Operators Perspectives of Composite Repair Systems for Energy Pipelines

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Outline

• What Operators look for in composite repair systems
• What is the vision for repairing energy pipelines with composite sleeves, for the next 5-10 years?
• Perspectives for future developments and applications of composite repairs
What Operators Look for in a Composite Repair System

• Easy Installation & Durability Continue to be Top Priorities
  – Tightening of sleeves, banding and cure time
  – Stability of hardenable filler and its load transfer ability

• Some Concerns
  – Long term reliability of composites
  – Training and certification of installers...why the need for training the trainer?
  – Limitations of composite sleeves for repairing defects...promote products within their proven and intended design purpose
What is your vision and direction for composite sleeves?

• What do you see happening in the next 5-10 years to composite repairs for the energy pipeline market?

• What are the challenges and opportunities for composite repair sleeves in this industry?

• What can we start doing now to develop repair systems applicable to more severe and complex damage on pipelines rather than installing metal sleeves or performing cut outs?

• What can this group do?
Perspectives for Future Applications of Composite Repairs

• Demonstrate the ability to repair crack-like indications and seam weld anomalies with composite sleeves
  – Type B sleeves: generally regarded as the standard
  – If the use of composite repairs for aircrafts have been proven and certified, why not proving and certifying composite systems for repairing cracks on energy pipelines?
  – What is it going to take to do this?
  – Where do we start?
Considerations When Developing Composite Repairs for Cracks

• Understand the physical behavior of cracks and seam weld anomalies on pipelines
  – Know the physics, science and engineering principles that describe and govern crack formation and growth in pipelines

• Demonstrate that the stiffness of composite sleeves will not allow operational cyclic or sustained stresses/strains to drive crack grow

• Know the principles that govern structural reinforcement of sleeve repairs on cracks on pipelines
  – With sleeve repairs, generally we are after restraining bulging at defect

• Demonstrate stability and durability of composite repairs under pipeline operational conditions
  – Approx 25 years since we started installing composite sleeves, what have we learned?

• Validate engineering analysis and meet expectations or applicable certification requirements through full scale testing program
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