

PHMSA Research, Technical and Policy Perspectives



Working Group #1 – Threat/Damage Prevention

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Pipeline Research and Development Forum

Nov. 16-17, 2016



Damage Prevention Research

- Stakeholder input sought/generated for Damage Prevention research at 6 Pipeline R&D Forums
- Solicited for related topics in 10 research solicitations since 2002
 - However not all solicited topics successful in becoming new research
- Related Investment: 18 technology development, product development & process improvement projects using \$4.9M (PHMSA)



Threat Prevention Research

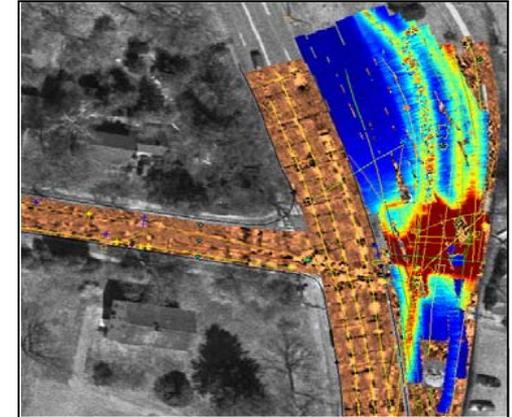
- Primarily addressed via our Competitive Academic Agreement Program
- Research awards primarily addressing solutions for preventing corrosion
 - Four projects, \$956K PHMSA contribution
 - Texas A&M
 - RFID Smart Corrosion Coupon
 - University of Akron
 - Threat of AC Induced Corrosion



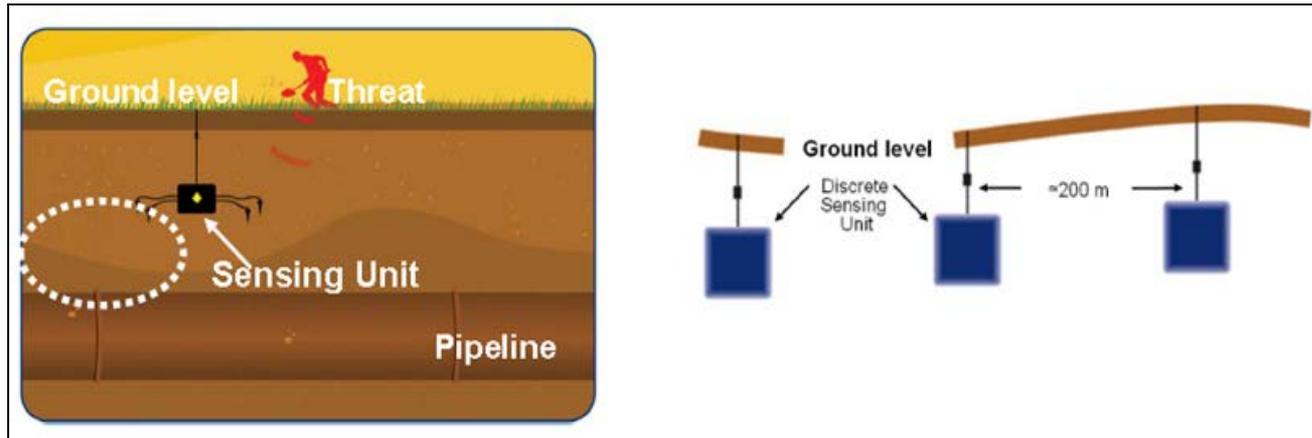
Notable Outputs/Impacts



Successful deployment of digging triggers on backhoes & integration into the VA Pilot Program



Commercial improvements to encroachment monitoring systems.



Commercial improvements to ground probing radar for sub-surface mapping



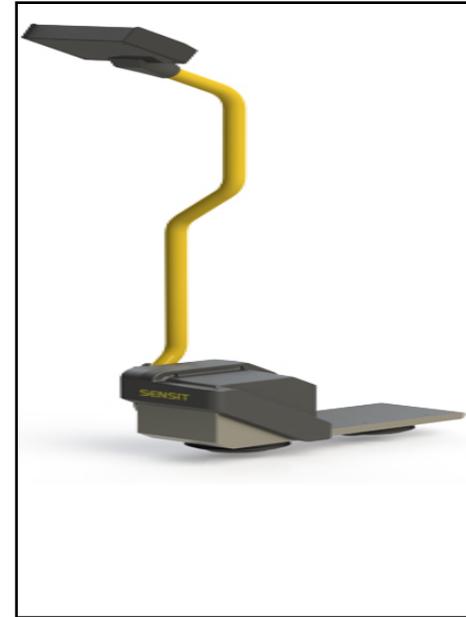
Notable Outputs/Impacts



General knowledge on the effectiveness of back fill methods



General knowledge on the effectiveness of damage prevention methods

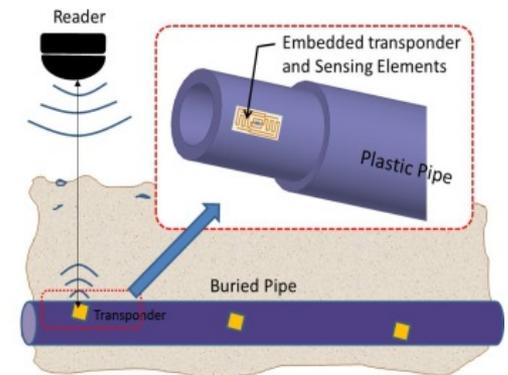
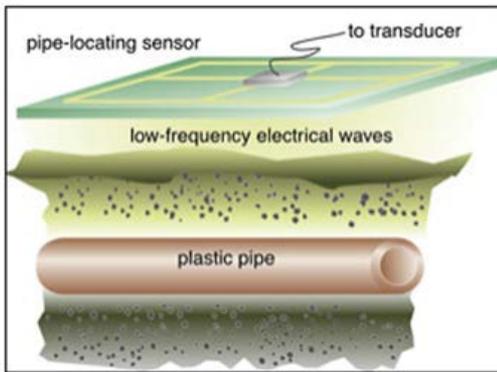


Handheld asset locator in detecting buried metallic and non-metallic pipes (PE and sewer pipes)



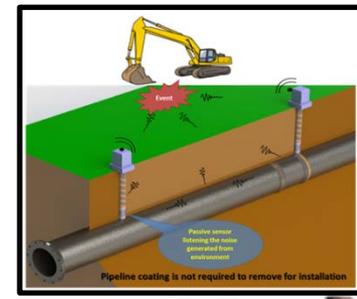
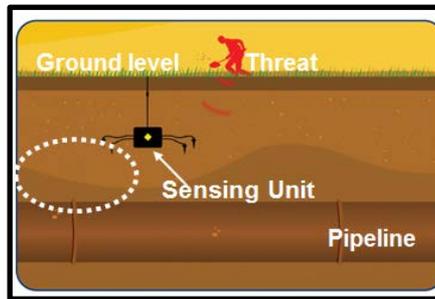
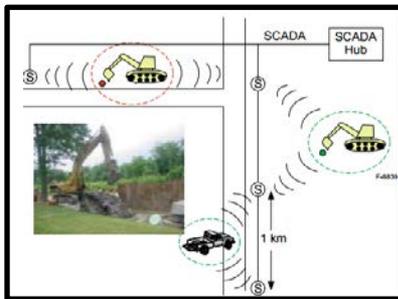
Active Research: Intrinsically Locatable Pipe

| Project Title | Contractor | PHMSA | Resource Share |
|---|---|---------------|----------------|
| Embedded Passive RF Tags towards Intrinsically Locatable Buried Plastic Materials | University of Colorado Denver | \$300K | \$75K |
| Application of Amorphous Metals for Plastic Pipeline Detection | University of North Dakota Energy & Environmental Research Center | \$100K | \$25K |
| Advancement in the Area of Intrinsically Locatable Plastic Materials | West Virginia University | \$300K | \$78K |
| Subsurface Multi-Utility Asset Location Tool | Gas Technology Institute | \$126K | \$54K |
| Acoustic-based Technology to Detect Buried Pipes | Operations Technology Development NFP | \$280K | \$400K |
| Total | | \$1.4M | \$707K |



Other Notable Active Work

| Project Title | Contractor | PHMSA | Resource Share |
|---|---|-----------------------|-----------------------|
| Infrasonic frequency seismic sensor system for preventing third party damage to gas pipelines | Northeast Gas Association | \$210,000.00 | \$210,000.00 |
| Infrasonic Frequency Seismic Sensor System for Pipeline Integrity Management | Physical Sciences Inc. | \$748,308.00 | \$0.00 |
| Pipeline Integrity Management for Ground Movement Hazards | Pipeline Research Council International | \$525,241.00 | \$523,580.00 |
| Advanced Development of PipeGuard Proactive Pipeline Damage Prevention System | Northeast Gas Association | \$268,492.00 | \$71,508.22 |
| Combined Vibration, Ground Movement, and Pipe Current Detector | Operations Technology Development NFP | \$299,030.00 | \$299,030.00 |
| Total | | \$2,900,937.00 | \$2,135,595.22 |



River Crossing Study

- Pipelines crossing rivers have different challenges
 - Dynamic environment
 - Terrestrial right-of-ways are static to some degree
 - Fluvial crossings may change day to day, year to year
 - Physical threats differ from terrestrial threats
 - Variable depth of cover, loss of supporting soil
 - Timescales differ
 - Construction threat for terrestrial threats are acute
 - Fluvial threats could be acute or over many year timeframe



River Crossing Study

- Path forward
 - What gaps exist in our understanding of river cross threat prevention?
 - What existing technologies could best address river crossing threat prevention?



Gas Migration

- Present challenges
 - Ground morphology dependent
 - Leaks below detection threshold
 - Tracing to source difficult
- Path Forward
 - What tools exist to address these challenges?
 - What gaps can be filled?



PHMSA Damage Prevention Technology Study

- PIPES Act of 2016:
 - Requires PHMSA to submit study within one year of enactment of law (June 22)
 - Results must include recommendations, that include the consideration of technical, operational, and economic feasibility, on how to incorporate into existing damage prevention programs technological improvements and practices that help prevent excavation damage.
 - Must be developed with stakeholder input



Damage Prevention Study Requirements

- (1) an identification of any methods to improve existing damage prevention programs through location and mapping practices or technologies in an effort to reduce releases caused by excavation;
- (2) an analysis of how increased use of global positioning system digital mapping technologies, predictive analytic tools, public awareness initiatives including one-call initiatives, the use of mobile devices, and other advanced technologies could supplement existing one-call notification and damage prevention programs to reduce the frequency and severity of incidents caused by excavation damage;
- (3) an identification of any methods to improve excavation practices or technologies in an effort to reduce pipeline damage;
- (4) an analysis of the feasibility of a national data repository for pipeline excavation accident data that creates standardized data models for storing and sharing pipeline accident information; and
- (5) an identification of opportunities for stakeholder engagement in preventing excavation damage.



Damage Prevention Study: Approach

- Review historical PHMSA R&D projects, incorporate outcomes as appropriate for study
- Review PHMSA grant programs, incorporate outcomes as appropriate
- Seek input from stakeholders to include trade associations and Common Ground Alliance
- Use info from R&D Forum
- Other input welcome but must be submitted by November 30 to annmarie.robertson@dot.gov



Working Group Discussions and Study

- Seeking to understand
 - Generally, what technologies are in place
 - Locating
 - Mapping/GPS
 - Predictive analytic tools
 - Mobile devices
 - Methods to improve excavation practices/technologies
 - How increased use/development of these technologies could improve damage prevention



Thank You!/R&D Program Contacts

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PHMSA RD&T Providing/Supporting:

