Gaining Further Understanding and Insights of Crack Features from Data Collected by ILI Crack Tools

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Pipeline Analytics

The Opportunities

- Improve characterization of cracks in curved surfaces such as in and around dents, wrinkle bends, and curved fittings

- Improve system performance of ILI Crack tools when inspecting Natural Gas Liquid (NGL) pipelines

- Development of hardware and data acquisition systems that support the use of available sophisticated scientific computing and visualization techniques

Flexible and Surface Adaptive Ultrasonic Arrays & Shape Sensing Fibers

Inspecting curved surfaces of jet engine parts & aircraft structures

Chris J. Lane, Rolls Royce, 2014

Probe + Part	Without SAUL	With SAUL

D. L. Hopkins, et al., BERCLI Corp, 2014
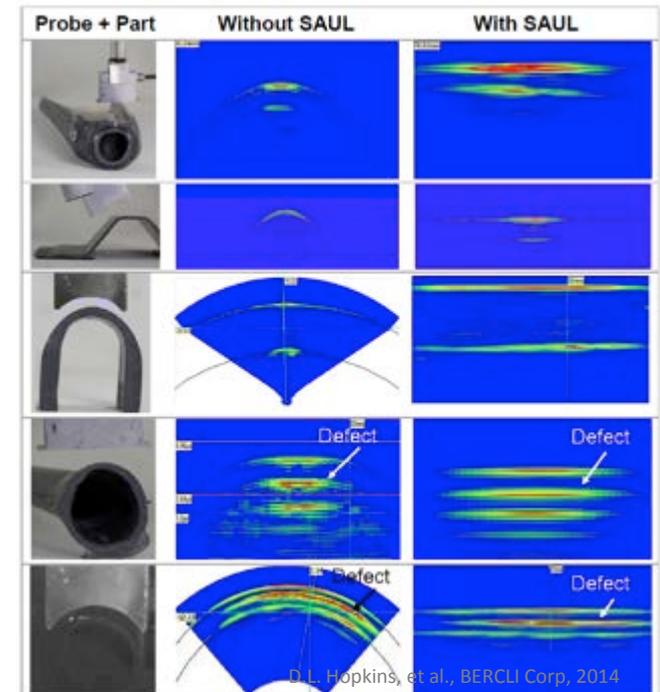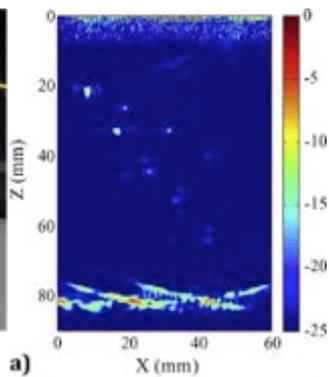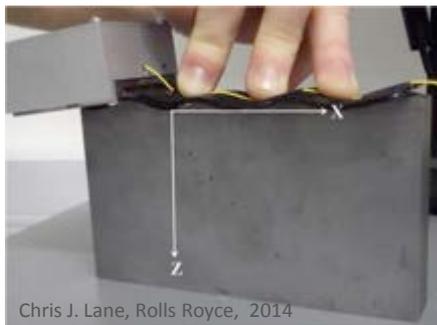
Improve UT ILI Crack Tools for Inspecting Natural Gas Liquids (NGL) Pipelines
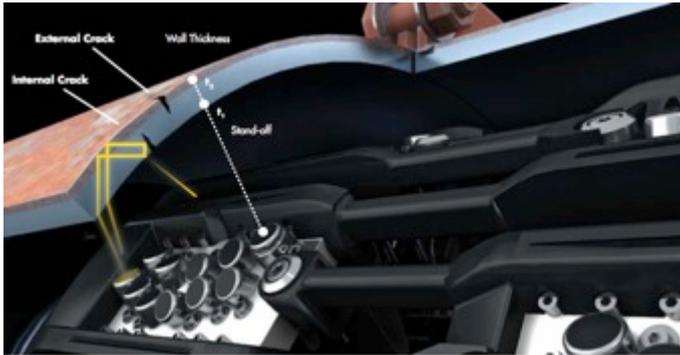
Keeping signal attenuation within a target range of multi-phase fluid NGLs is a challenge

NGL Attribute Summary

Natural Gas Liquid	Chemical Formula	Applications	End Use Products
Ethane	C_2H_6	Ethylene for plastics production; petrochemical feedstock	Plastic bags; plastics; anti-freeze; detergent
Propane	C_3H_8	Residential and commercial heating; cooking fuel; petrochemical feedstock	Home heating; small stoves and barbeques; LPG
Butane	C_4H_{10}	Petrochemical feedstock; blending with propane or gasoline	Synthetic rubber for tires; LPG; lighter fuel
Isobutane	C_4H_{10}	Refinery feedstock; petrochemical feedstock	Alkylate for gasoline; aerosols; refrigerant
Pentane	C_5H_{12}	Natural gasoline; blowing agent for polystyrene foam	Gasoline; polystyrene; solvent
Pentanes Plus*	Mix of C_5H_{12} and heavier	Blending with vehicle fuel; exported for bitumen production in oil sands	Gasoline; ethanol blends; oil sands production

C indicates carbon, H indicates hydrogen; Ethane contains two carbon atoms and six hydro
*Pentanes plus is also known as "natural gasoline." Contains pentane and heavier hydroca

US Energy Information Administration, 2014

Development of Hardware and Data Acquisition Systems that can Support Higher Level of Scientific Computing and Visualization

C-scan of crack inspection data
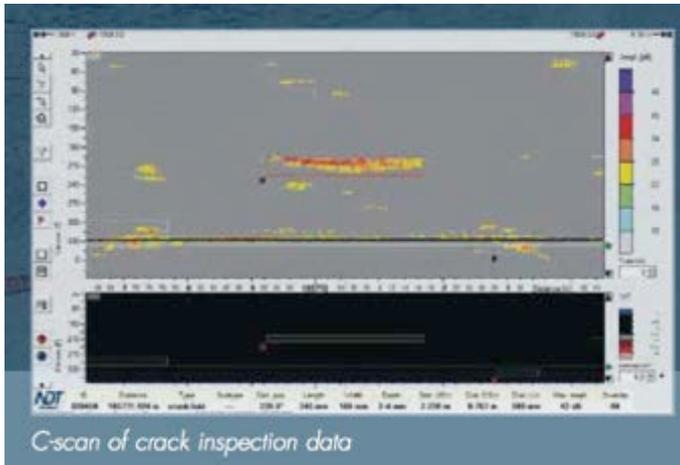
What additional insights and patterns can be obtained by analyzing these data through advanced scientific computing and visualization methods?
…***what else could the data be telling?***

Obtain higher definition of crack shape, size and interaction through 2D-3D image analysis and statistics

Data Driven Pipeline Analytics
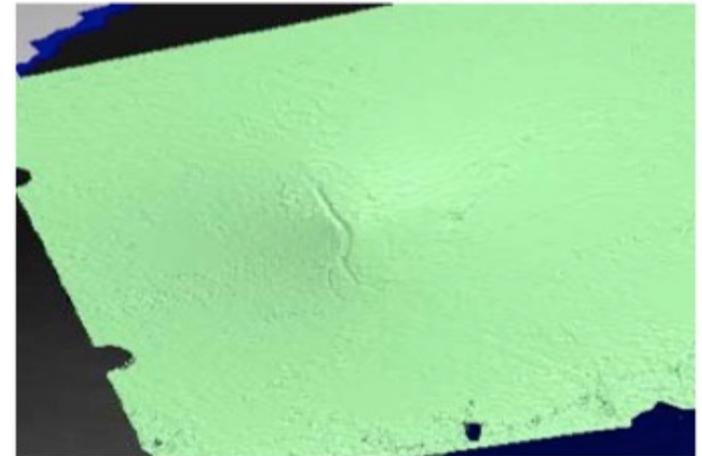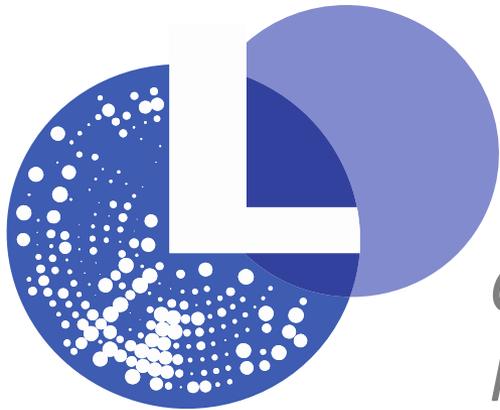
Committed to Enhancing Pipeline Integrity