Mechanical Damage Technical Workshop

Detection & Characterization Technology Research

Pipeline & Hazardous Materials Safety Administration

Pipeline Safety R&D Objectives

- Fostering the development of new technologies
- Strengthening regulatory requirements and related national consensus standards
- Improving & disseminating knowledge to decision makers

Detection and Characterization Program Elements and Goals

	Program Elements	Program Element Goals
1.	Damage Prevention	Reducing the number of incidents and accidents resulting from excavation damage and outside force
2.	Pipeline Assessment and Leak Detection	Identifying and locating critical pipeline defects using inline inspection, direct assessment and leak detection
3.	Defect Characterization and Mitigation	Improving the capability to characterize the severity of defects in pipeline systems and to mitigate them before they lead to incidents or accidents
4.	Improved Design, Construction, and Materials	Improving the integrity of pipeline facilities through enhanced materials, and techniques for design and construction
5.	Systems for Pipeline Mapping and Information Management	Enhancing the ability to prevent and respond to incidents and accidents through management of information related to pipeline location (mapping) and threats definition
6.	Enhanced Operation Controls and Human Factors Management	Improving the safety of pipeline operations through enhanced controls and human factors management
7.	Risk Management & Communications	Reducing the probability of incidents and accidents, and mitigating the consequences of hazards to pipelines
8.	Safety Issues for Emerging Technologies	Identifying and assessing emerging pipeline system technologies for opportunities to enhancing their safety

Mechanical Damage Challenges
Detection & Characterization R&D

- Coordinating or just being aware of various research efforts
- Is there a development order for technology?
- Developing the right technology
- Slow integration of characterization knowledge into standards
- Large $$$ investment required with technology development
- Test beds needed – field conditions

Mechanical Damage Detection R&D

#	Project ID	Contractor	Project Title	PHMSA	Co-Share	%
1.	DTRS56-05-T-0002	Northeast Gas Association	"Design, Construction and testing of a segmented MFL sensor for use in the inspection of unpiggable pipelines"	$501,000	$516,107	100 Mod
2.	DTPH56-05-T-0001	Electricore, Inc.	"Understanding Magnetic Flux Leakage (MFL) Signals from Mechanical Damage in Pipelines"	$54,000	$54,000	99 Mod
3.	DTRS56-04-T-0008	R/D Tech	"Stage 2 Phased Array Wheel Probe for In-Line Inspection"	$160,000	$160,000	92
4.	DTRS56-02-T-0001	Southwest Research Institute	"Application of Remote-Field Eddy Current Testing to Inspection of Unpiggable Pipelines"	$629,806	$87,500	86
5.	DTRS56-05-T-0002	Northeast Gas Association	"Design, construction and demonstration of a robotic platform for the inspection of unpiggable pipelines under live conditions"	$501,000	$1,316,438	80 Mod
6.	DTPH56-05-T-0005	Shell Global Solutions (US) Inc.	"Cathodic Protection Current Mapping In-Line Inspection Technology"	$401,000	$450,000	64
7.	DTRS56-05-T-0002	Northeast Gas Association	"Validation and enhancement of long range guided wave ultrasonic testing: A key technology for DA of buried pipelines"	$500,981	$617,750	60
8.	DTR57-06-C-10004	Intelligent Automation, Inc.	"In-Line Nondestructive Inspection of Mechanical Defects in Pipelines with Shear Horizontal Wave EMAT"	$100,000		55
9.	DTRT57-06-C-10005	FBS, Inc.	"Feasibility of an Ultrasonic Based Instrument for Assessing In-Situ Pipeline Coatings"	$97,366		51
			Totals:	**$2,945153**	**$3,201,975**	

Mechanical Damage Detection R&D

What kind of technologies are expected?

1. Tools and sensors (MFL & RFEC) for unpiggable natural gas pipelines

2. Improvement to MFL sensors

3. In Line Inspection sensors for coating damage

4. Improvement to GUT sensors

5. Through coating external inspection of pipelines

Mechanical Damage Characterization R&D

#	Project ID	Contractor	Project Title	PHMSA	Co-Share	%
1.	DTPH56-05-T-0001	Electricore, Inc.	"Understanding Magnetic Flux Leakage (MFL) Signals from Mechanical Damage in Pipelines"	$54,000	$54,000	99 Mod
2.	DTRS56-04-T-0009	BMT Fleet Technology Limited	"Mechanical Damage at Welds"	$80,000	$149,997	83
3.	DTRS56-05-T-0003	Battelle Memorial Institute	"Integrity Management for Wrinklebends and Buckles"	$275,971	$480,000	60
4.	DTRS56-05-T-0003	Battelle Memorial Institute	"Model Modules to Assist Assessing and Controlling Stress Corrosion Cracking (SCC)"	$365,887	$700,000	60
5.	DTRS56-05-T-0002	Northeast Gas Association	"Validation and enhancement of long range guided wave ultrasonic testing: A key technology for DA of buried pipelines"	$500,981	$617,750	60
6.	DTRS56-04-T-0001	Southwest Research Institute	"Nonlinear Harmonic-based Mechanical Damage Severity Criteria for Delayed Failures in Pipelines"	$333,230	$354,000	55
			Totals:	**$2,641,646**	**$3,327,497**	

Mechanical Damage Characterization R&D

What kind of results are expected?

1. Improvement of MFL data characterization
2. Improvement of GUT data characterization
3. Reducing unnecessary repairs
4. Improvement of severity criteria for wrinkles, SCC and other types of mechanical damage

Pipeline Safety R&D Program
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