

# Mechanical Damage Characterization - Technology Research

	<b>Coating</b> holidays, disbondment	<b>Expected Results</b>	<b>Denting</b> smooth dents, sharp dents, rerounding	<b>Expected Results</b>	<b>Metal Loss</b> associated corrosion, removed metal	<b>Expected Results</b>	<b>Metal Deformation</b> smeared metal, scrapes, pipewall creasing	<b>Expected Results</b>	<b>Cracking</b> shear cracks, ductile tearing, fatigue cracks, SCC	<b>Expected Results</b>
<b>Liquid</b>	1		Integrity Management for Wrinklebends and Buckles / Brian Lies, Battelle Memorial Institute / OPS DTRS56-05-T-0003 (164)	1-3 Yrs	Full-scale demonstration of the interaction of dents with localised corrosion defects / Fleet / PRCI	1-3 Yrs	Nonlinear Harmonic-based Mechanical Damage Severity Criteria for Delayed Failures in Pipelines / Al Crouch, Southwest Research Institute / OPS DTRS56-04-T-0001 (141) - PRCI - Tuboscope Pipeline Services	1-3 Yrs	Nonlinear Harmonic-based Mechanical Damage Severity Criteria for Delayed Failures in Pipelines / Al Crouch, Southwest Research Institute / OPS DTRS56-04-T-0001 (141) - PRCI - Tuboscope Pipeline Services	1-3 Yrs
	2			2			Dual Field MFL for Mechanical Damage Characterization / Bruce Nestleroth - Battelle Walter Kresic-Enbridge	1-3 Yrs	Multiple project on models development and full scale testing to predict servicability, remaining live prediction, mechanical damage David Balle-PRCI Mechanical Damage Consultant / PRCI	<1yr
	3			3			Shear Wave Birefrence for measureing metal stress/strain / Ron Alers-EMAT Ultrasonics / Thomas Beuker-Rosen	1-3 Yrs		
	4			4						
<b>Gas Transmission</b>	1		Mechanical Damage at Welds / Aaron Dinovitzer, Fleet Technology Ltd / OPS DTRS56-04-T-0009 (146)	< 1 Yr	Full-scale demonstration of the interaction of dents with localised corrosion defects / Fleet / PRCI	1-3 Yrs	Nonlinear Harmonic-based Mechanical Damage Severity Criteria for Delayed Failures in Pipelines / Al Crouch, Southwest Research Institute / OPS DTRS56-04-T-0001 (141) - PRCI - Tuboscope Pipeline Services	1-3 Yrs	Nonlinear Harmonic-based Mechanical Damage Severity Criteria for Delayed Failures in Pipelines / Al Crouch, Southwest Research Institute / OPS DTRS56-04-T-0001 (141) - PRCI - Tuboscope Pipeline Services	1-3 Yrs
	2		Integrity Management for Wrinklebends and Buckles / Brian Lies, Battelle Memorial Institute / OPS DTRS56-05-T-0003 (164)	1-3 Yrs			Dual Field MFL for Mechanical Damage Characterization / Bruce Nestleroth - Battelle Walter Kresic-Enbridge	1-3 Yrs	Multiple project on models to predict servicability, verify with burst tests, remaining live prediction, etc of mechanical damage / PRCI	>3 yrs
	3			3			Shear Wave Birefrence for measureing metal stress/strain / Ron Alers-EMAT Ultrasonics / Thomas Beuker-Rosen	1-3 Yrs		
	4			4						
	5			5						
<b>Gas Distribution (Steel)</b>	1		Integrity Management for Wrinklebends and Buckles / Brian Lies, Battelle Memorial Institute / OPS DTRS56-05-T-0003 (164)	1-3 Yrs	Full-scale demonstration of the interaction of dents with localised corrosion defects / Fleet / PRCI	1-3 Yrs	Nonlinear Harmonic-based Mechanical Damage Severity Criteria for Delayed Failures in Pipelines / Al Crouch, Southwest Research Institute / OPS DTRS56-04-T-0001 (141) - PRCI - Tuboscope Pipeline Services	1-3 Yrs	Nonlinear Harmonic-based Mechanical Damage Severity Criteria for Delayed Failures in Pipelines / Al Crouch, Southwest Research Institute / OPS DTRS56-04-T-0001 (141) - PRCI - Tuboscope Pipeline Services	1-3 Yrs
	2			2			Dual Field MFL for Mechanical Damage Characterization / Bruce Nestleroth - Battelle Walter Kresic-Enbridge	1-3 Yrs	Multiple project on models to predict servicability, verify with burst tests, remaining live prediction, etc of mechanical damage / PRCI	>3 yrs
	3			3			Shear Wave Birefrence for measureing metal stress/strain / Ron Alers-EMAT Ultrasonics / Thomas Beuker-Rosen	1-3 Yrs		
	4			4						
<b>Gas Distribution (Non-Metallic)</b>	1			1						
	2			2						