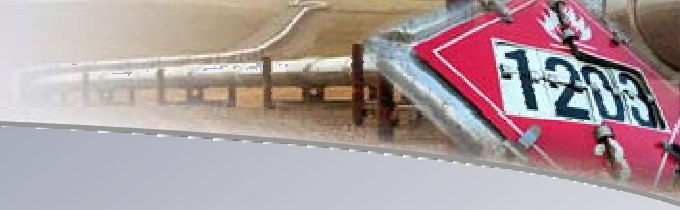


PHMSA Pipeline Safety Research

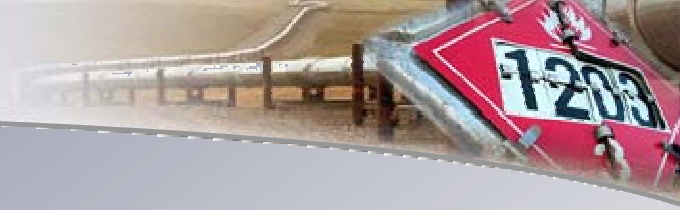


**Track Session on Anomaly Remediation/Repair
June 24-25, 2009**



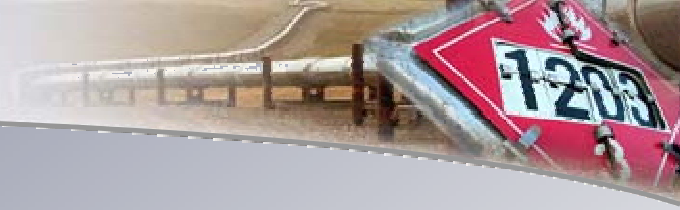
Remediation/Repair Strategy

- Improving the integrity of pipeline facilities through enhanced repair tools, materials, techniques or processes.



Project Types Underway

- PHMSA's R&D program has sought relevant topics in nearly all research solicitations since 2002.
- Approximately 15 related projects with:
 - \$3 M PHMSA + \$3.4 M Industry co-sponsoring
- Projects are relevant to technology development, the strengthening of standards and the generation of general knowledge.
 - The lion share of projects are addressing general knowledge and are complete.

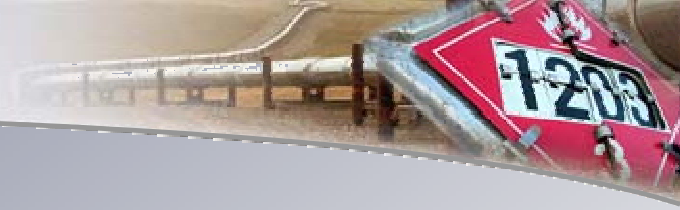


Project Types Underway

General Knowledge work continues:

- Development of HAZ Hardness Limits for In-Service Welding
 - To develop heat-affected zone hardness acceptance criteria that can be used to evaluate welds during the qualification of procedures for welding onto in-service pipelines.
- Evaluation and Method for Qualification of Fiber Reinforced Composite Repair Techniques for Transmission and/or Distribution Pipelines
 - To develop a method for qualification of fiber reinforced composite repairs while simultaneously evaluating the products that are currently available for operators.

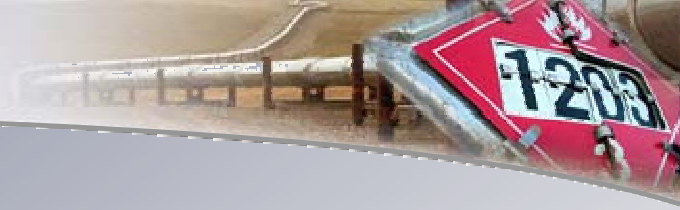
There are currently only two active project relevant to the subject matter.



Project Impacts To Date

Technology Impacts:

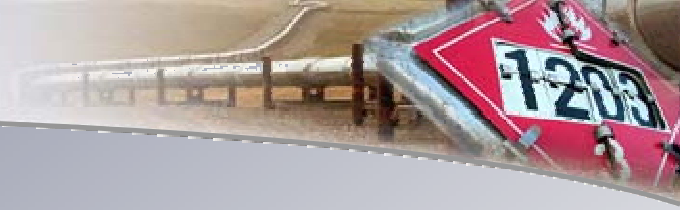
- "Advanced Welding Repair and Remediation Methods for In-Service Pipelines"
 - An automated system that takes 30 minutes to mount on the pipeline and 36 minutes to make all the fill passes (1.1 hours total) at an estimated cost of \$176.00 per reinforcement sleeve (Type A). This new automated system is approximately 2.3 times faster and 62% cheaper than manual welding.
 - Commercialized with BUG-O Systems, Inc.



Project Impacts To Date

Strengthening Standards:

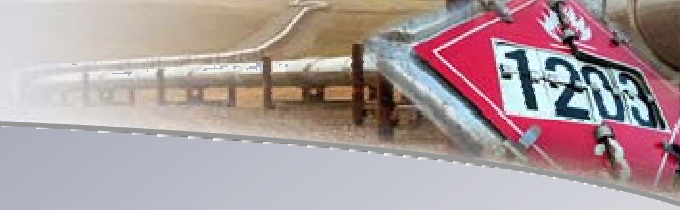
- API Std 1104, "Welding of Pipelines and Related Facilities" was revised from a project addressing the Improved Inspection and Assessment Methods for Pipeline Girth Welds and Repair Welds.
- Other project results sent to relevant committees for use in revising the standard:
 1. High CP Potential Effects on Pipelines – NACE RP 0169
 2. Development of HAZ Hardness Limits for In-Service Welding - API Std 1104
 3. Pipeline Assessment and Repair Manual – ASME B31.4/B31.8, API RP 579



Project Impacts To Date

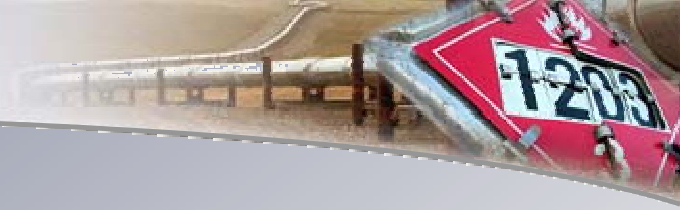
General Knowledge:

- Joint Industry Project “DW RUPE: Deepwater GOM Pipeline Damage Characteristics & Repair Options” developed and increased confidence in the industry’s response ability to repair underwater pipeline in water depths from 1,000 to 10,000 feet.
- “Assessment & Validation of TFI-Identified Anomalies Criteria for Repair and Available Repair Methods” is now assisting the industry and government in evaluating the severity of seam weld defects from recent seam weld incidents.



Remaining Challenges

- Remediation & Repair challenges require solutions having people, process and equipment as part of a comprehensive program.
- Reliable methods to repair coating damage and corrosion damage.
- Improved confidence in composite repair methods.
- Girth weld repairs of high strength welds: methods to further eliminate cracked girth welds in field situations – type rod usage/welding process, pre-heat, NDE, MFL Tools
- Coatings – effective maximum operating temperature for FBE coatings to operate long term at higher temperatures and type application methods to extend temperature ranges



For More Information...

- On the projects addressing remediation & repair, please visit: <http://primis.phmsa.dot.gov/rd/splan.htm>
- On the impacts measured on projects addressing remediation & repair visit:
<http://primis.phmsa.dot.gov/rd/performance.htm>
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