ENHANCED GIRTH WELDING PROCEDURE QUALIFICATIONS
TO PRODUCE STRAIN-RESISTANT GIRTH WELDS

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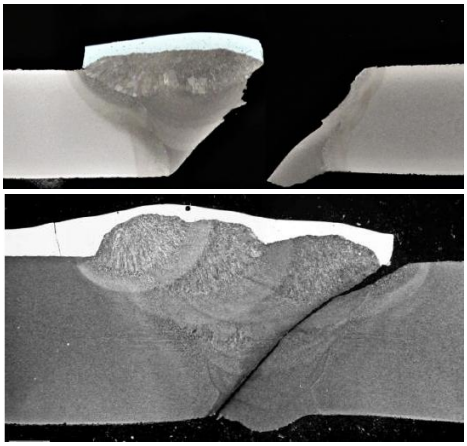
Why?

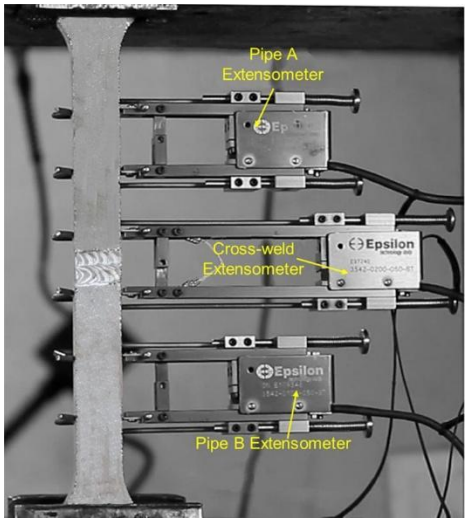
- Girth weld failures have occurred in newly constructed pipelines during service and in pre-service hydrostatic testing.
- Girth welds meeting the minimum requirements of standards may not be sufficient to resist actual loads from pipeline construction and operations.
- Higher-quality and strain-resistant girth welds can be made and qualified with minimal extra costs using an enhanced welding procedure qualification process.



Cross-sections of two failed girth welds

What Are the Benefits of Enhanced Qualifications?

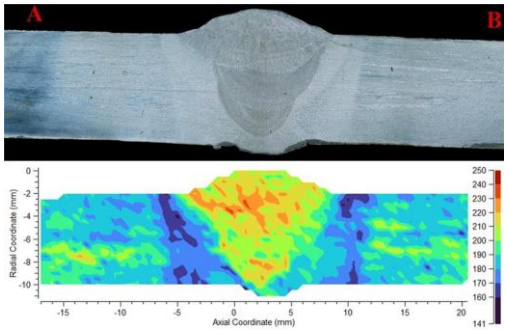
- Reduced risk of girth weld failures that can lead to negative societal and economic consequences
- Having greater flexibility in the execution of construction projects, including pipe replacement projects
- Reducing life-time cost of pipelines
- Meeting regulatory requirements and expectations



Instrumented cross-weld tensile test developed and implemented by CRES

What Does Enhanced Qualification Include?

- Development of a flexible and actional qualification plan tailored to company and project needs
- Review of existing qualified procedures to determine their adequacy to meet project needs and implied weld resilience
- Selection of welding processes and consumables
- Fabrication of qualification welds
- Selection of qualification tests to meet regulatory and company requirements
- Quantitative characterization of the strain resistance of qualified welds
- Guidance on the use of qualified procedures, including code compliance and setting applicable limits, such as maximum actual pipe strength



An etched girth weld macro (top) and its corresponding microhardness map (bottom)

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