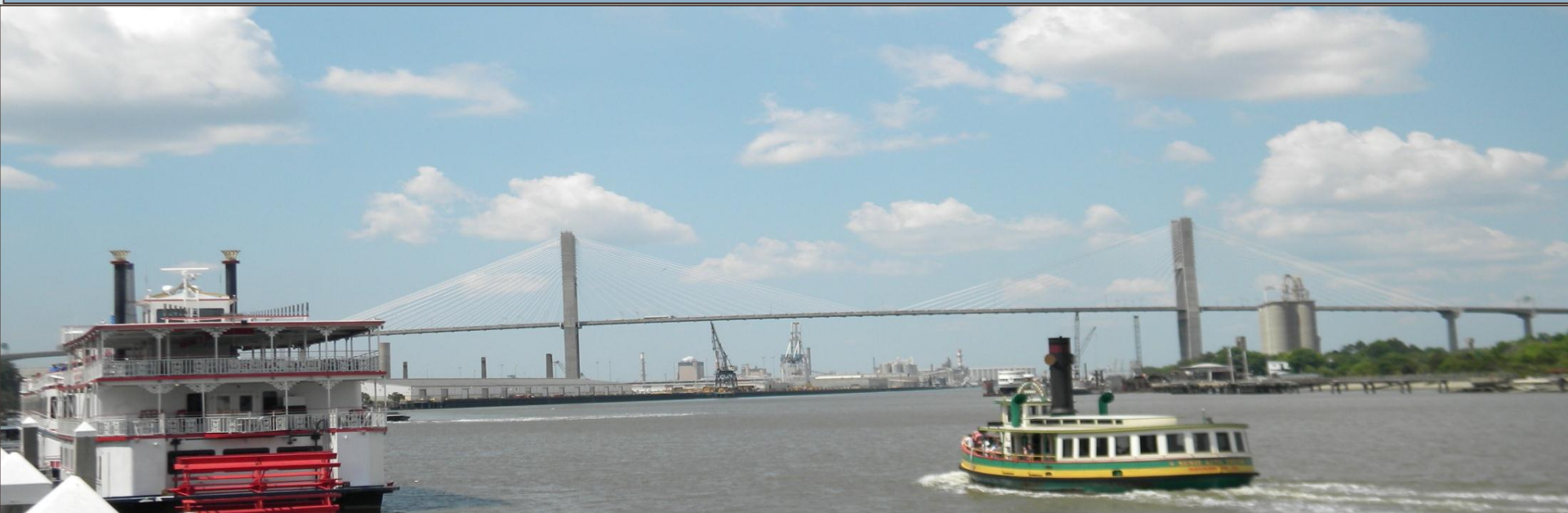
Highway Crossing Pipeline Encasement in Alabama

Jay Lindly, P.E., Ph.D.
Department of Civil, Construction and Environmental Engineering
The University of Alabama



Overview

- Funding Agency: Alabama DOT
- Research Agency: University of Alabama
- “Natural Gas Encasement for Highway Crossings”
- Completion Date: August 31, 2013
- Purpose: Review encasement policies and suggest re-written variance policy.

Current Alabama DOT Situation

- Typical bury 3': bury 4' under roadway
- Steel lines >2" must be encased. Variance policy is available; not used in all Divisions.
- High-volume roads (Interstates) and active ALDOT projects require encasement.
- All plastic lines must be encased, though non-vented sleeves may be all that's required on small-diameter lines.
- Frequently, encasement ends near road edge.

ALDOT Thoughts for Possible Adjustments

- Should encasement requirement continue?
- Possible alternatives
  - Vary requirement by pipe diameter?
  - Deeper burial?
  - Different requirements for roads of different traffic volumes?
  - Alternatives for pipelines installed on active projects?

UA Tasks

- Literature review
- Consult ALDOT, pipeline companies, and PSC
- Review other state's policies
- Analyze PHMSA incident data
- Interview Alabama Utility Contractor's Association
- Observe installations
- Review software packages
- Review standards

Initial Results of Literature Search (GRI 2010)

- 2 states of 27 responding always require encasement
- 19 of 27 states allow requests for variance
- 3 of 27 states allow encased or unencased
- 2 of 27 states evaluate on case-by-case basis
- 1 of 27 (Washington) encasement not required (change made in 2007)

Initial Results of PHMSA Data

- Dig-ins a main source of incidents in distribution pipelines
- External corrosion, dig-ins, material failure are big sources of incidents in transmission facilities
- Encased pipe crossings: External corrosion dominates a small sample
- Unencased pipe crossings: Dig-ins dominate a small sample

Requested Data from Alagasco

- Linear feet/miles of crossing pipe (cased vs. unencased)
- Linear feet/miles of parallel pipe in ROW
- Incidents in ROW
- Incidents at crossings
- Costs for encased vs. unencased crossings

Computer Pipeline Wall Thickness Programs

- Commercial
- UA-generated

Pipeline Design Standards

- States policies frequently cite CFR Title 49, Vol. 3, Part 192 (for natural gas pipelines) and Part 195 (for hazardous liquid pipelines)
- Part 192 doesn't require encasement but gives requirements in the event that encasing is used.
- Part 192 cites ASME B31.8 ('Gas Transmission and Distribution Systems'), which contains design information that requires thicker pipe wall at most crossings.
- ASME B31.8 suggests using API RP 1102. API RP 1102 adds a few modifications but changes results little. Cornell used it to develop PISCES.

Cities/Counties

- A limited survey in Alabama indicates that cities/counties do not require encasement of gas pipelines at crossings.

Pipeline Company Observations

- They would trade moderately deeper bury to avoid encasement.
- Both encasement and thicker pipe wall discourage dig-ins, but they're not foolproof.
- Their observation: DOTs are reducing/eliminating excavations under roadway, reducing need for encasement under roadway.
- They would like to make thicker pipe wall at crossings the norm while eliminating "in lieu of" requirement.

Continuing Questions

- Data to back up varying encasement requirement by:
  - Depth of bury
  - Average daily traffic
  - Pipe diameter
  - Linear extent
  - Plastic pipe

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Questions?

- In addition to questions, we'd appreciate thoughts and experiences from the audience.