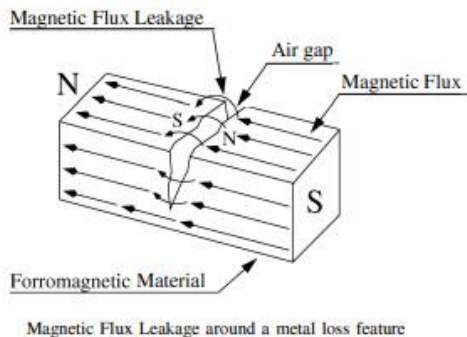
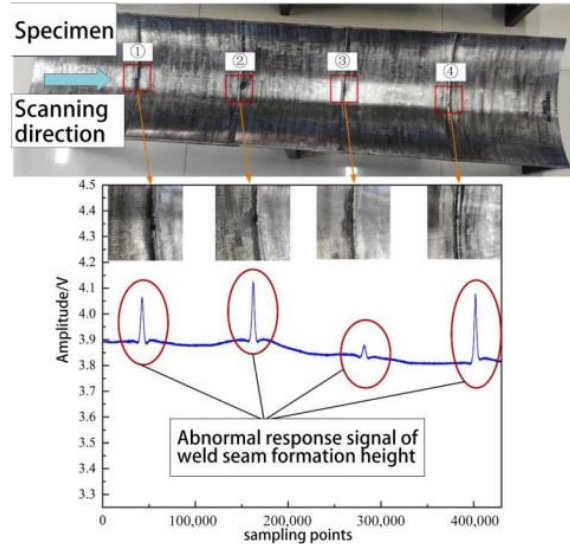


Background: ILI (In-Line Inspection) inspections involve using specialized tools, often referred to as "pigs," to assess the condition of pipelines from the inside. These inspections help detect anomalies such as corrosion, cracks, dents, or metal loss, ensuring the integrity and safety of the pipeline. ILI tools gather high-resolution data while traveling through the pipeline, enabling pipeline operators to make informed maintenance decisions.

Aim: The aim of this program suite is to identify weld seams in pipeline In-Line Inspection (ILI) data. Weld seams are critical structural points that join pipeline sections, and detecting them accurately is essential for inspection and maintenance processes.



MFL-based pipeline inspection tools (Source: Baker Hughes Inc., www.bakerhughes.com)



Abnormal response signal of girth weld formation height.

Results:

- **Detection of Peaks in Inspection Data:** The program processes pipeline inspection data by standardizing and smoothing readings using moving averages. Peaks are then detected in the standardized and smoothed data, highlighting potential weld seams.
- **Fluctuation Analysis:** Standard deviations of specific inspection channels (IRC columns) are analyzed to identify fluctuations. Sections with significant fluctuations across multiple channels are flagged as potential weld seams.
- **Combining Results:** The results from peak detection and fluctuation analysis are merged using logical conditions to produce a final dataset identifying weld seams accurately.



Content:

1. PHH.csv -Input file containing primary inspection data, including a column (avg) used for peak detection.
2. prim_flags.csv - Output file with standardized, smoothed data, and flags for detected peaks. (not uploaded to GitHub repository due to huge volume)
3. IRC.csv - Input file with secondary inspection data (IRC columns) used for fluctuation analysis.
4. sec_flags.csv - Output file containing moving standard deviations and flags for significant fluctuations. (not uploaded to GitHub repository due to huge volume)
5. final_flags.csv - Final output file listing detected weld seams based on combined peak detection and fluctuation analysis. (not uploaded to GitHub repository due to huge volume)