



Pipeline and Hazardous Materials Safety Administration Office of Pipeline Safety

Pipeline Safety Research & Development Program

Workgroup#3: Utilization of Inspection Tools on Hydrogen Pipelines

Christian Sellu

December 1, 2021



U.S. Department of Transportation
Pipeline and Hazardous Materials
Safety Administration

PHMSA: Your Safety is Our Mission



Good Morning & Welcome!

PHMSA Leader: Christian Sellu, Pipeline Safety Inspector

Industry Co-Leader: Kirk Wissmar, Pipeline Integrity Engineer, BHE GT&S,

Industry Co-Leader: Greg Van Boven, Senior Engineer, Innovation & Decision Optimization, TC Energy

- Thank you for choosing this Workgroup
- We have an important charge for you:
 - Listening/Learning
 - Assist in developing PHMSA's future research agenda



Research Funding Organization Presenters

Jeff Whitworth, Program Manager – Emerging Fuels
Institute, Pipeline Research Council International

Bryce Brown, VP Industry, Regulatory & Public Affairs,
Rosen



Workgroup Objectives

1. Updating the audience on the challenges and funded research to date associated with ILI inspections of hydrogen pipelines
2. Identifying technical gaps that address key challenges
3. Developing a list of important topics for future PHMSA funded research from identified gaps
4. Study the reliability of ILI tools to characterize the integrity of hydrogen pipelines



Agenda at a Glance



Today's Agenda – December 1

Time	Presentation	Speaker
10:00 AM	Introduction to Workgroup	Workgroup Leader PHMSA
		Workgroup Leader Industry
10:30 AM	Research Funding Organization Presentations	Presenters 1-4
11:30 AM	Q&A	
12:00 PM	Contractor Support Introduction & Description	S&K Facilitate
12:10 PM	Research Gap Brainstorming Session	Workgroup Participants
12:45 PM	Lunch Break & CAAP Poster Presentations During Lunch similar gaps will be combined.	
2:45 PM	Review gaps identified following the combination.	Workgroup Leaders
3:15 PM	Sticky Note Exercise – Round 1 & 2 Workgroup prioritizes R&D Gaps	S&K Facilitate
4:15 PM	Break	
4:30 PM	Workgroup Research Topic Roadmapping	Workgroup Leaders & Participants
6:00 PM	Workgroup Closeout Day 2 closeout	Workgroup Leader



Tomorrow's Agenda – December 2

10:00 a.m. PHMSA's Year-Round R&D Solicitation

10:10 a.m. Workgroup Readouts

The results of this Workgroup will be presented at 10:10 a.m. tomorrow ETZ.

Return to the event meeting page to find the entry link to Day 3.

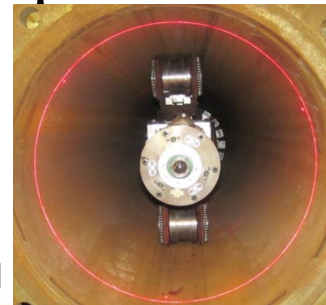
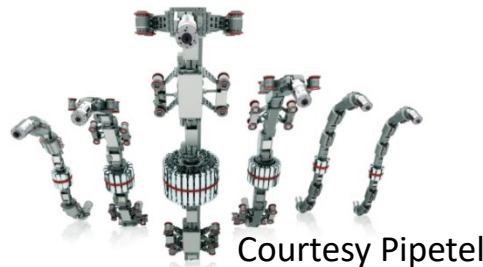
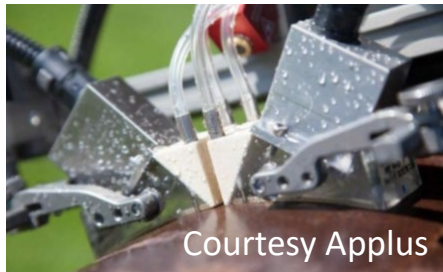


PHMSA Funded Research



PHMSA Related Research

- Major PHMSA funding of technology development for inspection tools since 2002
 - Focus seen with corrosion and cracking integrity threats for both In Line Inspection (ILI) and hand-held tools
 - Heavy focus with ILI for unpiggable systems
 - This include knowledge-based modeling to characterize identified damage
- No current focus on inspection technology for hydrogen blend or pure hydrogen service impacts



Notable Research Impacts

- PHMSA periodically conducts data calls to register technology or knowledge transfer
- Significant Technology Transfer registered to vendors
 - Robotic inspection platforms and various sensors
 - Hand-held in the ditch tools
 - Guided wave ultrasonics
- Knowledge Transfer registered to standards bodies
 - American Petroleum Institute Recommended Practice 1183, Assessment and Management of Dents in Pipelines



Related Policy Issues



2021 Infrastructure Bill

- Includes funds for Hydrogen Research & Development for the safe and efficient delivery of hydrogen using pipelines and hydrogen infrastructure
- Policy still under development pending review of Infrastructure Bill and spending commitments



Concerns about Hydrogen Pipelines

- Lightest element in the periodic chart
- Extremely flammable and easily ignited
- Can be infused into the body and welds of pipelines
- Causes embrittlement of steels especially high-grade steels and rare earth metals
- Concern about the BTU value of hydrogen blends with natural gas



ILI Data

- Inline Inspection (ILI) is a technology that has matured over the last 40 years with the Integrity Management regulations
- Of 1,600 miles of hydrogen pipelines in the US, 1177 miles have been inspected using ILI tools (2010-2020)
- 596,227 miles of Gas transmission pipelines have been inspected by ILI tools in same period



Some issues for consideration

- Existing infrastructure or New infrastructure?
- Effect of Hydrogen on Inline Inspection (ILI) equipment
- Methodology of conducting ILI inspections to minimize the effects of hydrogen
- Analyzing pipeline defects in hydrogen service
- Reliability of ILI tools in assessment of pipelines
- Leak Detection issues to consider



Thank You!

Research Program Contacts

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