



PHMSA RESEARCH & TECHNICAL PERSPECTIVES



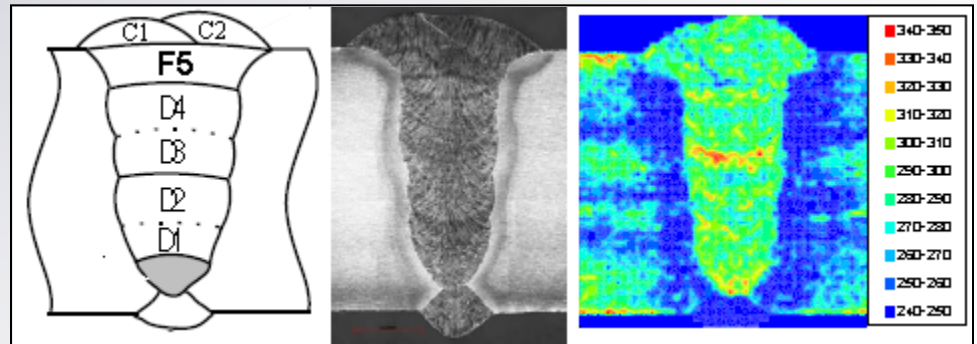
Working Group 5 – Design/Materials/Welding-Joining/Valves
Gov/Industry Pipeline R&D Forum

July 18, 2012



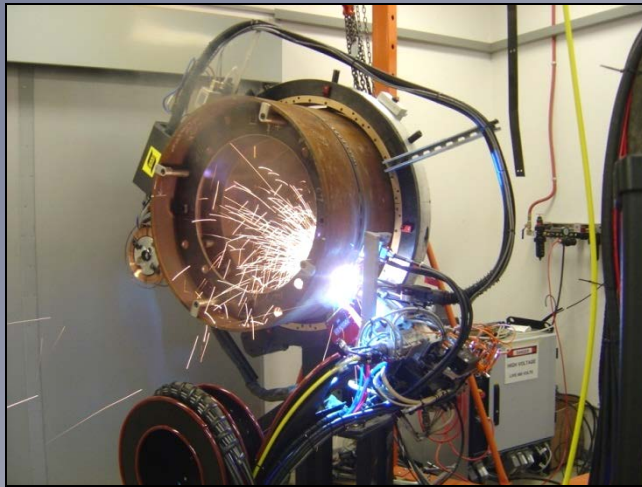
Design/Materials/Welding-Joining & Valves Research

- Stakeholder input sought/generated for detection/characterization research at 4 Pipeline R&D Forums and other public events
- Solicited for related topics in 8 research solicitations since 2002
 - Not all solicited topics successful in becoming new research
 - No valve research in core program to mention
- Related Investment: 61 tech development and product/process development improvement projects using \$25M (PHMSA)





Notable Outputs/Impacts

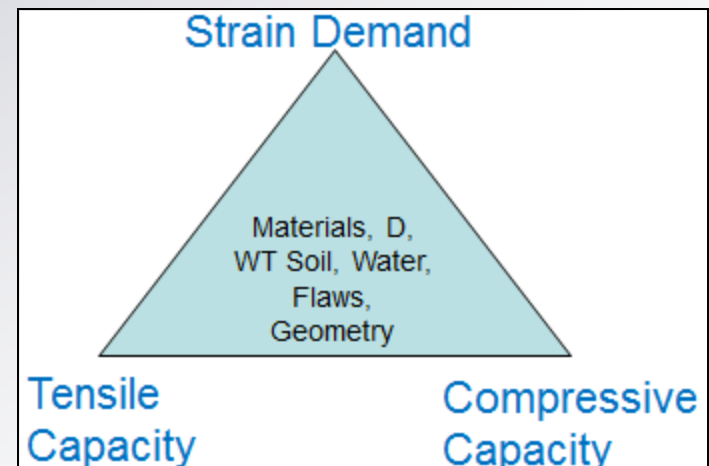


Validation testing of hybrid welding systems with possible commercialization.

Detailed testing and modeling of issues for strain based design.

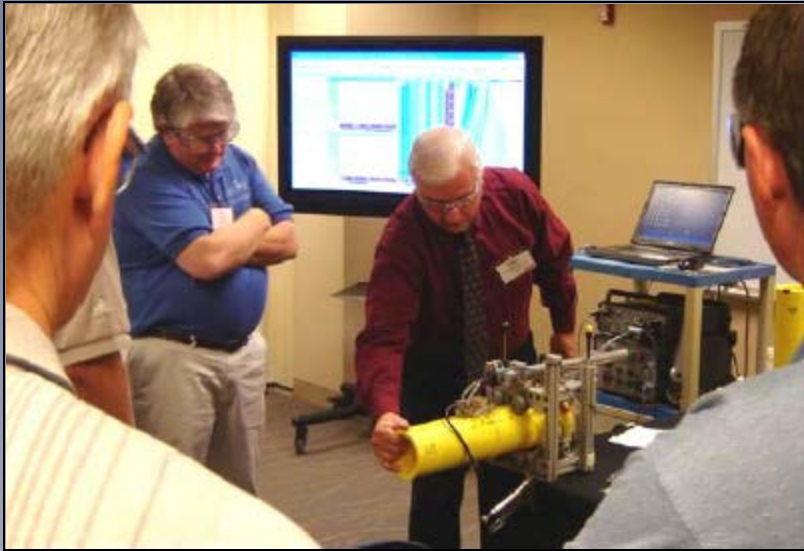


Impact on welding standards.



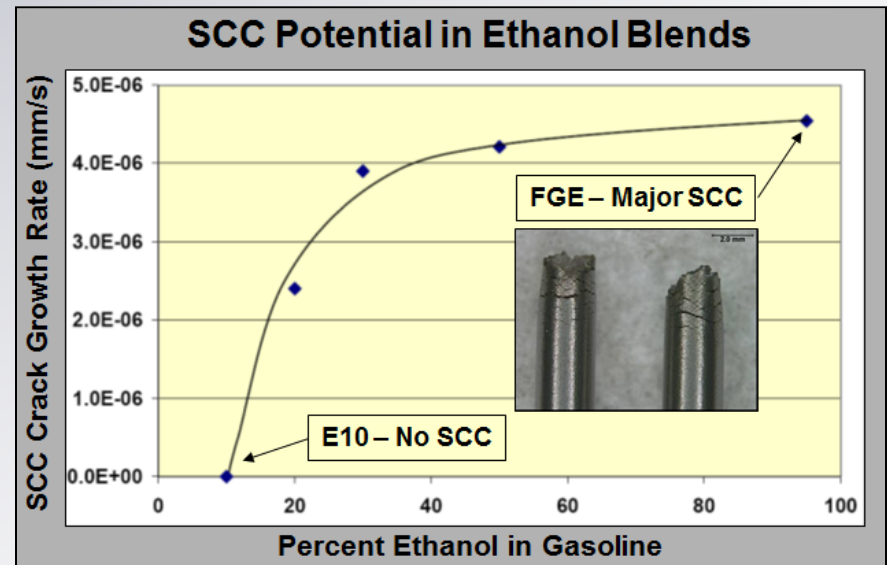


Notable Outputs/Impacts



Investigations into joining and joint inspection of plastic pipes.

Investigations in ethanol, biodiesel and biogas leading to material selection guidance and threat mitigation methods.





Current Research

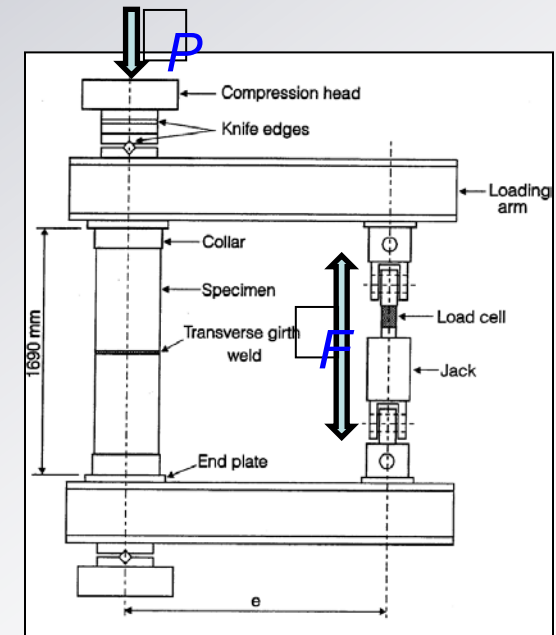
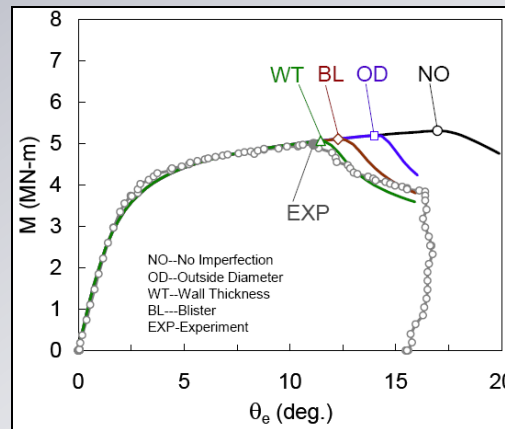
Realistic Strain Capacity Models for Pipeline Construction and Maintenance

- ❑ Emerging issues related to compressive strain capacities
 - ❖ Effect and model of realistic geometry imperfections / weld high-low misalignment
 - ❖ Similarity of model/experiment conditions vs. field conditions
 - Model and experiment specimen length
 - Distributed soil load vs. moment at pipe end
 - ❖ Effect of net section tension/compression force
 - ❖ Measure and calculation of strains
 - ❖ Effect and model of loading history



Buried pipeline

Longitudinal translation at pipe ends is partially constraint; Moments at pipe ends and/or distributed load





Current Research

Comprehensive Study to Understand Longitudinal ERW Seam Failures

- Main Objective & NTSB Driver for this project
 - PHMSA: “at a minimum provide a deliverable to assist in closure of the NTSB recommendation one (i.e., P-09-1)”
 - NTSB P-09-1 Recommended
 - “comprehensive study to identify actions that can be implemented by pipeline operators to eliminate catastrophic longitudinal seam failures in ERW pipe”
 - “at a minimum, ... include:
 - 1) assessments of the effectiveness & effects of in-line inspection tools, hydrostatic pressure tests, and spike pressure tests;
 - 2) pipe material strength characteristics and failure mechanisms;
 - 3) the effects of aging on ERW pipelines;
 - 4) operational factors; and
 - 5) data collection and predictive analysis”.



Study to Understand Application of ASVs and RCVs

- Required by 2011 Pipeline Safety Act and NTSB San Bruno Report
- Oak Ridge National Laboratory is conducting the study
 - Study the technical, operational, and economical feasibility to require by regulation the installation of ASV and RCV on hazardous liquids and natural gas transmission pipelines
 - Draft report 10/2012 will be reviewed by trades and public
- General Accounting Office (GAO) is studying transmission pipeline facility operators ability to respond to a release from a pipeline segment located in an High Consequence Area (HCA)



Understanding the Application of ASVs & RCVs Workshop

- March 28, 2012 in Rockville, Maryland
- Application of ASV & RCV on Hazardous Liquid and Natural Gas Pipelines
- Valve capabilities, limitations, and research presentations
- Identified gaps and research opportunities for ASVs & RCVs:
 - Technology improvements in hardware, communications, sensors, and integration
 - Alternative technologies
 - Reliability
 - Security
 - Flow assurance
 - Emergency Response



PHMSA Hot Topics

- Interactive Threats and Crack-like Defects – NTSB
- DIMP: Determining relevant threats, appropriate mitigation, and performance measures of mitigation techniques
- Hydrostatic testing
- Cast iron pipe
- Depth of cover
- Pipeline design life
- In-line inspection data
- Stress corrosion cracking (SCC)
- Ground movement – prevention and mitigation
- Construction quality