Session #2
Excavation Damage Prevention

Session Chair - Burt Williams
Co-Chair - Maureen Droessler

Facilitator - Paul Wood

Objective of the Discussion

- What are we charged to produce?
  - Information focusing future procurement
  - Given ongoing & completed work, what gaps exist?
  - What are the highest priority gaps?
  - What are the characteristics of these gaps?
  - What opportunities exist to deal with the gaps?

Recent Legislation - PIPES Act 2006

Underground pipeline damage prevention

- The Act provides new tools for PHMSA and its State partners to address damage to pipelines caused by excavation activities, including
  - new civil penalty enforcement authority,
  - standards for effective state damage prevention programs,
  - grants to States for developing and carrying-out these programs.
- The Act also authorizes $1,000,000 to promote the 811 national excavation damage prevention phone number

DIRT Report - Reported Root Causes for 2005

- Notification practices not sufficient, 33.7% (37.1% for pipelines)
- Locating practices not sufficient, 11.1% (10.1% for pipelines)
- Excavation practices not sufficient, 22.2% (20.1% for pipelines)
- Miscellaneous root causes, 6.7% (7.1% for pipelines)
- Data not collected, 26.3% (25.2% for pipelines)

DIRT Report - Excavation Equipment Involved

Stakeholders reported the following excavation equipment producing reported damage:

- ‘Backhoe/trackhoe’ for 28.2%
- ‘Hand tool’ followed with 7.4%
- ‘Trencher’ with 3.6%
- ‘Auger’ with 1.8%
- ‘Grader/scraper’ with 1.8%

Stakeholders reported the ‘unknown/other’ or ‘data not collected’ option for 55.2%

DIRT Reported - Type of Work Performed

- ‘Sewer’ for 7.7% of events
- ‘Water’ with 5.3%
- ‘Landscape’ with 5.0%
- ‘Electric’ with 4.0% (2,061),
- ‘Roadwork’ with 3.2%
- ‘Fence’ with 3.1%
- ‘Telecommunication’ with 2.8%
- ‘Unknown/other’ or ‘data not collected’ option for 58.0% of events

PRCI Structure

- Monitoring ROW Intrusions, Infringements & Environment
- Pipeline Risk Behavior & Public Awareness
- Facility Identification
- Buried Utility Protection

PRCI Gaps Identified

- Evaluation of damage prevention best practices
- Improvements to one call centers
- Improvements to public awareness education
- Improvements to monitoring
- Capturing excavation data
- Develop damage investigation best practices
- Develop human & organization factor skill set

Candidate Structure of Our Discussions

- Notification practices
- Locating information & practices
- Excavation & drilling practices
- Monitoring ROW
- Public & excavator awareness
- Damage detection & reporting
- Pipeline protection
- Design/material/installation features to minimize impact
- Characterization of risk - data & analysis needs
- Characterization of effectiveness of practices - data & analysis needs

	Needed Development		
R&D Area	**Technology**	**Standards**	**Knowledge**
Notification practices			
Locating information & practices			
Excavation & drilling practices			
Monitoring ROW			
Public & excavator awareness			
Damage detection & reporting			
Pipeline protection			
Design/material/installation features to minimize impact			
Characterization of risk - data & analysis needs			
Characterization of effectiveness of practices - data & analysis needs			

M - Metallic pipe
P - Plastic Pipe
S - Submerged Pipe

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Attendance Breakdown

Approximate total attendance	18 persons
Federal Regulators	2 persons
State Regulators	0 persons
International Regulators	0 persons
Pipeline Industry	8 persons
Standard Organizations	0 persons
Researchers	6 persons
Academics	2 persons

Top 4 Identified R&D Gaps

Gap #1 - Improvements to technologies to quickly/accurately/cheaply locate underground facilities (Technology)

- Locate plastic pipe
- Deal with the human element (ease of use)
- Sensors for “complex soils”
- Much work is underway; outcome is uncertain

Gap #2 - Effectiveness of enforcement – a social research issue (General Knowledge)

- Study of what will work, what has worked, conditions necessary for success

Gap #3 - Technology to provide early warning of the presence of excavators (Technology)

- Software to integrate information to support focus on unmarked, high risk lines

Gap #4 - Technology to integrate accurate information on pipe location into operation of excavation equipment (Technology)

- Similar to building information management system (BIMS)

Associated Details
(Gap #1)

Improvements to technologies to quickly/accurately/cheaply locate underground facilities (Technology)

1. Depending on the specifics of projects, this technology would apply to all pipeline types, including plastic pipe
2. Depending on the specifics of projects, this technology would apply to buried or underwater piping
3. Functionality: quick, accurate, low cost, efficient, all soil types; identify diameter, pipe type
4. If it satisfied the above characteristics, it will be deployed given interest by commercial organization
5. We expect progress can be made in three years or less, the work will need to continue beyond that time

Associated Details
(Gap #2)

Effectiveness of enforcement – a social research issue (General Knowledge)

1. Projects would apply to all pipeline types
2. Projects would apply to buried or underwater piping
3. Result would apply to all underground facilities
4. Barrier to applicability: some excavators & entities are exempted - one call laws aren't consistent across the states
5. Short term

Associated Details
(Gap #3)

Technology to provide early warning of the presence of excavators (Technology)

1. Technology would apply to ROWs for all pipeline types
2. Technology would apply to all equipment operating near any pipe
3. Functionality: ability to differentiate among equipment, low cost, able to be coupled to one call notification system, real time processing & notification
4. Barriers: high cost associated with retrofit, could be justified in high risk applications
5. Time Frame: development will require greater than three years
6. Many technologies may be capable of satisfying requirements (aerial and ground-based)

Associated Details
(Gap #4)

Technology to integrate accurate information on pipe location into operation of excavation equipment (Technology)

1. Technology would apply to all pipeline types
2. Technology would apply to both buried & submerged pipe
3. Functionality: low cost, accurate
4. Barriers: lack of electronic location data, security considerations, accuracy of current location information
5. Time Frame: development will require longer than three years

All Identified Gaps - In Priority Order

1. Improvements to technologies to quickly/accurately/cheaply locate underground facilities (Technology)
2. Effectiveness of enforcement – a social research issue (General Knowledge)
3. Technology to provide early warning of the presence of excavators (Technology)
4. Technology to integrate accurate information on pipe location into operation of excavation equipment (Technology)
5. Strengthen the completeness and usability of damage data from DIRT as well operator data bases (Standards & Knowledge)
6. Off shore damage prevention (Technologies & “Standards”)

All Identified Gaps - In Priority Order

7. Develop excavation methods that don't damage underground utilities (Technology)
8. Understand the effectiveness of candidate approaches to education - social science research (Knowledge)
9. Use of available technology to detect underground utilities and shutdown excavation equipment (Standards)
10. Demonstrate cost effective/timely coupling between one call and excavation permitting - in Virginia pilot?
11. Means to strengthen the effectiveness of use of location information during excavations
12. Means to more effectively engage other stakeholders, including underground utility owners, in local damage prevention efforts

Special Considerations

1. The group believes that R&D on the highest priority gaps is worth pursuing; however, the major impact on excavation damage prevention will result from strengthened Education & Enforcement
2. The group noted that while work is ongoing or serious consideration is being given to most R&D gaps identified, there is limited R&D known to be underway on the gap of “Offshore Damage Prevention” (where the greatest risk is associated with lines in shallow water); the importance of this gap would no doubt change with greater offshore representation in the voting
3. For some gaps considerable work is underway, therefore it might be prudent to understand the results and implications from ongoing work before future procurements