Assuring Ohio Pipeline Safety

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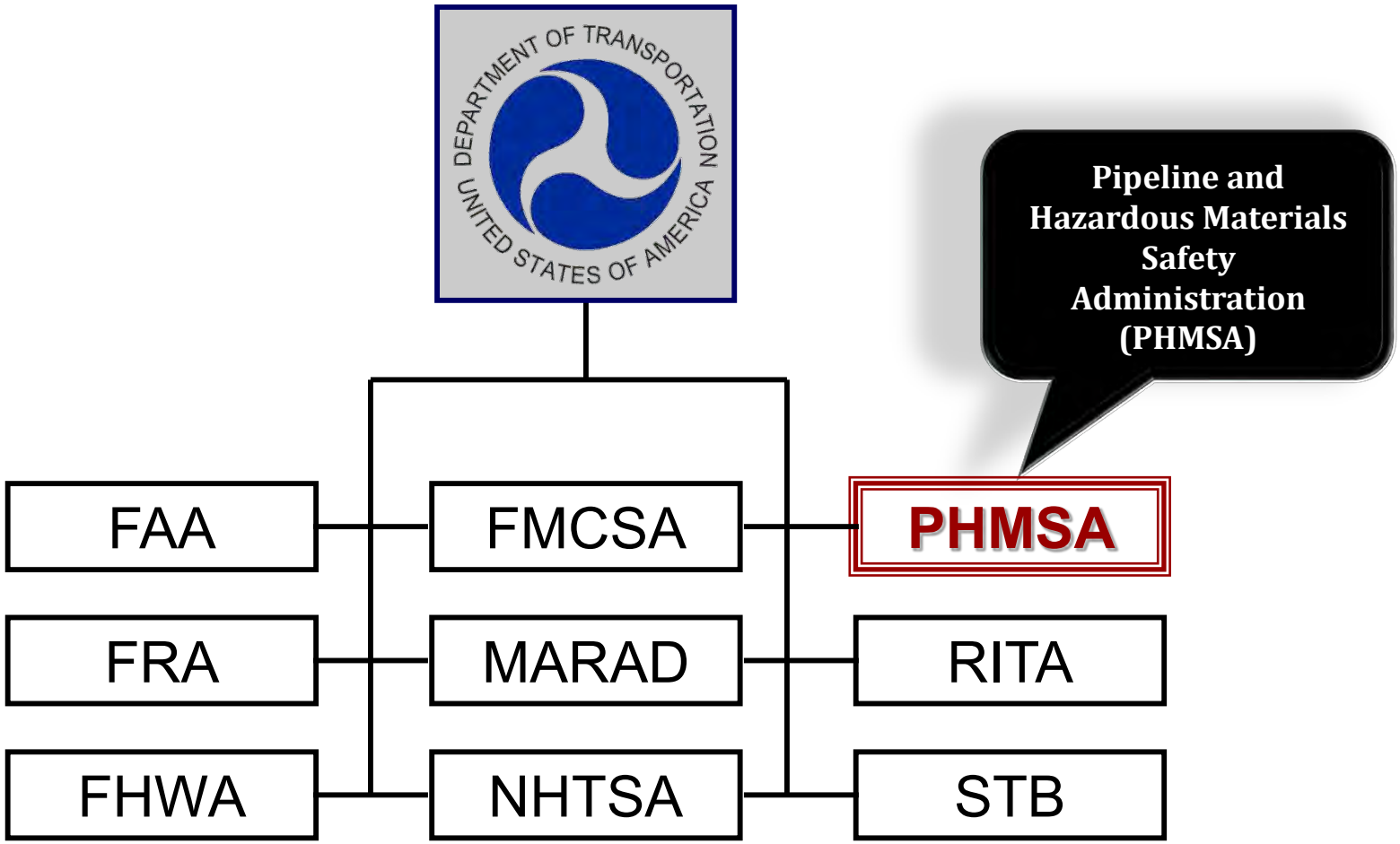
Disclaimer

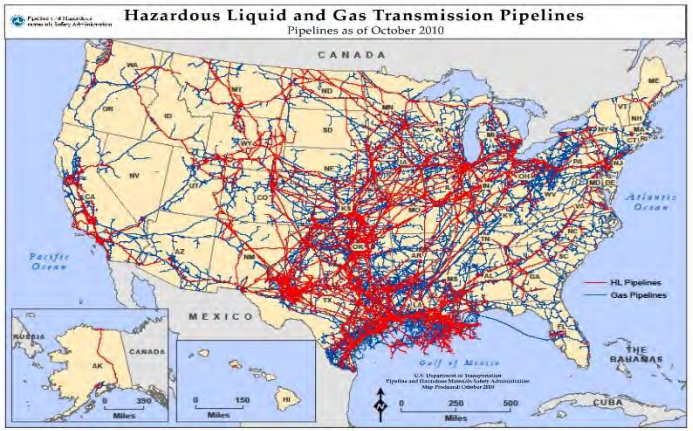
- The opinions in this presentation are my own and do not reflect those of The Ohio State University's Subsurface Energy Resource group nor of the Ohio State University Alumni Association nor of the OSU Retiree Association.

Who is PHMSA - DOT/PHMSA?



Overview - PHMSA

- Oversight role includes…
  - Inspection and Enforcement
  - Federal/State Partnership
  - Incident investigation
    - (with NTSB, state/local officials)
  - Data Analysis
  - Outreach/Education
  - Grant Programs
  - Research and Development
- Program Reauthorized at four-year intervals
  - New regulations, new initiatives



What PHMSA Regulates

- **Pipeline Miles by System Types – end of CY 2013, as-of 9/17/2014**

System Type	Miles	%Total	# of Operators
Hazardous Liquid	192,396	7%	441
Gas Transmission	302,825	11%	990
Gas Gathering	17,429	1%	356
Gas Distribution (Mains & Services)	2,148,519	81%	1,358
Total	2,644,341		

- Some Operators have multiple System Types
- States Inspect approximately 80 percent of the pipeline infrastructure under PHMSA's authority

Pipeline Safety 101

- PHMSA regulates gathering pipelines that could impact highly populated areas, cross commercially navigable waterways, or affect rural unusually sensitive areas
- The PHMSA regulates gathering lines greater than 6 5/8 inches in diameter in all “non-rural” areas and in rural areas that are (1) within a quarter mile of an “unusually sensitive area” and (2) operating above a certain pressure. Unusually sensitive areas include drinking water sources and ecological resources unusually sensitive to environmental damage from a liquids release. Other gathering lines can be regulated by states or the Interior Department
- Ohio regulates other gathering lines.

Pipeline Safety 101

- Under the Pipeline Safety Act, States can receive certification from PHSMA to assume pipeline safety responsibilities within their states. Certification is a “mutual agreement” between PHMSA and a State to take on this responsibility, and the State must agree to ensure that its pipeline operators meet the PHMSA’s minimum pipeline safety standards. Once certified, the State is responsible for oversight of the intrastate pipelines, including compliance and enforcement. Ohio is under this program.

State Programs

- State Base Grant – Act provides up to 80 percent funding by PHMSA for State Pipeline Safety Programs
- PHMSA does not manage State programs, but uses grant funding to encourage states to align with PHMSA goals and initiatives

What Ohio Regulates

- Ohio is home to over 100 unique pipeline operators that operate over 56,000 miles of distribution lines, over 10,000 miles of transmission lines and over 1,100 miles of gatherings lines. The PUCO employs field inspectors who perform compliance inspections of gas pipeline operators to ensure they are following design, construction, operation and maintenance safety regulations.

Interstate Agents

- Ohio does not have an Interstate Agent Agreement
- Ohio relies on the federal PHMSA pipeline inspection for interstate natural gas and hazardous liquids pipelines

What Ohio Regulates

- The Public Utilities Commission of Ohio regulates the **safety aspects** of most gas pipelines located within the state of Ohio. The PUCO Pipeline Safety section monitors the construction of these lines and conducts routine inspections and audits once the lines are placed in service.
- The only exceptions to PUCO regulations are **production lines** that are regulated by the Ohio Department of Natural Resources, and **liquids** or **interstate lines** that are regulated directly by the federal Pipeline and Hazardous Safety Administration (PHMSA).

Pipeline Safety 201

- Pipeline companies are responsible for the safety of pipelines. They operate under a comprehensive series of regulations from construction to operation and maintenance. Federal and state pipeline inspectors, operating pursuant to PHMSA regulations, evaluate whether operators are being diligent in meeting regulatory requirements, conducting proper inspections, and making necessary repairs.

Pipeline Safety 201

- The general responsibility of a pipeline inspector include inspection of safety records, facilities, construction, integrity management and other programs, and investigation of accidents.
- Most State pipeline programs, including Ohio, go beyond the federal requirements and perform additional kinds of oversight.

Pipeline Safety 201

- Two Ohio examples of Ohio requiring higher compliance standards:
  - Pipeline safety extended to gas gathering lines
  - Requires distribution operators to conduct a riser inventory of their system, to track and monitor riser leak failures, to report semi-annually all riser failures to the PUCO, and to ensure that risers are being installed appropriately.

Ohio's Compliance & Safety Program

- PUCO investigators inspect each natural gas pipeline system in the state at least once every two years and review records and procedures implemented by utilities. When violations are detected, the PUCO orders corrective action and may assess fines and other penalties to ensure that Ohio's natural gas pipeline systems continue to deliver natural gas safely and reliably.

Pipeline Safety 201

- Current Issues:
  - Pipeline construction because of non-conventional gas sources & Gas and liquids flow reversals
  - Programs to accelerate the repair, rehabilitation, and replacement of the highest-risk pipeline infrastructure, including
    - Cast iron mains
    - 1960 through 1980 plastic pipe
    - Mechanical couplings used for joining and pressure-scaling pipe
    - Copper pipe
    - And other vulnerable pipe, including pipe with inadequate records to verify integrity

Pipeline Safety 201

- Cast Iron Pipe: Cast and wrought iron pipelines are among the oldest energy pipelines constructed in the United States. Many of these pipelines were installed over 60 years ago and still deliver natural gas to homes and businesses today. However, the degrading nature of iron alloys, the age of the pipelines, and pipe joints design have greatly increased the risk involved with continued use of such pipelines.

Pipeline 201

- On Bare Steel Pipe: Uncoated steel pipelines are known as bare steel pipelines and while many of these pipelines have been taken out of service, some of these pipelines are still operating today. The age and lack of protective coating typically makes bare steel pipelines of higher risk as compared to some other pipelines and candidates for accelerated replacement programs.

Ohio Main Replacement Programs (Cast-Iron/Bare-Steel*)

Company	Duke Energy	Columbia Gas	Dominion East Ohio	Vectren
Term of the program	15 years	25 years	25 years	20 years
Current year of program	14	7	7	6
Estimated program cost	$716 million	$1.8 billion	$3.4 billion	$337.5 million
Proposed replacement mileage	1,200	4,153	5,572	708
Miles replaced to date**	1117	1121.3	920	157
Dollars spent to date ^	$678.2 million	$698.9 million	$754.6 million	$77.7 million

Includes bare steel, cast iron, pre-1955 unprotected coated steel, wrought iron, and copper pipe (and associated service lines).

** Mileage is as of 12/31/2014

^ Dollars include only the cost of main replacements and related service lines

Pipeline Safety 201

- Gathering lines: given the high pressure nature of non-conventional gas, Ohio decided to provide pipeline safety regulation where appropriate
- Expect a further build out of the natural gas pipeline system
- Legitimate siting concerns on gathering lines and pipelines, include: wetlands, endangered species, water crossings and impacts, sediments, historical preservation, preservation of natural areas, parks, and preserves
- Remember to consider safety in subsequent land use near pipelines.

What is a smart pig?

- What is a smart pig?
  - A. Green Acres' Arnold Ziffle. See https://www.youtube.com/watch?v=fTEcL7bw6U4ile
  - B. Floyd of Rosedale See http://www.rivalrytrophy.com/products/floyd-of-rosedale
  - C. Pigs are devices that are placed inside the pipe and traverse the pipeline. Smart pigs might be equipped to detect magnetic flux for leakage, with ultrasonic, elastic/shear wave, transponder/transducer, or a combination thereof
- Haven't got a clue?

What is a smart pig?

- The correct answer is all of the above. However, for the purposes of this presentation, the correct answer is C.

Pipeline Safety 201

- A "pig" in the pipeline industry is a tool that is sent down a pipeline and propelled by the pressure of the product flow in the pipeline itself. There are four main uses for pigs:
  - Physical separation between different fluids flowing through the pipeline
  - Internal cleaning of pipelines
  - Inspection of the condition of pipeline walls (also known as an Inline Inspection (ILI) tool)
  - Capturing and recording geometric information relating to pipelines (e.g., size, position).

Pipeline Safety 201

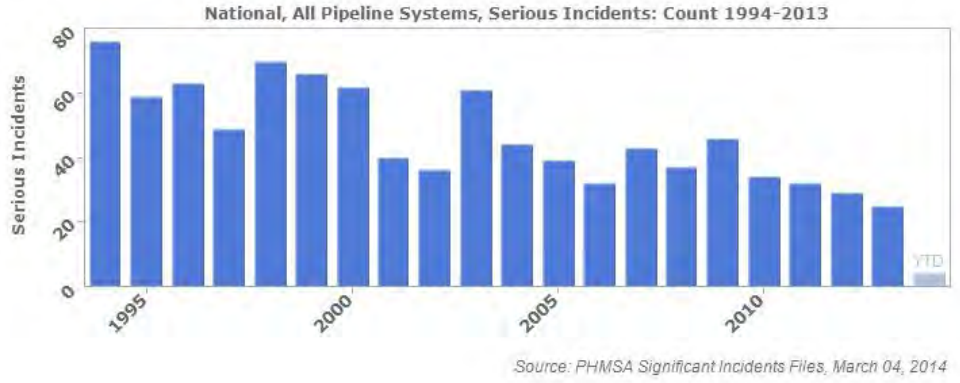
- Modern intelligent or 'smart' pigs are highly sophisticated instruments that include electronics and sensors that collects various forms of data during their trip through the pipeline. They vary in technology and complexity depending on the intended use and the manufacturer.
- The technology used varies by the service required and the design of the pig, each pigging service provider may have unique and proprietary technologies to accomplish the service.
- Surface pitting and corrosion, as well as cracks and weld defects in steel/ferrous pipelines are often detected using magnetic flux leakage (MFL) pigs.
- Other 'smart' pigs use electromagnetic acoustic transducers to detect pipe defects. Caliper pigs can measure the roundness of the pipeline to determine areas of crushing or other deformations.
- Some smart pigs use a combination of technologies, such as providing MFL and caliper functions in a single tool.

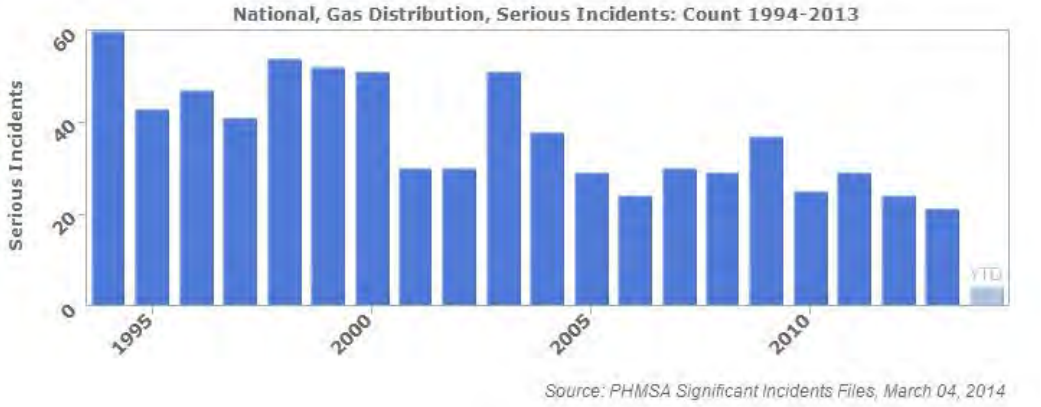
What does the data show? Pipeline incidents

- All System Types downward trend

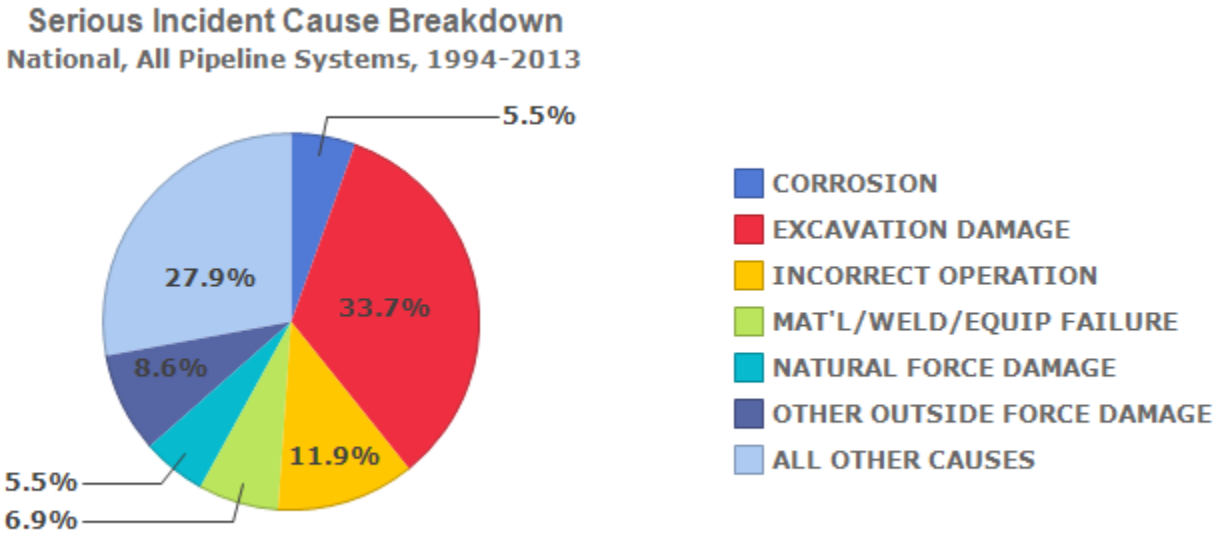
Serious incidents = release with injury or fatality

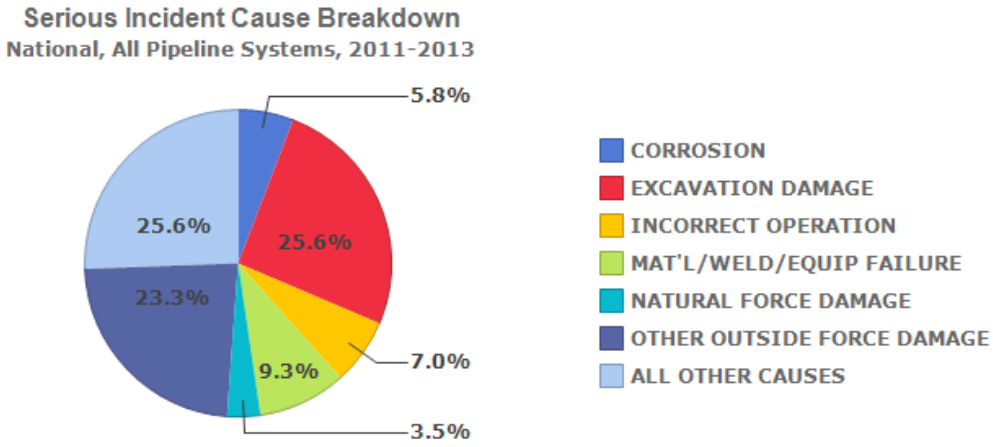
Gas Distribution - Similar trend





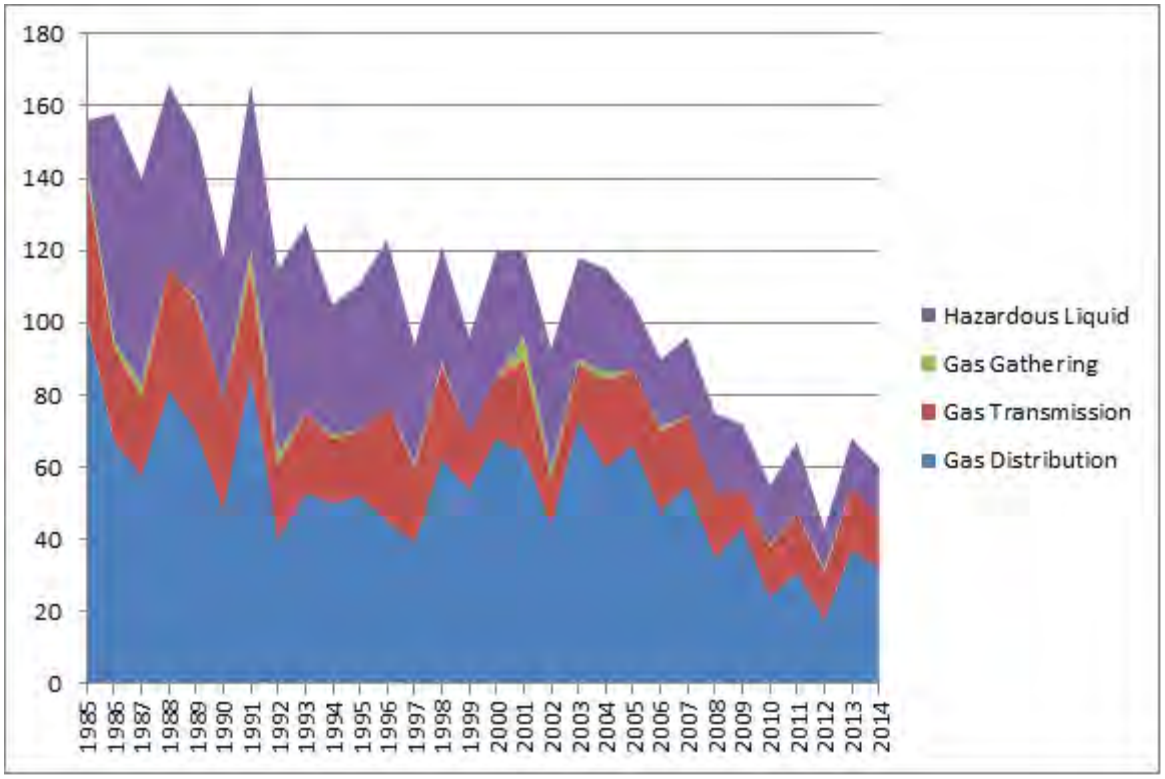
A Serious Risk: Excavation Damage





Source: PHMSA Significant Incidents Files, Feb 04, 2014

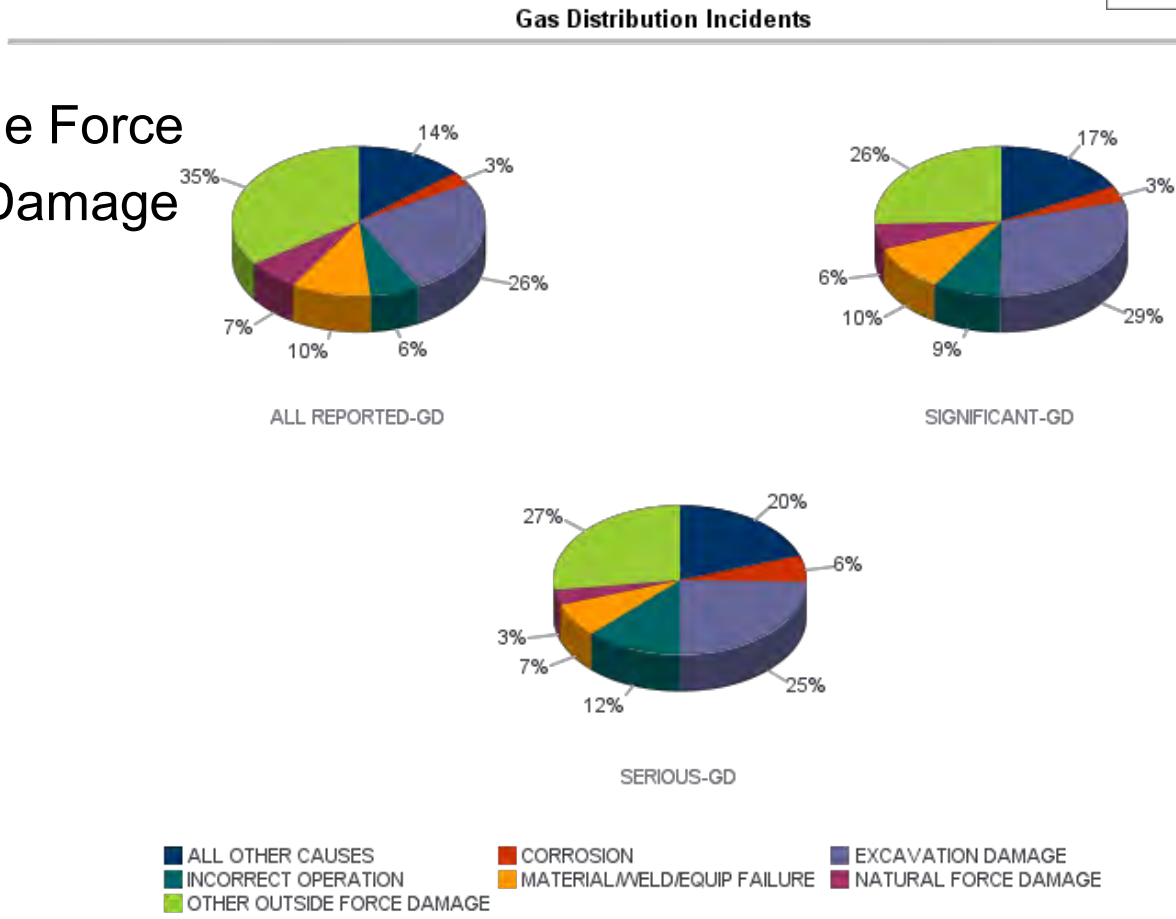
Incidents caused by excavation



Distribution incidents 2010 - 2014

Top Causes

- Other Outside Force
- Excavation Damage



Ohio's 811
Call Before You Dig

- By law, everyone —including homeowners—must contact the Ohio Utilities Protection Service, the Oil and Gas Producers Underground Protection Service, 8-1-1 or 1-800-362-2764, at least 48 hours but no more than 10 working days (excluding weekends and legal holidays) before beginning any digging on their property. The depth of utility lines varies and there may be multiple utility lines in a common area, so it's always smart to have them marked.
- By simply calling 8-1-1, you can notify Ohio's one-call notification systems. The Ohio Utilities Protection Service coordinates with local utilities and the Oil and Gas Producers Underground Protection Service coordinates with oil and gas production facilities to have underground lines marked, so you know ahead of time where it is safe to dig. Not only will doing so avoid headaches and make your job easier, but you avoid potential utility outages, repair costs and serious or even fatal injuries.

Ohio's 811
Call Before You Dig

- Tell the operator where you're planning to dig, what type of work you will be doing and your affected local utilities companies will be notified about your intent to dig. In a few days, they'll send a locator to mark the approximate location of your underground lines, pipes and cables, so you'll know what's below - and be able to dig safely.
- Visit the Ohio Utilities Protection Service's website at www.oups.org, the Oil and Gas Producers Underground Protection Service's website at www.ogpups.org, or call 8-1-1 or 1-800-362-2764.

For More Information

- The PUCO Pipeline Safety Division
- Pipeline infrastructure/replacement programs:

http://opsweb.phmsa.dot.gov/pipeline_replacement/

http://primis.phmsa.dot.gov/dimp/perfmeasures.htm

- PHMSA damage prevention information:

http://primis.phmsa.dot.gov/comm/DamagePrevention.htm?nocache=1970

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