



February 6 - 10 • Houston

CONFERENCE PROCEEDINGS

Volume 1 of 2

Copyright © 2023 Clarion Technical Conferences and the contributing authors. All rights reserved. This publication and its contents may not be reproduced in any form without the permission of the copyright owners. For further information, contact bstroman@clarion.org

ORGANIZED BY



ppimconference.com

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2023) by Clarion Technical Conferences and the author(s).
All rights reserved.

Printed with permission by Curran Associates, Inc. (2023)

ISBN (Print): 978-1-7138-0300-3
e-ISBN: 978-1-7138-7228-3

For permission requests, please contact Clarion Technical Conferences
at the address below.

Clarion Technical Conferences
2715 Houston Avenue
Houston, TX 77009
United States

Phone: (713) 521-5929
Fax: (713) 521-9255

info@clarion.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

VOLUME 1

PHMSA Updates Related to Data and GIS.....	1
<i>Monique Roberts, Leigha Gooding</i>	
Evaluating the Suitability of the US Pipeline Network for Hydrogen Service.....	21
<i>Simon Slater, Neil Gallon, Ryan Sager, Richard Ingolia, Sebastiaan Schuite</i>	
Your API 5L Vintage Line Pipe Fracture Toughness Data Would Likely Fall Within This Range.....	47
<i>Sergio Limon, Carlos Madera, Kevin Coulter, Ken George, Ravi Krishnamurthy</i>	
Applying API RP 1183 to Real-World In-Line Inspection Dent Data	63
<i>Aaron Lockey, Susannah Turner, Tim Turner, Mike Kirkwood</i>	
An Optimal Approach of Acceptance Criteria for Mild Ripples in Pipeline Field Bends Under Internal Pressure	85
<i>Enyang D. Wang, Aaron Dinovitzer, Jing Ma</i>	
Three Emerging Threats: Climate Change, Vandalism and Cyberattack.....	101
<i>Eduardo Munoz</i>	
Thought Bias: The Hidden Pipeline Integrity Threat	113
<i>Michael Rosenfeld, Joel Anderson</i>	
Value-Added Pipeline Applications Using High-Fidelity Fiber Optic Monitoring and Machine Learning	127
<i>Ehsan Jalilian, Steven Koles, Mike Hooper</i>	
Low-Cost Airborne Oil Leak and Threat Detection for Pipeline Right-of-Way.....	141
<i>Eric Bergeron, Alexandre Thibeault, Ray Philipenko</i>	
A Probabilistic Method to Predict Nominal Wall Thickness	157
<i>Owen Oneal, Masoud Moghtaderi-Zadeh, Peter Veloo, Colin Bullard, Cameron Fisch, Michael Fernandez</i>	
Operator Statistical and Probabilistic Grade Estimation Using API 1176	175
<i>William V. Harper, Benjamin R. Hanna, Thomas A. Bubenik, Tara P. McMahan, Adriana Nenciu,</i>	
Pipeline Integrity Dig Lessons Learned, Challenges, and Improvements	189
<i>Nathan Weigl, Jordan Brooke, Alireza Kohandehghan</i>	
Limitations and Pitfalls of NDE Techniques for the Validation of In-line Inspections.....	213
<i>Sayan Pipatpan, Tannia Haro</i>	
Perception vs Reality: Managing ILI Verification for Internal Corrosion	233
<i>Paul Spoering, Mike Niosi, Taras Bolgachenko, Keith Walters</i>	
Preventing Product Releases into Coastal Waterways and Ship Channels	247
<i>Joseph Lamberth</i>	

OPEX Optimisation for Un-Piggable Vent Line/Low Flow Pipeline Inspection via Self-Propelling Robotic ILI Tool	257
<i>Mohamed Ali Bin Abdullah, M Nazmi B M Ali Napiah, M Nazri B, Ahmad, Aisyah Mastura Bt Suppian, Ahmad Sirwan B Tuselim, Hendra Luthfi B Hassan, Mohamed Ridzuan Bin Mohamed Abd Salam, Denis Gurin, Mikhael Lebedev</i>	
192 Final Rule (RIN2) – Essential Elements and Guidelines to Perform a Dent Engineering Critical Assessment	277
<i>Shanshan Wu, Joseph Bratton, Jing Wang, David Kemp</i>	
Detaining Dents – Determining Restraint for Dents Measured by ILI Case Study	301
<i>Jonathan Hardy, Chris Newton</i>	
Investigating the Impact of Full-Scale Fatigue Testing and Changes to Formation Strain Predictions on Dent Integrity	323
<i>Morry Bankehsaz, Ryan Sager, David Slane</i>	
Navigating the New §192.712 Regulation on Dents	345
<i>Rhett Dotson, Fernando Curiel</i>	
Full-Scale Fatigue Testing and Assessment of Dents on Brittle Longitudinal Welds – A Detailed Management Approach for a Liquid Pipeline in Chile	361
<i>Pedro Guillen, Jamie Martin, Ricardo Alarcon, Roberto Jadue</i>	
Controlling ILI Tool Speed with Gas Recompression Delivers Better Data Without Venting or Flaring	379
<i>Adam Murray, Branden Allen</i>	
Innovative Pipeline Evacuation Technologies for Reducing Methane Releases to the Environment During Pipeline Maintenance and Pigging Operations.....	385
<i>Jeff Witwer, Rita Hansen, Mitch Jacobs</i>	
Keeping Pigging Safely Grounded as Hydrogen Takes-Off.....	401
<i>Neil McKnight, Mike Kirkwood</i>	
Detection of a Mandrel Pig in a NGL Pipeline Using Active Acoustics.....	417
<i>David Murray, Steven Bourgoyne, Scott Gisler</i>	
The Mega Rule Brings Greater Challenges to "Pigging the Unpiggable" that Will Require New Chemical Pigging Technologies	429
<i>LR Houchin, Dorian Granizo, Joseph Conine, Martin Ridge</i>	
Minimizing the Error in Corrosion Growth Rate Estimation from Box-to-Signal Matching	439
<i>Jed Ludlow, Jonathan Hardy</i>	
Lessons Learned from Applying Probability of Exceedance (POE) Analyses	449
<i>Tom Bubenik, Steven J Polasik, Ben Hanna</i>	
Beyond Standard ILI Analysis – Meaningful Interaction to Look Out for Specific Threats	463
<i>Gurwinder Nagra, Matthew Ma, Garret Meijer, Dennis Vogel</i>	
Avoid becoming a DOT 192 Pipeline Incident – An Analytical Review of the Last Decade of Incidents	477
<i>Derek Sollberger</i>	

New U.S. Gas-Gathering Pipeline Regulations and ILI: What to Do, and Not Do, to Comply with the Law – an Operator’s Perspective.....	493
<i>Bernardo Cuervo, Mark McQueen</i>	
Survey of Impact: RIN-2 Final Rule –Safety of Gas Transmission Pipelines: Repair Criteria, Integrity Management Improvements, Cathodic Protection, Management of Change, and other Related Amendments.....	509
<i>Chris Bullock , Lara Gran, Luke Whitrock</i>	
Applying Ultra-High-Resolution MFL to Achieve a Better Integrity Assessment of Pits-in-Pits	513
<i>Rick Desaulniers</i>	
Assessing the Accurate Topography of Complex Channeling Corrosion by Means of Ultrasonic Wall Measurement Tools: A Case Study and Experiences.....	527
<i>Kerstin Munsel, Katherine A. Hartl, Christoph Jäger, M. Santiago Urrea</i>	
Optimizing Risk Decisions with Imperfect Data.....	543
<i>Joel Anderson</i>	
Estimating Excavation Damage (Outside Force) ‘Hit Rates’ Using Machine Learning Models Trained on In-Line Inspection Data and Geographical Information.....	553
<i>James White, Steven Carrell, Jonathan Martin, Amine Ait Si Ali, Roland Palmer-Jones</i>	
Gas Transmission Valve Closure and Emergency Response Considerations	569
<i>K. G. Leewis</i>	
Variability and Mitigative Measures for Estimating Yield Strength in Line Pipe by Instrumented Indentation Testing.....	579
<i>Peter Martin, Jeffrey Kornuta, Emily Brady, Nathan Switzner, Jon Gibbs, Peter Veloo</i>	
Identifying Irregular and Erroneous Chemical Composition Data from In Situ Nondestructive Testing.....	599
<i>Janille Maragh, Peter Martin, Joel Anderson, Jonathan Gibbs, Jeffrey Kornuta, Peter Veloo</i>	
Combining Nondestructive Techniques to Obtain Full Vintage Pipeline Asset Fracture Toughness at Both the Seam and Pipe Body.....	611
<i>Intisar Rizwan I Haque, Bryan Feigel, Brendon Willey, Parth Patel,, Simon Bellemare</i>	
ILI Validation Case Study: Evaluating the Impact of a Weld Cap on a Vintage ERW Pipeline	627
<i>Ian Smith, Ted L. Anderson</i>	
Tool Performance Estimation Considering the Effect of Fixed vs. Variable Slope	639
<i>Alex Fraser, Juan S. Rojas, Jason Skow</i>	
Tolerance of ILI Validation Inspections, Why Is It Important, and How to Reduce It	661
<i>Tom Oldfield, Spencer Fowler, Daniel Torres</i>	
A Novel Concept Addressing Material Properties and Loading Conditions with a Dynamic Micro-Magnetic Sensor	677
<i>Sebastian Huehn, Dietbert Wortelen, Werner Thale, Christian Otte</i>	
Knowing the Long Seam: Essential Insights Using UHR MFL Technology.....	689
<i>Miguel Galeana, Rick Desaulniers</i>	

VOLUME 2

Making Hard Decisions.....	711
<i>Khanh Tran, Simon Slater, Jason Edwards, Sean Moran, Ann Reo, David Futch</i>	
Validating Selective Seam Weld Corrosion Classification Using ILI Technology	735
<i>Matthew Romney, Dane Burden, Ron Lundstrom</i>	
Development of a Multi-Diameter and Low-Pressure Compatible Tool to Inspect for Selective Seam Weld Corrosion.....	749
<i>John Nonemaker, Lance Wethey, Colin Bradley, Mustafa Jamaly, Susanna Kaumeyer, Kirk Strachan</i>	
ILI Ultrasonic Shear Wave and Compression Wave Inspections Capabilities for Selective Seam Corrosion.....	767
<i>Rogelio Guajardo, Debbie Wong, Anna Rodriguez, Diego Luna</i>	
Above & Below: A Holistic Geohazard Monitoring Solution	789
<i>Daniel Bahrenburg, Andy Young, Jason Edwards, Amin Singh, John Norman</i>	
How Should we Respond to Geohazards?.....	819
<i>Rhett Dotson, Alex McKenzie-Johnson</i>	
Management of Geohazard Personnel Safety for Working in Challenging Terrain.....	831
<i>Emily Ortis, Tim Waggott, Evan Shih, Dave Gauthier, Chad Fournier</i>	
Leveraging Engineering Assessments and Engineering Critical Assessments for an Enhanced and Practical Approach to Evaluating Pipeline conditions.....	843
<i>Cassandra Moody, Parth Iyer</i>	
Room Temperature Creep Behavior of Low Frequency ERW Pipe Seams and Implications on Managing Pressure Reversals in Hydrostatic Tests	861
<i>Dave Warman, Dan Jia, Yong-Yi Wang, Mike Bongiovi, Chad Destigter</i>	
Accounting for Residual Stress in the Predicted Failure Pressure Calculation	875
<i>Michael J. Rosenfeld, Scott Fannin</i>	
Estimate Pressure at Feature Location in A Complex Pipeline System.....	899
<i>Fan Zhang, Daniel Gutierrez</i>	
Effect of Pipe-soil Interaction Parameters on Pipeline Thermal Stress Analysis.....	919
<i>Kshama Roy, Suborno Debnath, Joseph Bratton</i>	
Know when using MFL for Effective Area is wrong!	935
<i>Christopher De Leon</i>	
Overcoming Detection and Sizing Challenges for Slanted/Skewed Cracking by Combining Axial and Circumferential Crack Detection In-Line Inspections	947
<i>Oscar Anguila, Francisco Ibarrola, Jordi Aymerich, Rogelio Guajardo, Katherine Hartl</i>	
Leveraging ILI Crack Profiles.....	963
<i>Stephan Tappert, Lyndon Lamborn</i>	
Burst Pressure Prediction for Axial Cracks in Pipelines with Complex Profiles.....	975
<i>Thomas Dessein, Ted Anderson</i>	

Phenomenology and Traits of SCC – and the ILI Challenge it Presents	989
<i>Brian Leis</i>	
From One to Many – Composite Repair of SCC.....	1007
<i>David B. Futch, Casey Whalen, Sean Moran</i>	
Measuring Toughness with Instrumented Indentation Methods: Fact or Fiction?.....	1023
<i>Ted L Anderson</i>	
Automated Methods to Estimate Transition Temperature, Upper Shelf Energy, and Uncertainty from Charpy V-Notch Data	1037
<i>Joel Anderson, Nathaniel Switzner, Peter Martin, Michael Rosenfeld, Lanya Ali, Brian Patrick, Peter Veloo</i>	
CVN or CTOD for Pipeline Fracture Mechanics? An Overview of Advantages and Disadvantages.....	1055
<i>Jonathan Brewer, Colton Sheets</i>	
A Case Study of Crack Diagnosis in Natural Gas Liquid Pipelines	1067
<i>Nathan Leslie, Sayan Pipatpan, Andreina Guedez</i>	
Failure Analyses and Consequent Mitigation: Case Studies.....	1081
<i>Ming Gao, Ravi Krishnamurthy</i>	
Optimizing a Reassessment Plan with Probabilistic Monte Carlo Analysis: A Summary of Recent Developments to Better Support Operational Decision-Making	1109
<i>Michael Turnquist, Ted L. Anderson, Miguel Martinez</i>	
Determining Active vs Passive Internal Corrosion using Data Science	1121
<i>Yevgeniy Petrov, Megan Scudder</i>	
Integrity Planning Utilizing In-Line Inspection Data	1133
<i>Brian Dew, Evelyn Rawlick, Amin Eshraghi</i>	
Application of Advanced Data Analytics to Improve Metal Loss Tolerance Specifications	1151
<i>Geoff Hurd, Keila Caridad, Melissa Gurney, Scott Miller, Samaneh Sadeghi, Aaron Schartner, Vincent Tse</i>	
Tool Tolerances in MFL In-Line Inspection and Why They’re Needed	1171
<i>Kenneth Maxfield, Mark Briell, Kenneth Plaizier</i>	
Proof of Performance: Flow-Loop-Testing Validation of UHR MFL Technology in the POD, POI and Sizing of Pinholes	1187
<i>James Lavender, Rick Desaulniers</i>	
Dig Data Warehouse to Enable ILI Continuous Improvement	1201
<i>Hong Sang, Nathan Verity, Pu Gong</i>	
Comparing Laser Scans against In-line Inspections and Quantifying Bias for Assessment Methods	1213
<i>Sayan Pipatpan, Andreas Pfanger</i>	
Leveraging Multiple ILIs and Technologies to Identify Possible Integrity Threats Under Type A Sleeves.....	1233
<i>Michael Plishka, Kelsey Hooten, Jason Williams, Matthew Lewis</i>	
Use of Mobile Fleet of Leak Detection Devices to Mitigate Risk During Pipeline Repair Program	1253
<i>Steve Edmondson, Adrian Banica, Tim Edward</i>	

Composite Repairs Evaluation for Axial and Bending Loads to Simulate Girth Welds Under Risk of a Geohazard Event.....	1263
<i>Omar Ramirez, Casey Whalen</i>	
New Repair Technology: the Path to Field Deployment	1281
<i>Shawn Laughlin</i>	
Know Your Materials! Onsite Non-Destructive Materials Testing for Gas Transmission Pipelines	1293
<i>Travers Schwarz, Steven Kinikin, Trevor Foster, Aaron Crowder</i>	
Pipe Grade Classification	1307
<i>Max Harrison</i>	
Validating and Quantifying In Situ NDT Uncertainty of Line Pipe Material Properties	1327
<i>Jeffrey Kornuta, Joel Anderson, Emily Brady, Janille Maragh, Peter Veloo</i>	
Axial Flaw and Crack Detection in Multi-Diameter Low-Pressure Gas Pipelines.....	1339
<i>Lance Wethey, John Nonemaker, Peter Clyde</i>	
Pathfinder® Foam Caliper Pig Overcomes Severe Pipeline Conditions to Successfully Identify and Locate Geometric Deformations in Gas Pipeline Mainland China.....	1351
<i>David Cockfield, Peter Ward, Qingdong Wei, Zhengxin Wei</i>	
Inline-Inspection Crack Diagnostics for Gas Pipelines – A Novel Technology	1369
<i>Willem Vos, Thomas Hennig</i>	
Inline Inspection Monitoring and Data Interpretation Using Fiber-Optic Sensing.....	1379
<i>Jerry Worsley, Jason Reynaud, Adnan Chughtai, Josh May, Tony McMurtrey</i>	
EMAT Lessons Learned Using Assessment Findings	1389
<i>Matthew Romney, Kayla Stark Barker, Ron Lundstrom, Daniel Bruce, Alireza Kohandehghan</i>	
Enhancing EMAT Crack Detection Services Using State of the Art Deep Learning.....	1403
<i>Stephan Eule, Thomas Beuker, Neil Pain</i>	

Author Index