILI data.

THANK YOU