Design Materials & Construction
Research Roadmap

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A synchronized, gap-driven portfolio for 2026–2030

Objective → Goal → Gap → Outcome → Project → Timing → Cost → Dependency



Design Materials & Construction Roadmap Overview

SUSTAINABILITY

- ❑ Demonstrate Temporary Repairs Are FFS Long Term
- ❑ Unique Solutions For immediate Repairs

TC Goals: ***Reduce environmental footprint through enhanced in-situ pipeline repairs***

INTEGRITY

- ❑ Improve detection and assessment of geohazard-induced strain and cracking
- ❑ Standardize water-crossing mitigation data and practices
- ❑ Better identify and assess interacting natural-force threats

TC Goals:
Enhance material property test methods
Improve weld quality and performance across the pipeline
Understand and reduce geohazard risks
Communicate PRCI research across the industry

EFFICIENCY

- ❑ Advance and validate repair technologies and practices
- ❑ Strengthen repair guidance for vintage and challenging pipeline conditions
- ❑ Support consistent interpretation and application of evolving standards
- ❑ Improve material record traceability and verification

TC Goals:
Enhance pipeline repair practices
Support compliance with standards

TECHNOLOGY

- ❑ Standardize material property data for cracking assessments
- ❑ Prevent pipeline and weld damage during HDD
- ❑ Improve understanding and control of post-HDD ground subsidence

TC Goal:
Develop modern, standardized tools and guidelines for complex threats
Maintain best practices and guidelines for HDD integrity

Research Progress Updates

Notable Work Completed This Period;

MAT-8-6 MAT-8-6, A New Definition of Resistance to Ductile Fracture Propagation, in final report review stage -

CNST-1-5 Engineering Calculations for Pipelines installation by Horizontal Directional Drilling (HDD) **is completed**

MATR-3-15B, SRP GHG: Industry Best Practices for Making Temporary Repairs Permanent – **Final report approved for public release. Webinar complete**

In Progress / Next Steps;

MATH-5-8, Cataloging Historical Pipe Manufacturing Data by Seam Type, Grade, and Production Period – **In contracting**

MATR-3-1B, Revision of the PRCI Hot-Tap Model to model two different base materials – Tom Marlow is working with the project team to refine scope.

2026–2030 Research Overview

RoadmapCode	Title	FirstYear	LastYear	Y2026	Y2027	Y2028	Y2029	Y2030
5004	Development and Validation of a Thermomechanical Multiphysics Framework for In-Service (Hot-Tap) Welding Analysis	2026	2028	$ 263,029	$ 294,086	$ 297,377	$ -	$ -
SBD-01-001	Characterization of Prior-Strain and Aging Effects on TSC and Their Implications on Integrity Management [	2026	2027	$ 125,000	$ 125,000	$ -	$ -	$ -
SBD-01-002	Pipeline Strain Demand Estimation	2026	2027	$ 140,000	$ 130,000	$ -	$ -	$ -
MAT-8-7	Universal Crack Fatigue Growth Model - Deployment to Operators	2026	2027	$ 150,000	$ 80,000	$ -	$ -	$ -
MATH-5-8	Cataloging Historical Pipe Manufacturing Data by Seam Type, Grade, and Production Period	2026	2026	$ 30,000	$ -	$ -	$ -	$ -
SIA-01-001	Desktop Methodology for Determining Post Weld Heat Treatment Exemption	2026	2026	$ 40,000	$ -	$ -	$ -	$ -
3937	Update of PRCI Pipeline Repair Manual	2027	2027	$ -	$ 85,000	$ -	$ -	$ -
4999	Practical Guidance on Strain-Resistant Pipeline Design and Construction	2027	2027	$ -	$ 90,000	$ -	$ -	$ -
4953	Update Strain Capacity in PRCI Seismic Design Guidelines	2027	2027	$ -	$ 80,000	$ -	$ -	$ -
3276	System and Consumable Performance Evaluation	2027	2027	$ -	$ 125,000	$ -	$ -	$ -
5052	Girth Weld Toughness Requirements and Construction Controls for CO2 Transmission Pipelines	2027	2028	$ -	$ 50,000	$ 50,000	$ -	$ -
5040	Development of Criteria/Guidelines for Welding onto In-service Chemical Pipelines Update	2027	2028	$ -	$ 52,800	$ -	$ -	$ -
5006	Influence of Drilling Mud in Boreholes After HDD Pipeline Pullback on Surface Subsidence	2028	2029	$ -	$ -	$ 30,000	$ 20,000	$ -
3729	Guidelines for Selecting Trenchless Installation Methods	2028	2028	$ -	$ -	$ 75,000	$ -	$ -
3939	Alternative Solution for Mitigation of Pipe Connections	2028	2029	$ -	$ -	$ 150,000	$ 100,000	$ -
3676	Technology Transfer Fitness-for-Service Standard API 579-1/ASME FFS-1- Year 3	2028	2028	$ -	$ -	$ 80,000	$ -	$ -
3535	Finite Element Models to Simulate X-Sectional Behavior of Pipelines Subjected to Permanent Ground Displacements	2028	2029	$ -	$ -	$ 100,000	$ 75,000	$ -
5036	Understanding and Preventing Unintended Relief-Valve Gas Venting Events	2028	2028	$ -	$ -	$ 78,000	$ -	$ -
3790	VTDC Material Property Database Management	2028	2028	$ -	$ -	$ 120,000	$ 80,000	$ 80,000
3744	Non-metallic Leak Repair Methods Demonstration for Gas/Liquid Pipelines and Valves	2029	2029	$ -	$ -	$ -	$ 500,000	$ -
5008	Interlaboratory Study for PRCI Pipe Tensile Test Protocols	2029	2030	$ -	$ -	$ -	$ 100,000	$ 100,000

New: A Strategic Filter Upstream of the Roadmap

Concept initiated by Gary Choquette

CONCEPT FOR TC REVIEW | A proposed strategic lens to be refined, vetted and agreed by the DMC Technical Committee

DRAFT CONCEPT

1 EVIDENCE BASE

Industry failure information and risk trends

External signal

2 DMC STRATEGY

Candidate knowledge gaps:

- Girth-weld reliability
- Geohazards and strain
- Materials and traceability
- Construction and commissioning

To be vetted by the TC

3 RESEARCH ROADMAP

Objectives, ideas and project portfolio

Existing committee tool

4 PROJECT DECISIONS

Evaluate, prioritize and fund projects

Normal DMC process

PROPOSED SPRING + FALL

TC reviews and confirms the strategic knowledge gaps, then tests every proposed and ongoing project against the agreed framework.

Next step: refine with the Vice Chairs, vet with the full DMC TC, and only then adopt it as the strategic filter upstream of the roadmap.

Thank You!

Open to Feedback