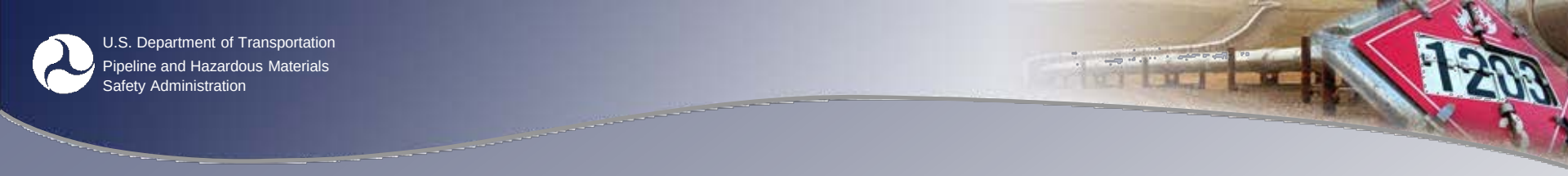


PHMSA RESEARCH & TECHNICAL PERSPECTIVES

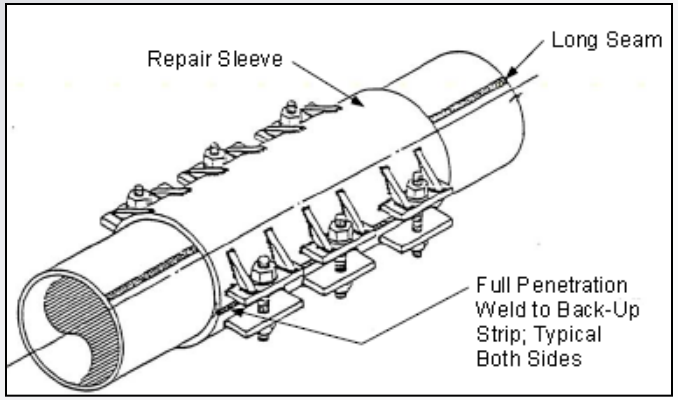
Working Group 4 – Anomaly Repair/Remediation

Gov/Industry Pipeline R&D Forum

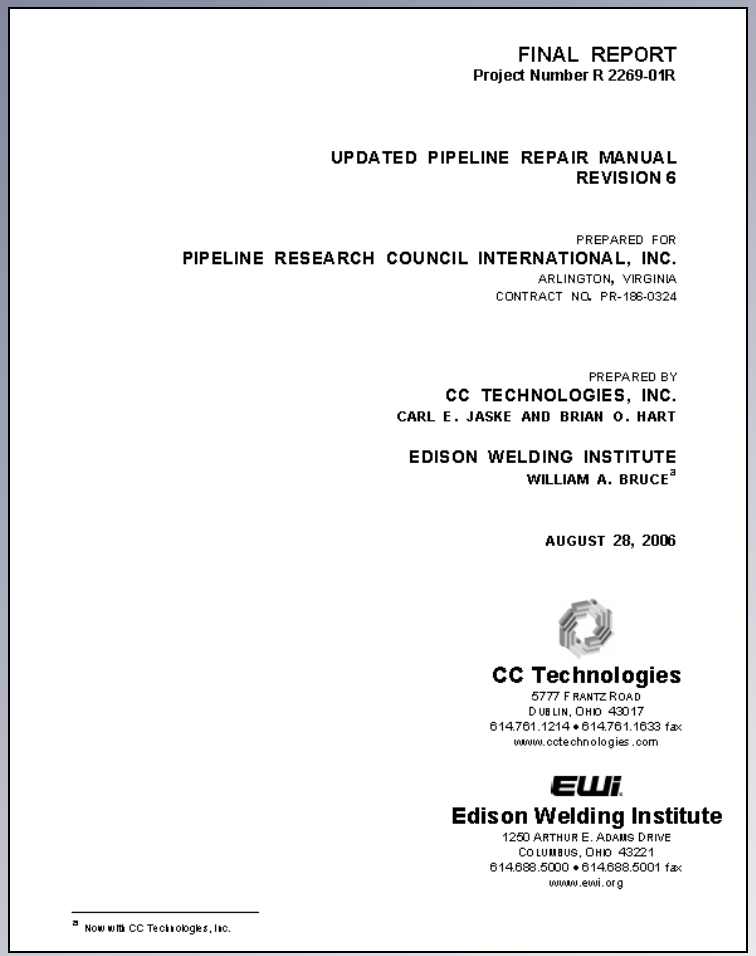
July 18, 2012

Anomaly Repair / Remediation Research

- Stakeholder input sought/generated for detection/ characterization research at 4 Pipeline R&D Forums and other public events
- Solicited for related topics in 7 research solicitations since 2002
  - However not all solicited topics successful in becoming new research
- Related Investment: 8 product/process development/ improvement projects using $1.4M (PHMSA)



Notable Outputs / Impacts



FINAL REPORT
Project Number R 2269-01R

UPDATED PIPELINE REPAIR MANUAL
REVISION 6

PREPARED FOR
PIPELINE RESEARCH COUNCIL INTERNATIONAL, INC.
ARLINGTON, VIRGINIA
CONTRACT NO. PR-186-0324

PREPARED BY
CC TECHNOLOGIES, INC.
CARL E. JASKE AND BRIAN O. HART

EDISON WELDING INSTITUTE
WILLIAM A. BRUCE[a]

AUGUST 28, 2006

CC Technologies
5777 FRANTZ ROAD
DUBLIN, OHIO 43017
614.761.1214 • 614.761.1633 fax
www.cctechnologies.com

EWI
Edison Welding Institute
1250 ARTHUR E. ADAMS DRIVE
COLUMBUS, OHIO 43221
614.688.5000 • 614.688.5001 fax
www.ewi.org

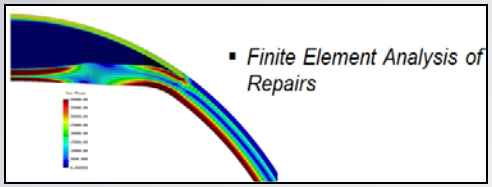
[a] Now with CC Technologies, Inc.

Revision of a widely used repair manual

Current Research

Selection of Pipe Repair Methods

The research project addresses the repair of non-leaking metallic pipelines.



The research results will provide pipeline operators with the following:

- Testing protocols to establish properties requirements of the repair systems,
- Procedures for the selection and design of the repair systems (with focus on composite repairs),
- Enhanced procedures for installation of the repair methods to reduce the risks associated with faulty or ineffective repairs.

Challenge - What are best practices for pipe cracking remediation?

- **Pipe Cracking – types**
  - Longitudinal, Circumferential, and Seam
  - All pipe sizes and locations
  - SCC
- **How do we evaluate these issues?**
  - Better construction practices and coatings
  - Monitoring: leaks, failures, coatings, and loads
  - Inspection – inline, excavations and right-of-way
  - Remediation measures
    - NACE
    - ASME

Challenge - Hydrostatic testing

- **NTSB Recommendation P-11-15:** *Amend Title 49 Code of Federal Regulations Part 192 of the Federal pipeline safety regulations so that manufacturing- and construction-related defects can only be considered stable if a gas pipeline has been subjected to a post-construction hydrostatic pressure test of at least 1.25 times the maximum allowable operating pressure.*
- PHMSA is reviewing options for strengthening Part 192 for confirming pipeline defect stability from manufacturing, construction, and operations for pipelines operating in accordance with the:
  - Grandfather Clause (§ 192.619) and
  - Existing natural gas pipelines with pressure tests below 1.25 times MAOP, and
  - New construction of natural gas pipelines.

Other Pipeline Challenges

- In-Line Inspection Data
- Cast Iron Pipe
- Depth of Cover
- Pipeline Design Life
- Preventing / Mitigating Ground Movements
- Construction Quality