



# Pipeline and Hazardous Materials Safety Administration

## Office of Pipeline Safety

### Pipeline Safety Data Update

William Lowry, PE

January 2024



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

PHMSA: Your Safety is Our Mission



# PHMSA Regulated Pipeline Facilities OPS and States

<b>Pipeline Facilities by Regulation and System Types – CY 2022 Annual Reports</b>			
<b>Safety and Reporting Regulated</b>	<b>Miles</b>	<b>% Miles</b>	<b># Operators</b>
<b>Hazardous Liquid/CO<sub>2</sub></b>	<b>229,290</b>	<b>8%</b>	<b>524</b>
<b>Gas Transmission</b>	<b>300,850</b>	<b>10%</b>	<b>1,070</b>
<b>Gas Gathering</b>	<b>111,411</b>	<b>4%</b>	<b>512</b>
<b>Gas Distribution</b>	<b>2,336,957</b>	<b>78%</b>	<b>1,332</b>
	<b>subTotal</b>	<b>2,978,508</b>	
<b>Reporting-Regulated-Only</b>	<b>Miles</b>	<b>% Miles</b>	<b># Operators</b>
<b>Hazardous Liquid</b>	<b>37,423</b>	<b>14%</b>	<b>125</b>
<b>Gas Gathering</b>	<b>234,293</b>	<b>86%</b>	<b>483</b>
	<b>subTotal</b>	<b>271,716</b>	
	<b>Total</b>	<b>3,250,224</b>	

Data as-of 7-9-2023

<b>Hazardous Liquid Breakout Tanks</b>	<b>8,519 Tanks, 241 Operators</b>
<b>Liquefied Natural Gas</b>	<b>171 Plants, 243 Tanks, 91 Operators</b>
<b>Underground Natural Gas Storage</b>	<b>400 Facilities, 16,630 Wells, 126 Operators</b>



# Pipeline Information Collections With Forms for Reporting to PHMSA

OMB #	Form(s) for Reporting to PHMSA	Expires
2137-0047	<b>HL Accident and GRR HL Accident</b>	<b>4/30/2026</b>
	Proposing HL Accident instruction revisions around accident date and tank events – <b>Implementing July 2023</b>	
2137-0635	<b>GD, GG GT UNGS, LNG, and RR GG Incident</b>	<b>3/31/2025</b>
	Proposing instruction changes around accident date, adding Confirmed Discovery, and updating excavation damage reporting – <b>waiting for OST to send to OMB</b>	
2137-0614	<b>HL Annual</b>	<b>3/31/2026</b>
	Proposing excavation damage reporting additions and changes around rural miles – <b>OMB approved and implementing for CY 2024 reports collected during 2025</b>	
2137-0522	<b>GG GT, LNG, UNGS, and RR GG Annual</b>	<b>3/31/2025</b>
	In GG GT Annual, proposing addition of excavation damage reporting - <b>waiting for OST to send to OMB</b> - and repair categories for §192.710 segments – <b>OMB approved and implementing for CY 2024 reports collected during 2025</b>	
2137-0629	<b>GD Annual</b>	<b>5/31/2024</b>
	Proposing update of excavation damage reporting and removal of EFV and curb valve data - <b>waiting for OST to send to OMB</b>	
2137-0627	<b>National Registry Notif and OpID Assign Request</b>	<b>3/31/2025</b>
2137-0596	<b>National Pipeline Mapping System (NPMS)</b>	<b>3/31/2026</b>
	Proposing addition of Medium Consequence Area (MCA) and §192.710 Assessment - <b>OMB approved and implementation in phases</b>	

updated  
7-10-2023



# Categories of Incident Reports

**Reporting-Regulated-Only** hazardous liquid and gas gathering are excluded from **Serious** and **Significant** Incidents

**Serious** – fatality or injury requiring in-patient hospitalization, but **Fire First** are excluded

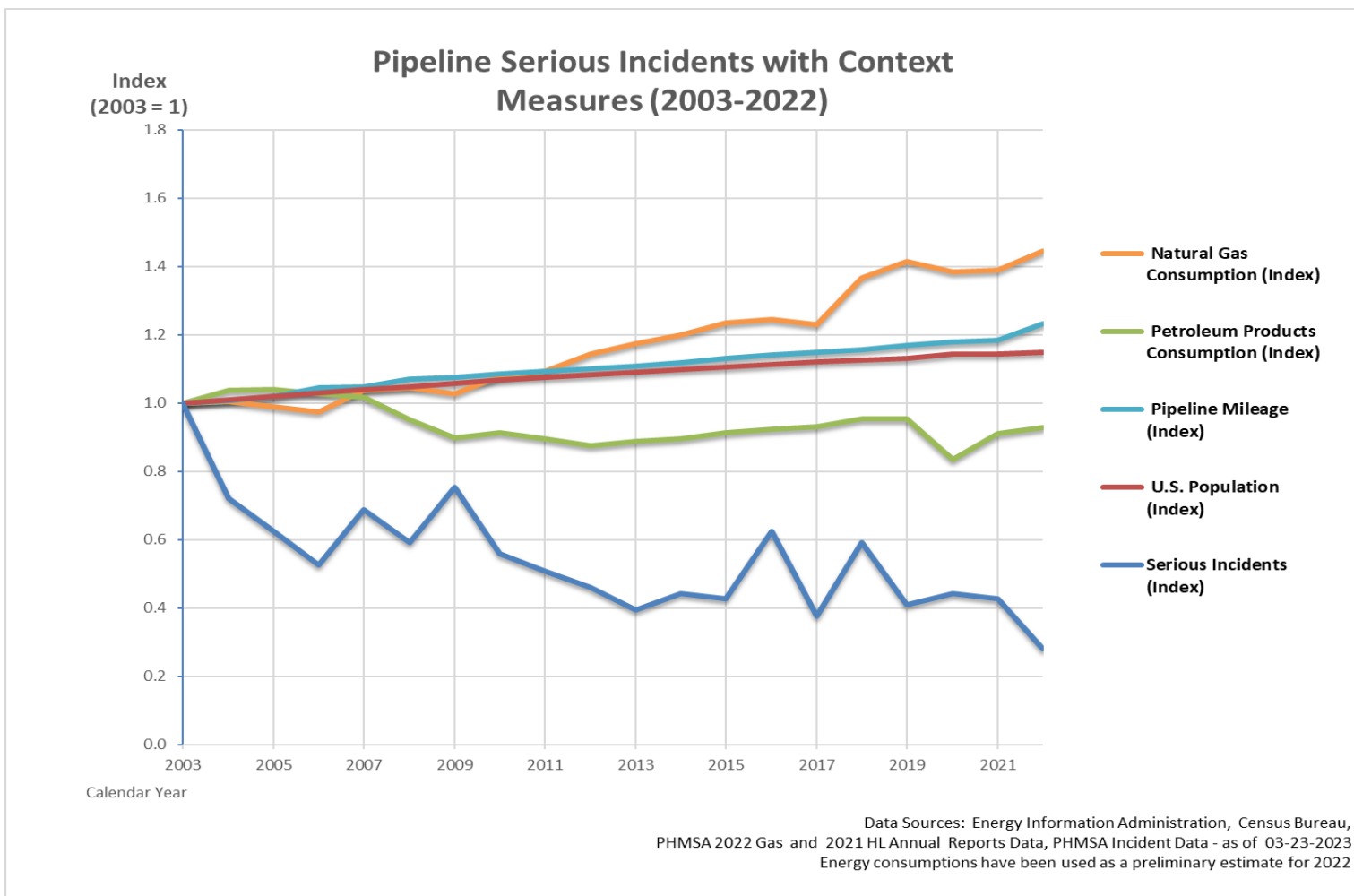
**Fire First** are gas distribution incidents with a cause of “Other Outside Force Damage” and sub-cause of “Nearby Industrial, Man-made, or Other Fire/Explosion”

**Significant** include any of the following, but **Fire First** are excluded:

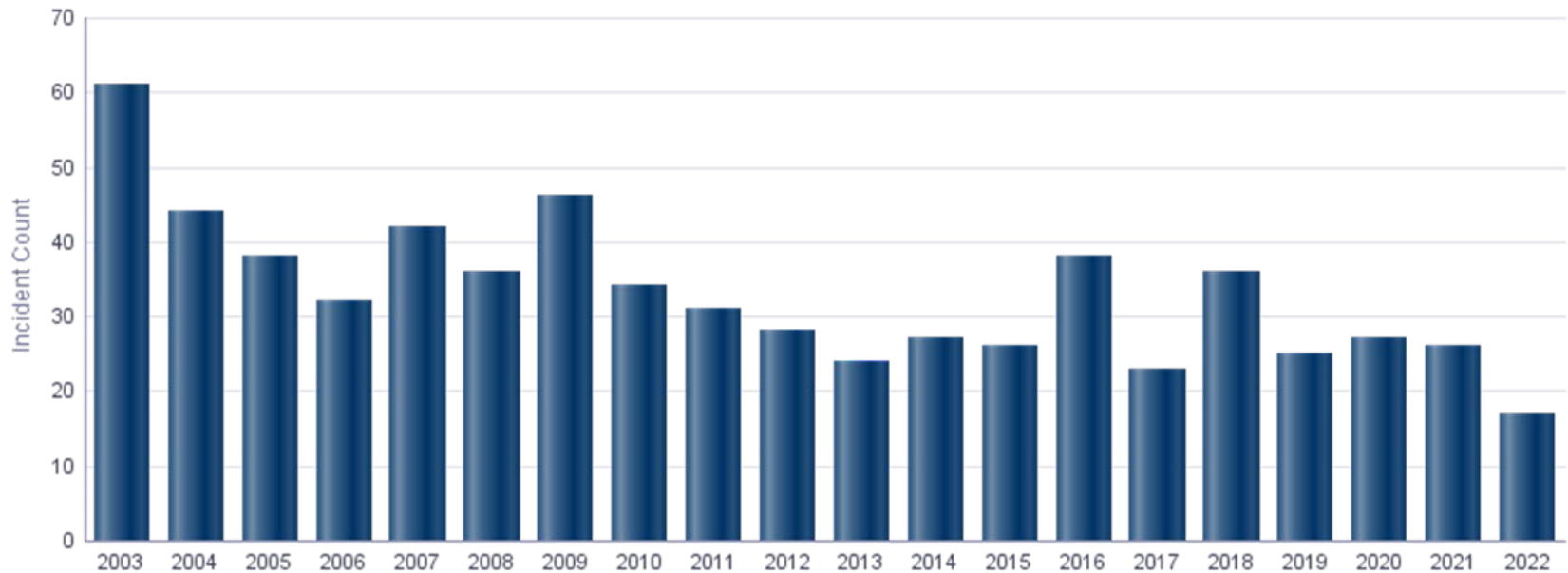
1. Fatality or injury requiring in-patient hospitalization
2. \$50,000 or more in total costs, measured in 1984 dollars
3. Highly volatile liquid (HVL) releases of 5 barrels or more
4. Non-HVL liquid releases of 50 barrels or more
5. Liquid releases resulting in an unintentional fire or explosion



# Pipeline Serious Incidents with Context Measures 2003-2022



# Serious Incidents 2003-2022



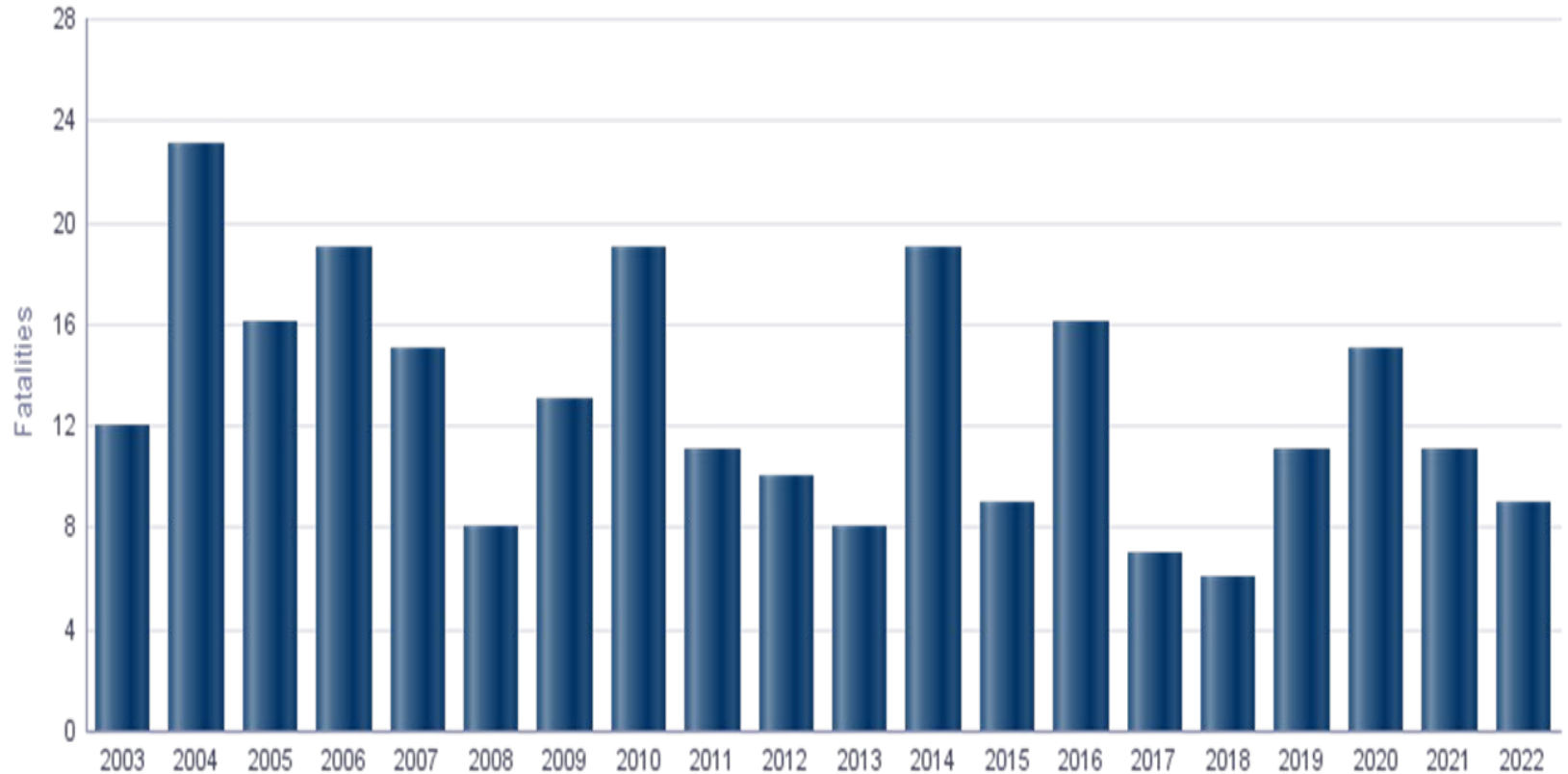
**17 in CY 2022 (26 in CY 2021)**

Data as-of 3-23-2023

71% Gas Distribution 23% Gas Transmission 6% Gas Gathering  
0% Hazardous Liquid, Underground Natural Gas Storage, and LNG



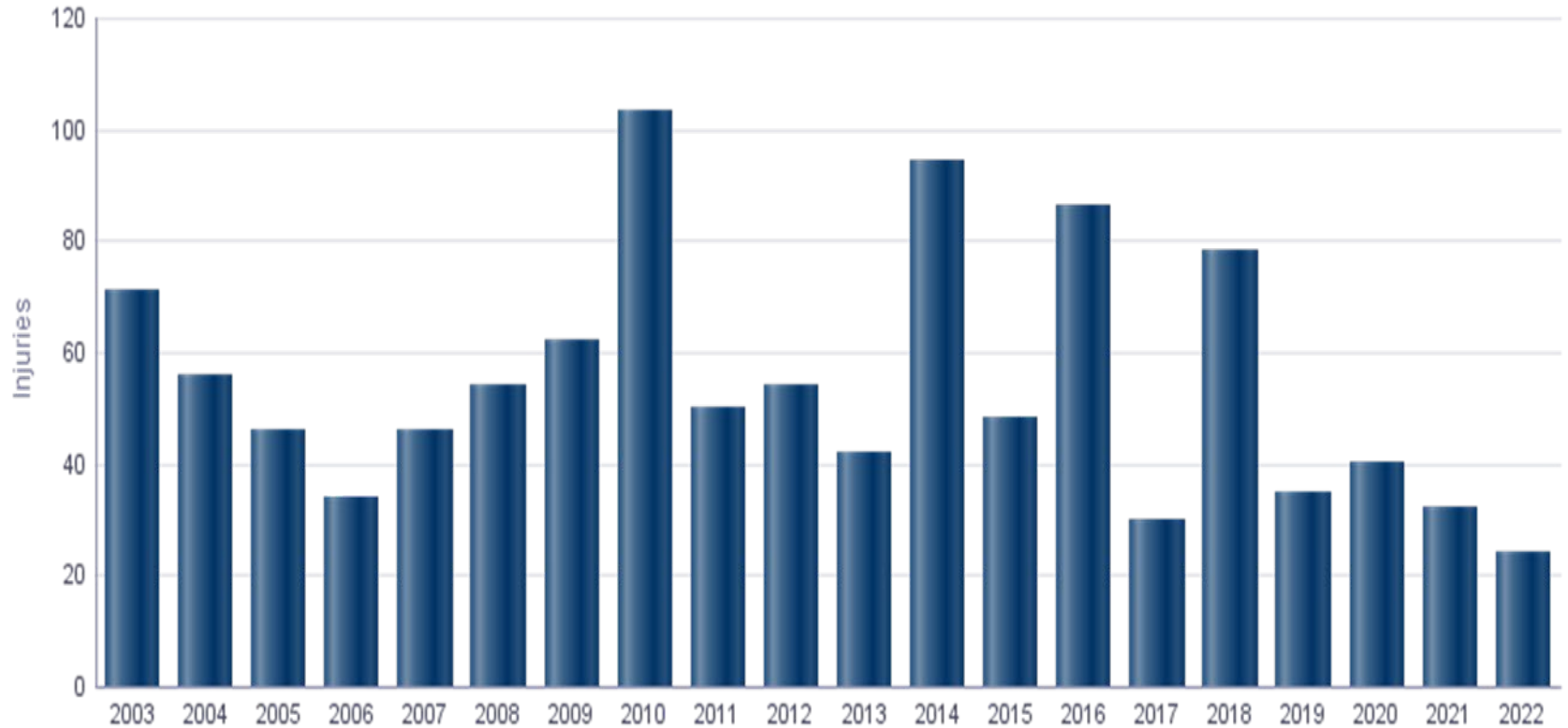
# Serious Incidents: Fatalities 2003-2022



Data as-of 3-23-2023



# Serious Incidents: Injuries 2003-2022



Data as-of 2-23-2023



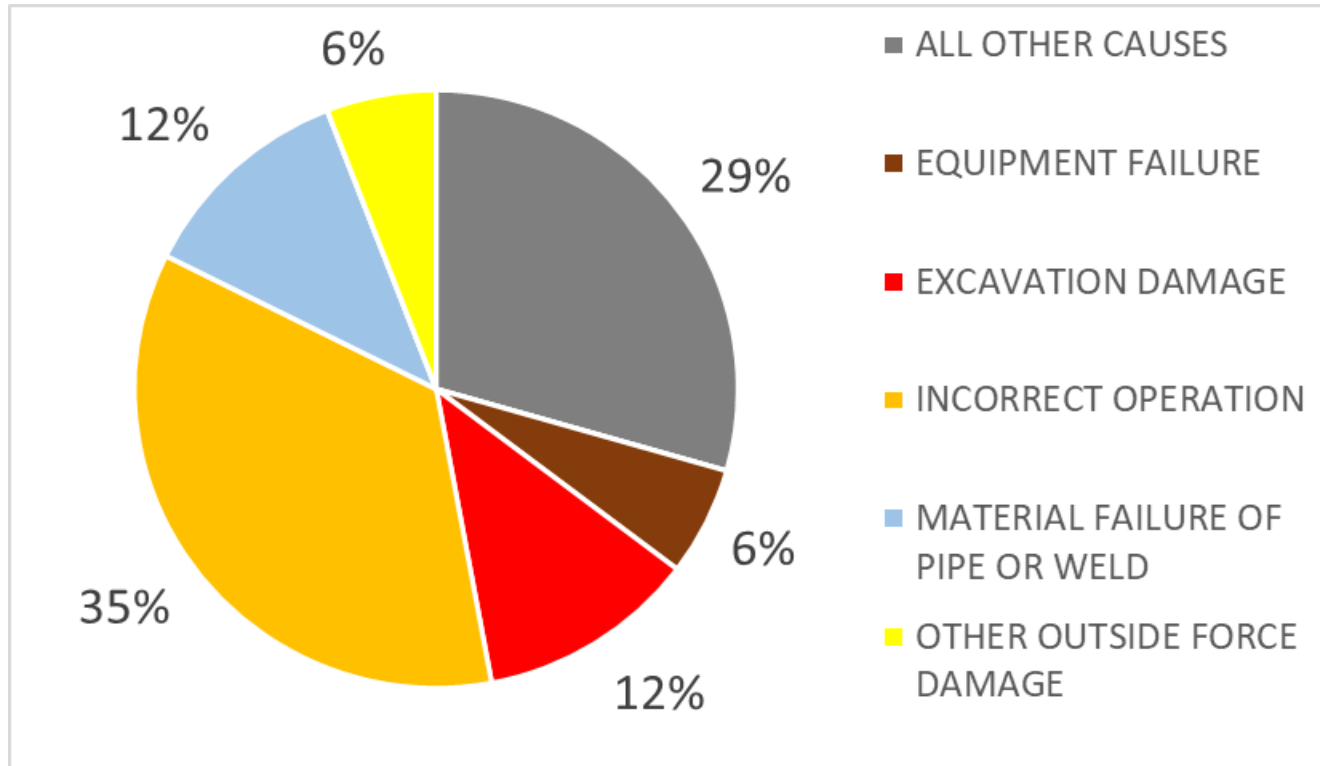


# Serious Incidents by Cause 2022

## Leading Causes:

Incorrect Operation

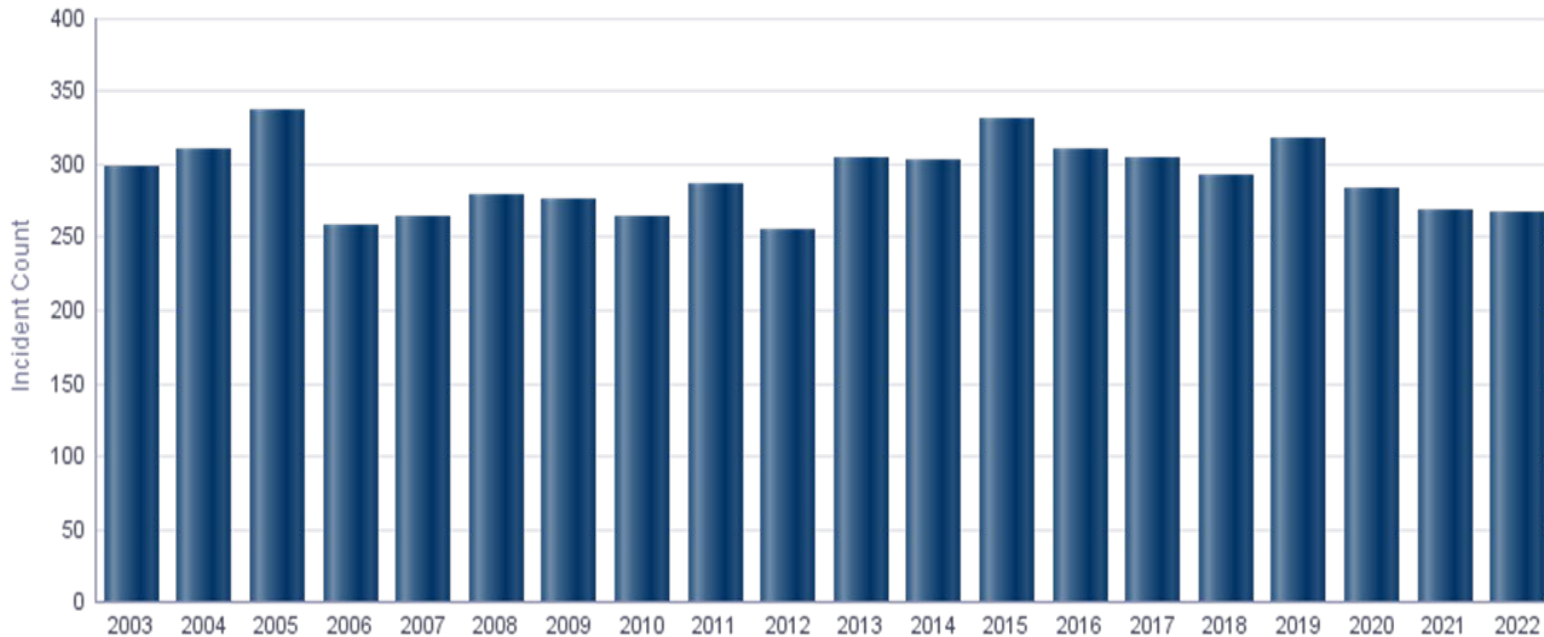
All Other Causes/Unknown



Data as-of 3-22-2023



# Significant Incidents 2003-2022



**266 in 2022 (268 in CY 2021)**

Data as-of 3-22-2023

19% Gas Distribution

6% Gas Gathering

25% Gas Transmission

48% Hazardous Liquid

<1% LNG

1% Underground NG Storage



# Significant Incidents by Cause 2022

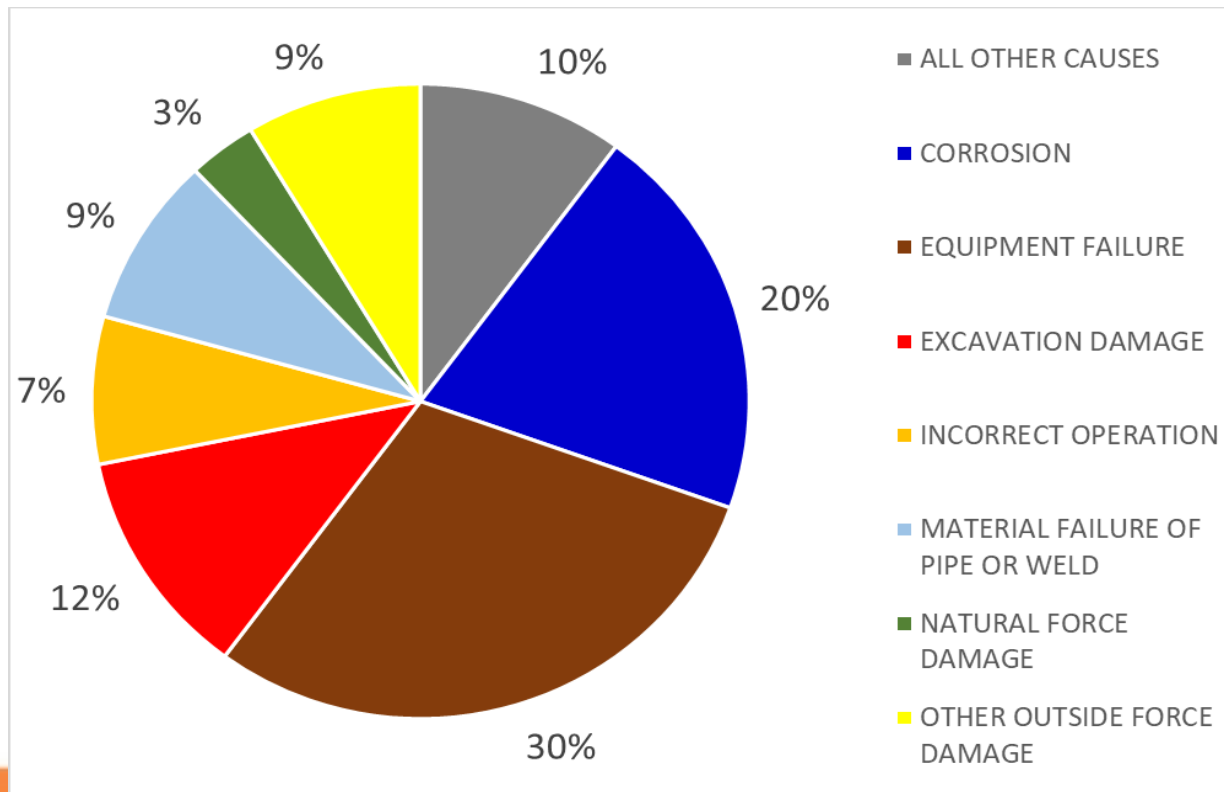
## Leading Causes:

Equipment Failure (Control/Relief, Connections)

Corrosion (Internal)

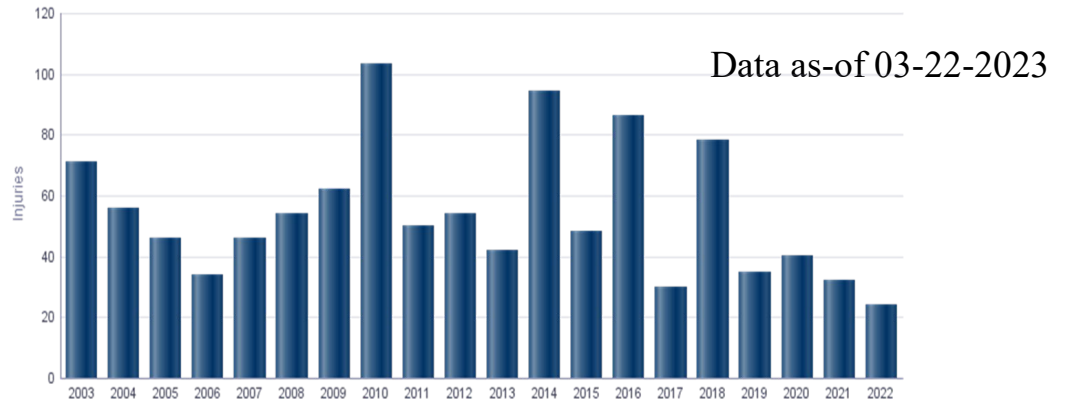
Excavation Damage (Third Party)

Data as-of 3-22-2023



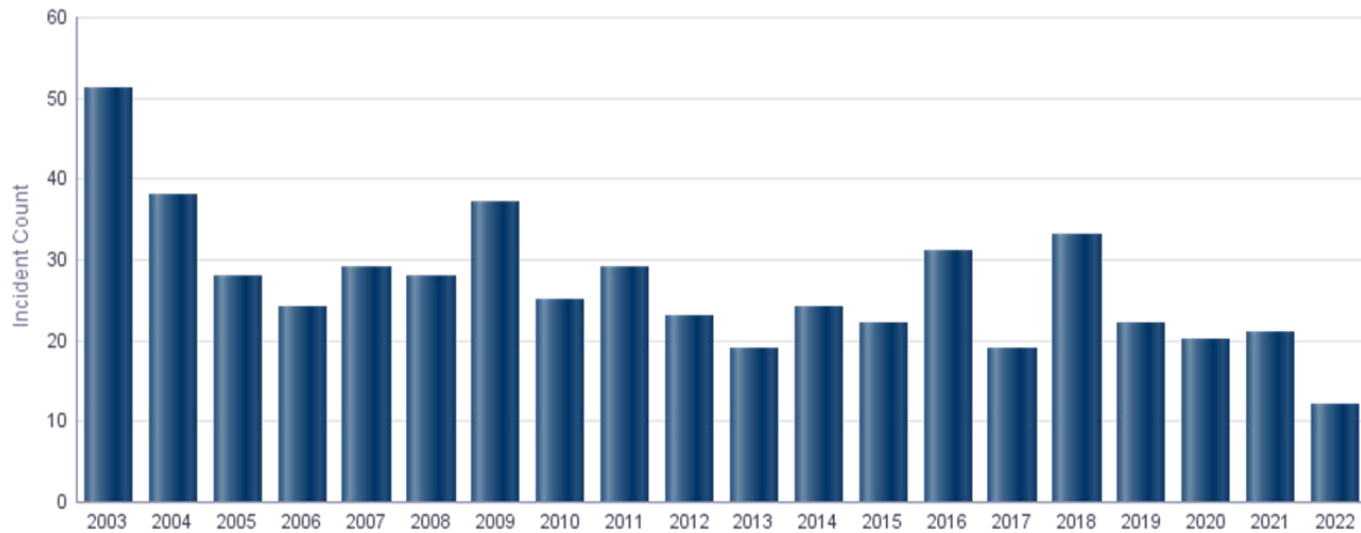
# Gas Distribution Serious Incidents 2003-2022

**All System Types  
Decreased in 2022**



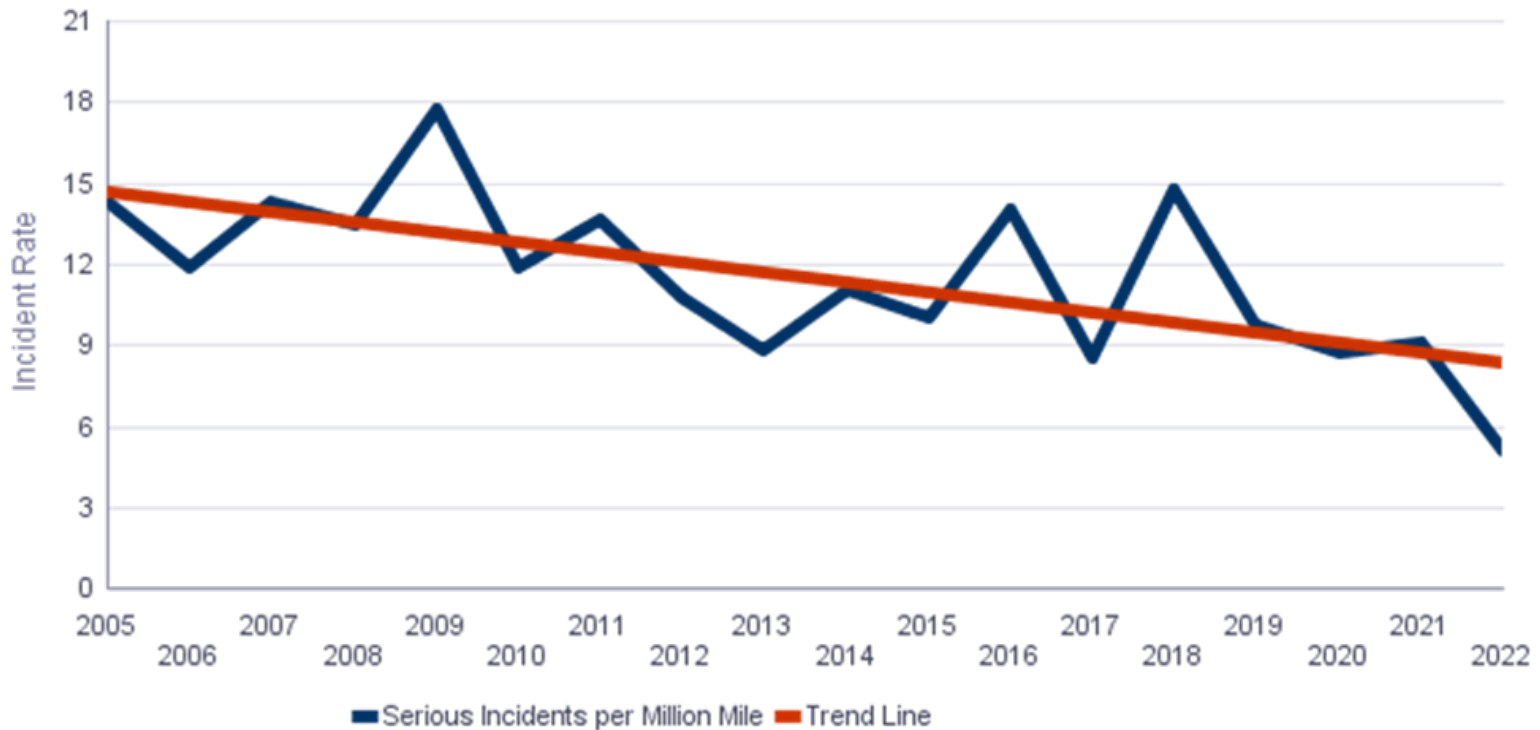
## Gas Distribution

**Decreased 43% from 2021 to 2022**



# Gas Distribution Serious Incidents per million Miles 2005-2022

Rate has fluctuated since 2005 with an overall decreasing trend



Data as-of 03-22-2023



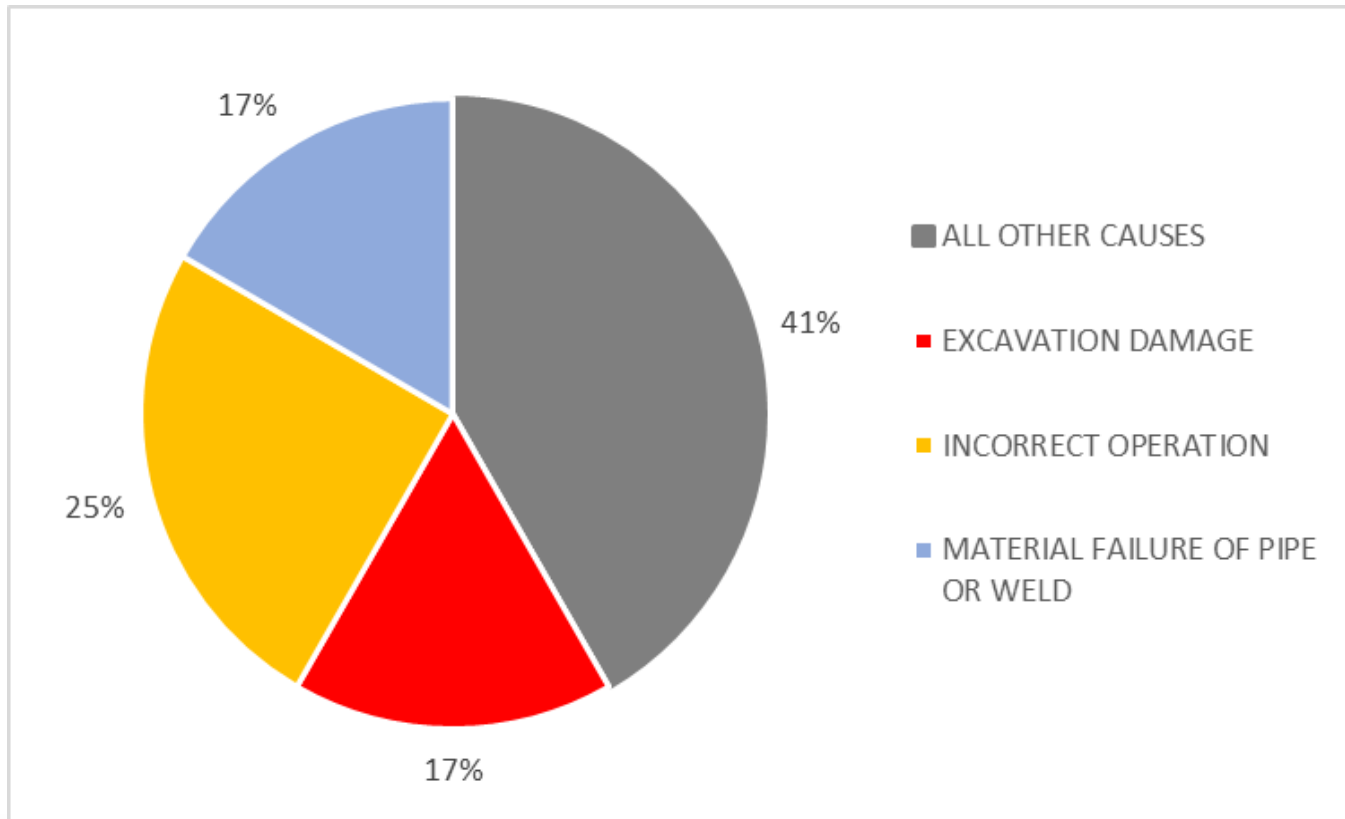
# Gas Distribution Serious Incidents 2022

## Leading Causes:

Data as-of 03-22-2023

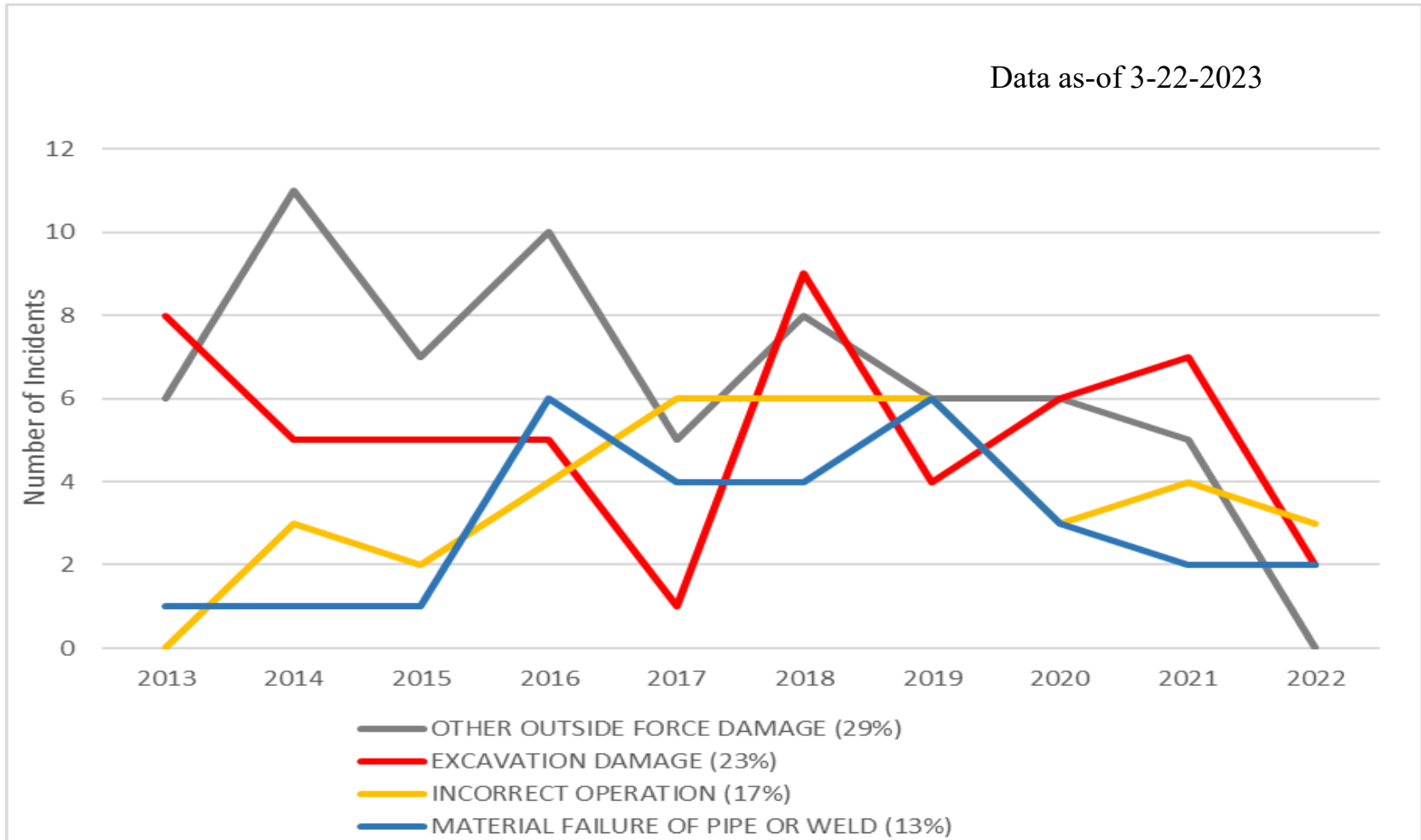
All Other Causes - Unknown

Incorrect Operation – Wrong/Improperly Installed Equipment

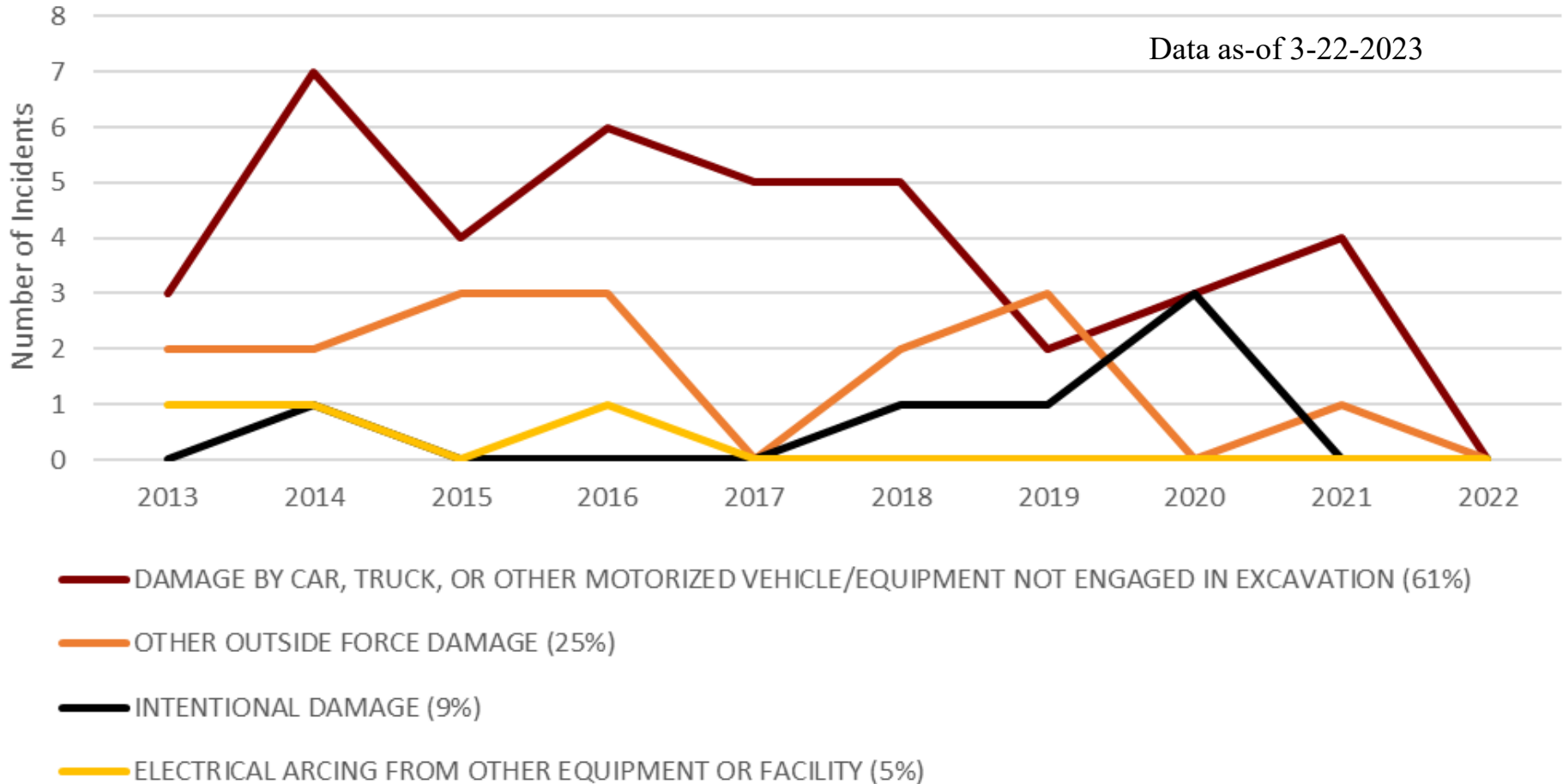


# Gas Distribution Serious Incidents Four Leading Causes 2013-2022

Data as-of 3-22-2023

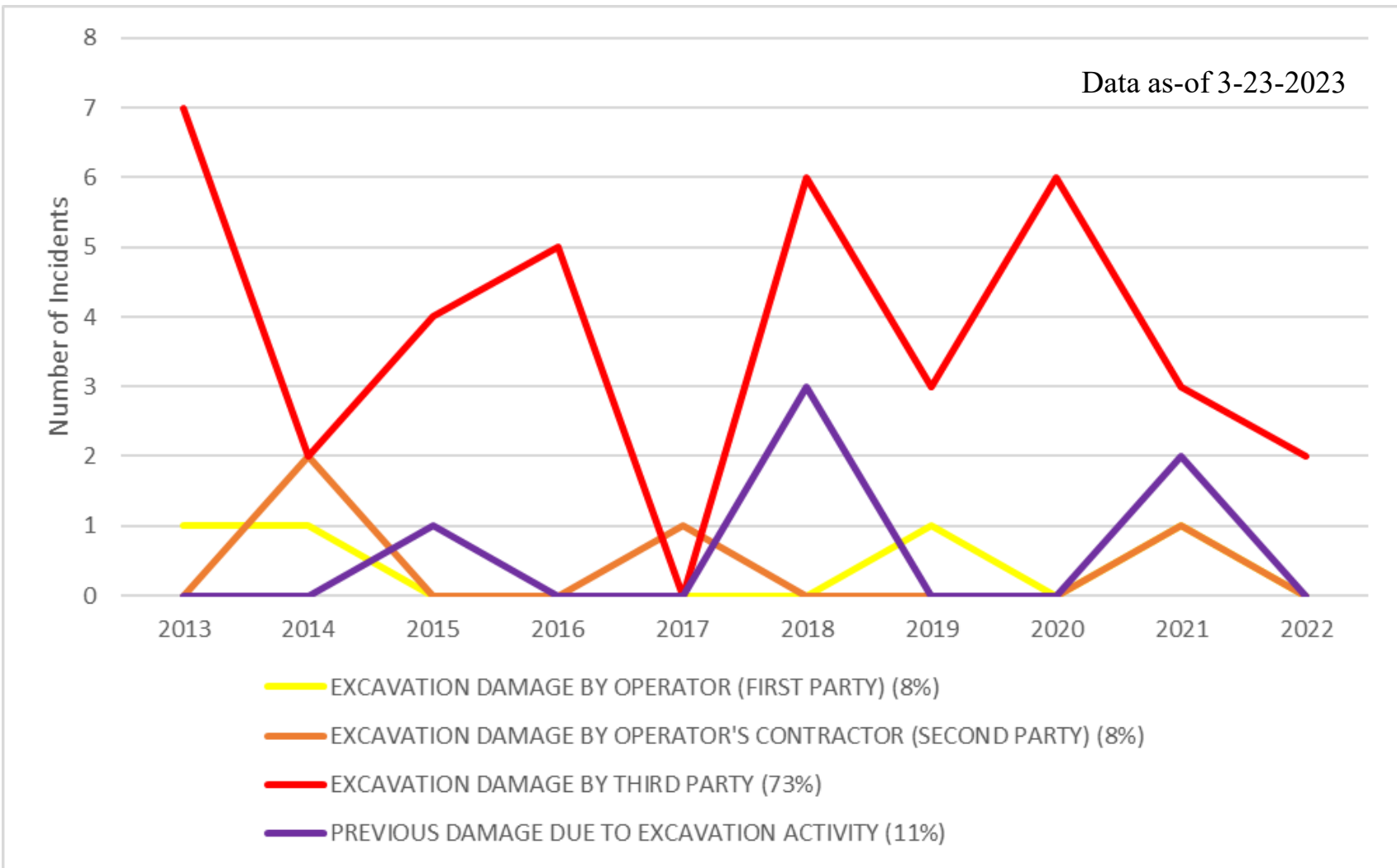


# Gas Distribution Serious Incidents Other Outside Force Damage by sub-Cause 2013-2022





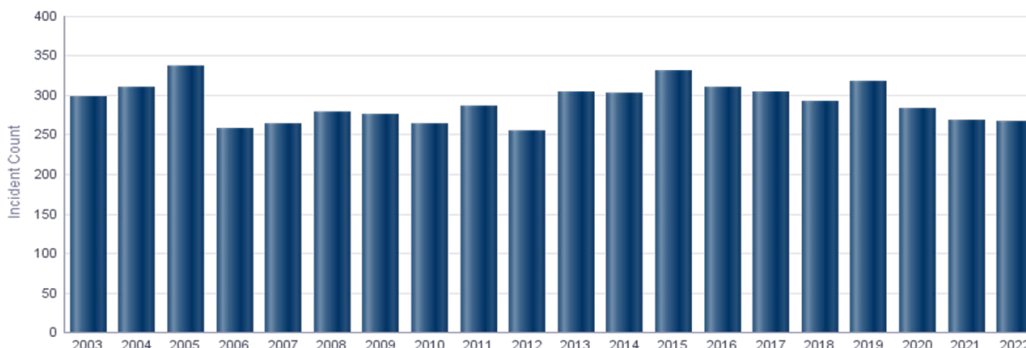
# Gas Distribution Serious Incidents Excavation Damage by sub-Cause 2013-2022



# Gas Distribution Significant Incidents 2003-2022

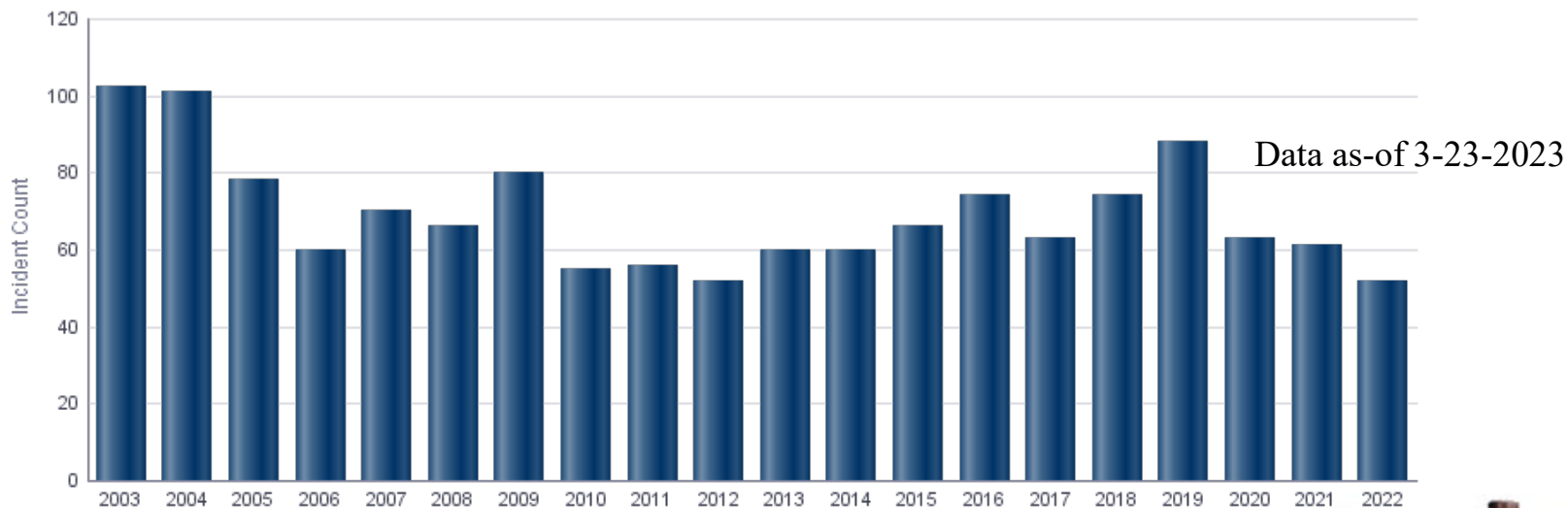
## All System Types

Slight decrease from  
2021 to 2022



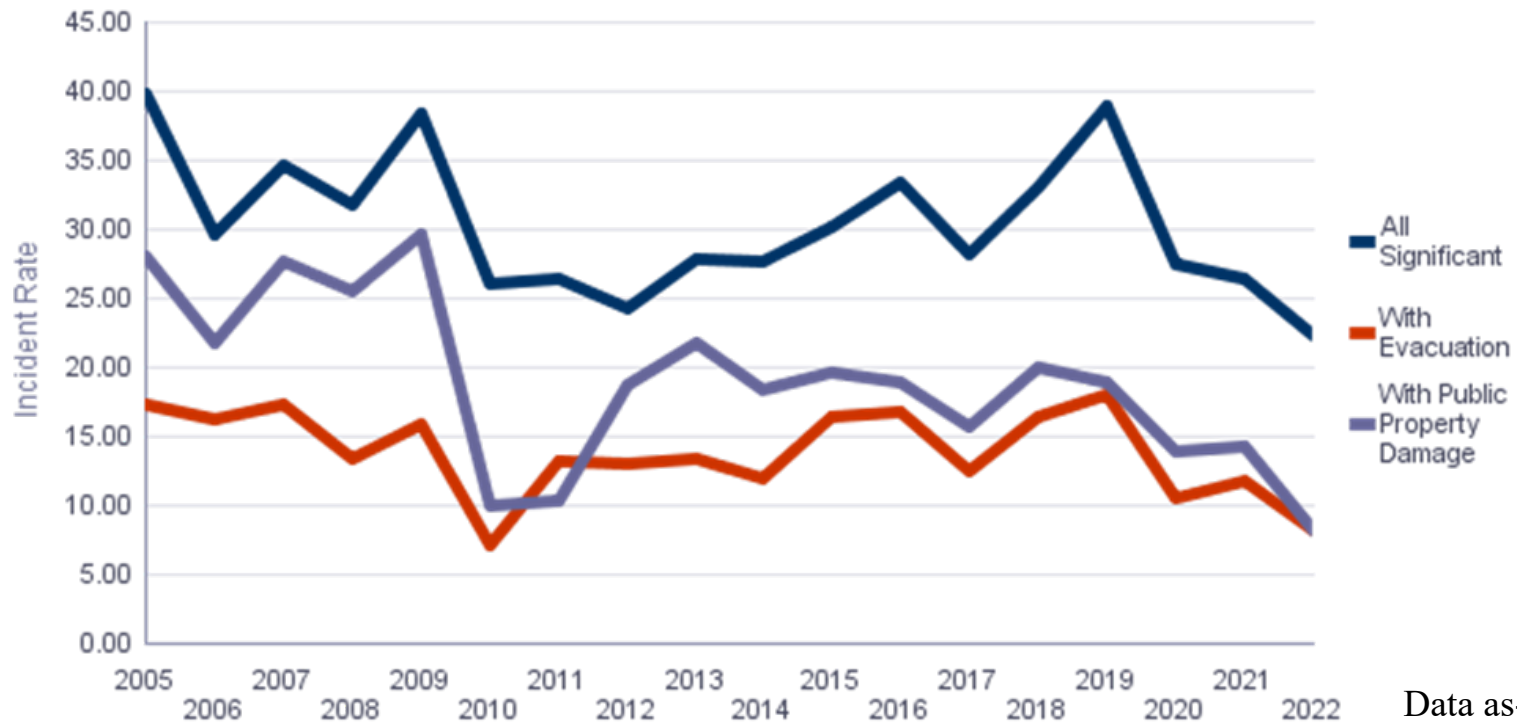
## Gas Distribution

Decreased 15% from 2021 to 2022



# Gas Distribution Significant Incidents per million Miles 2005-2022

Overall rate has fluctuated, with an overall downward decrease since 2005  
 In 2022, Evacuation occurred in 46% and Public Property Damage in 62%



# Gas Distribution Significant Incidents 2022

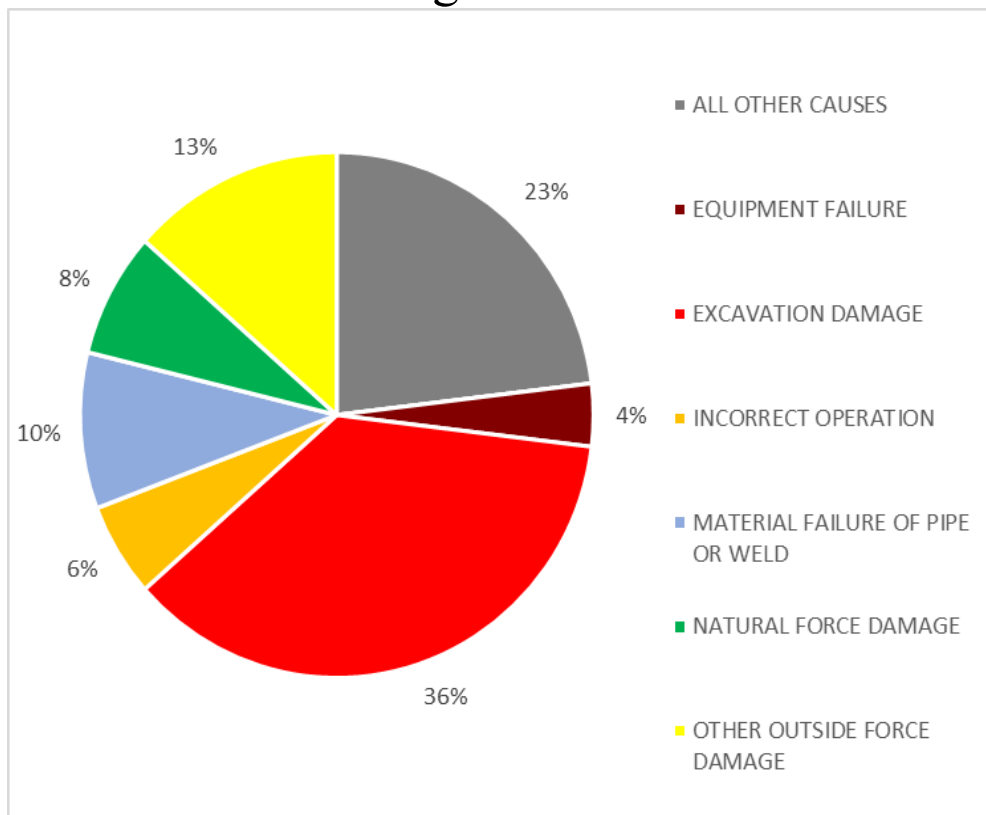
## Leading Causes:

Excavation Damage – Third Party

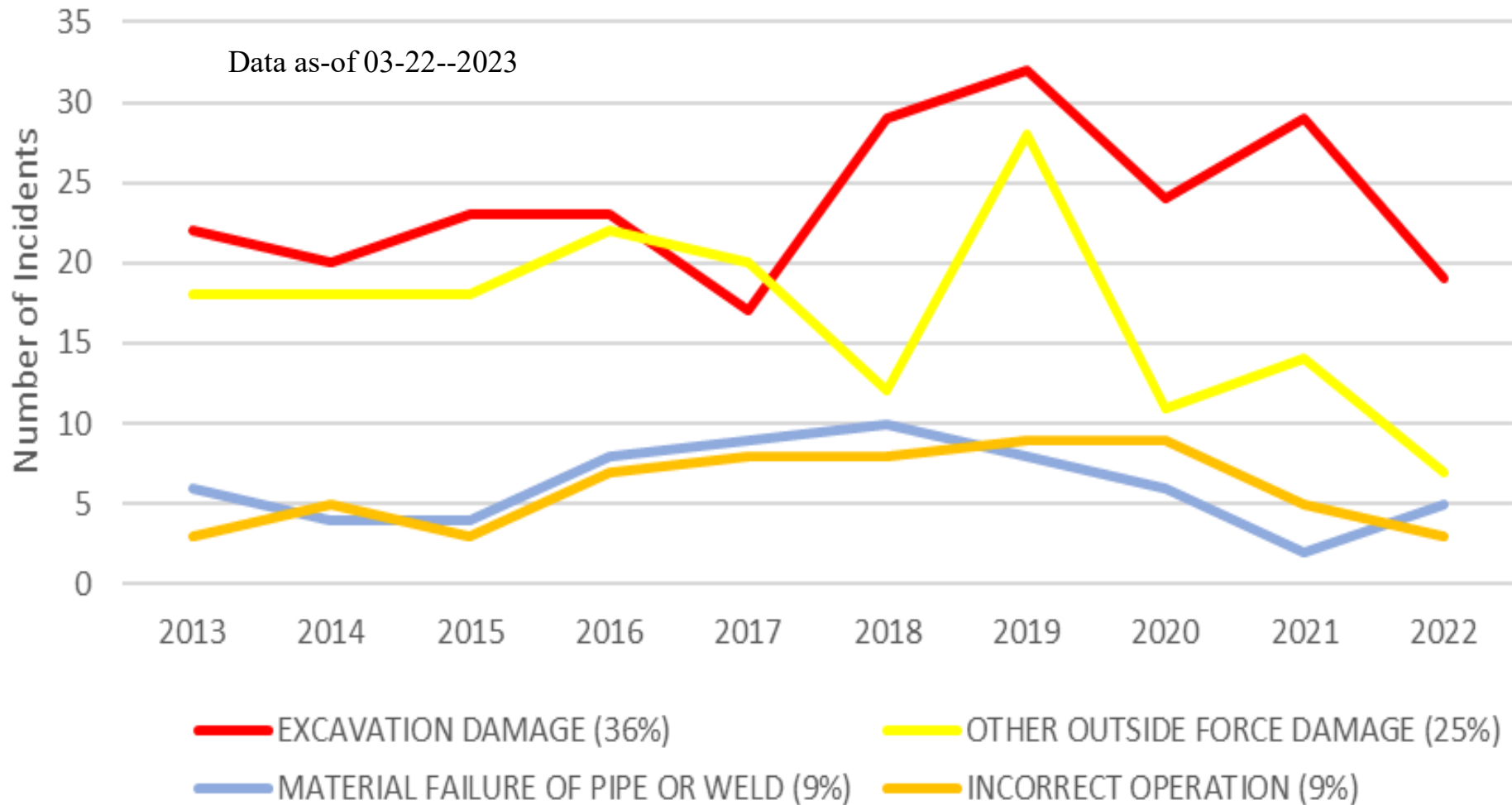
All Other Causes - Unknown

Other Outside Force Damage – Vehicles and “Other”

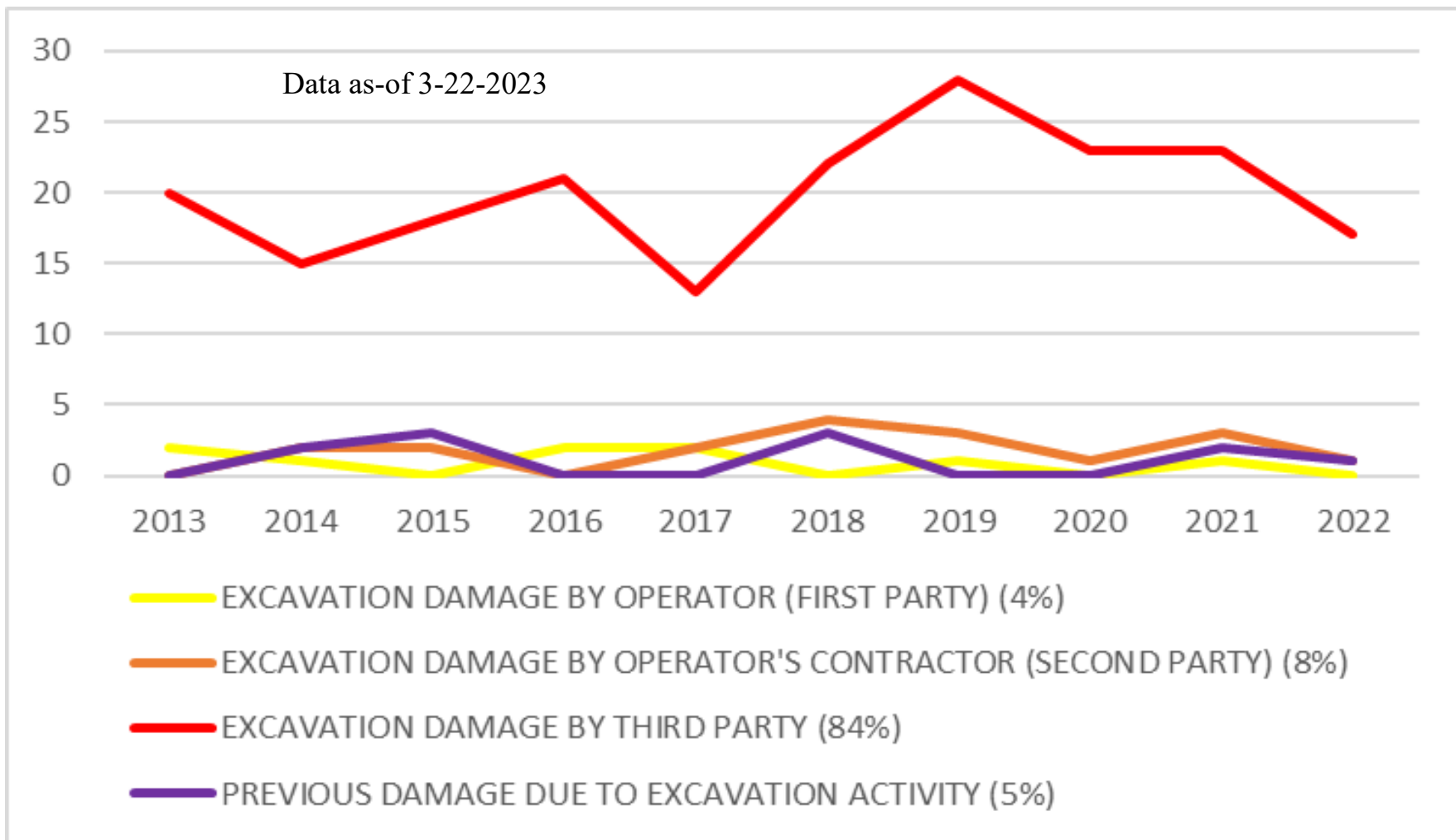
Data as-of 3-22-2023



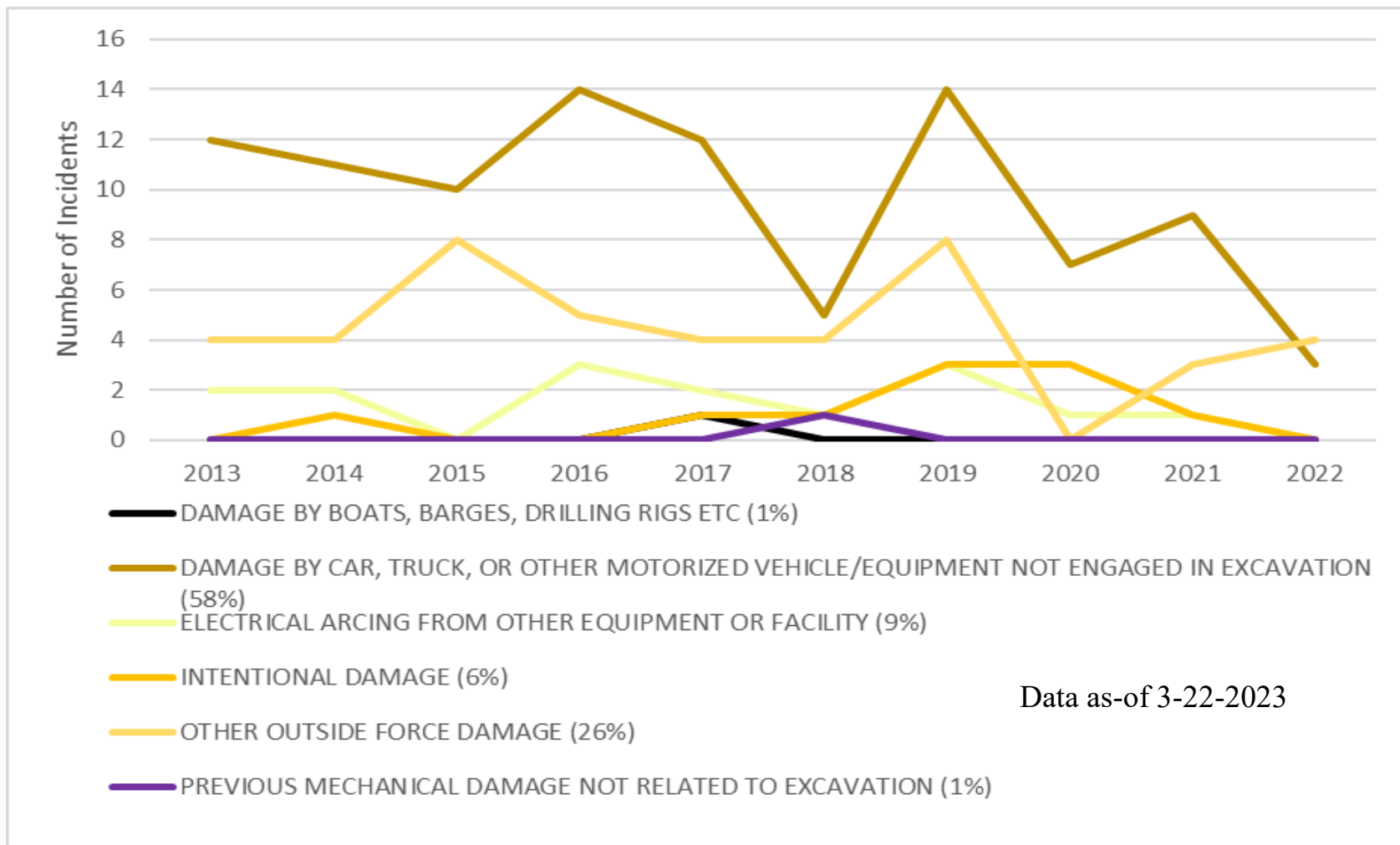
# Gas Distribution Significant Incidents Four Leading Causes 2013-2022



# Gas Distribution Significant Incidents Excavation Damage by sub-Cause 2013-2022



# Gas Distribution Significant Incidents Other Outside Force Damage by sub-Cause 2013-2022



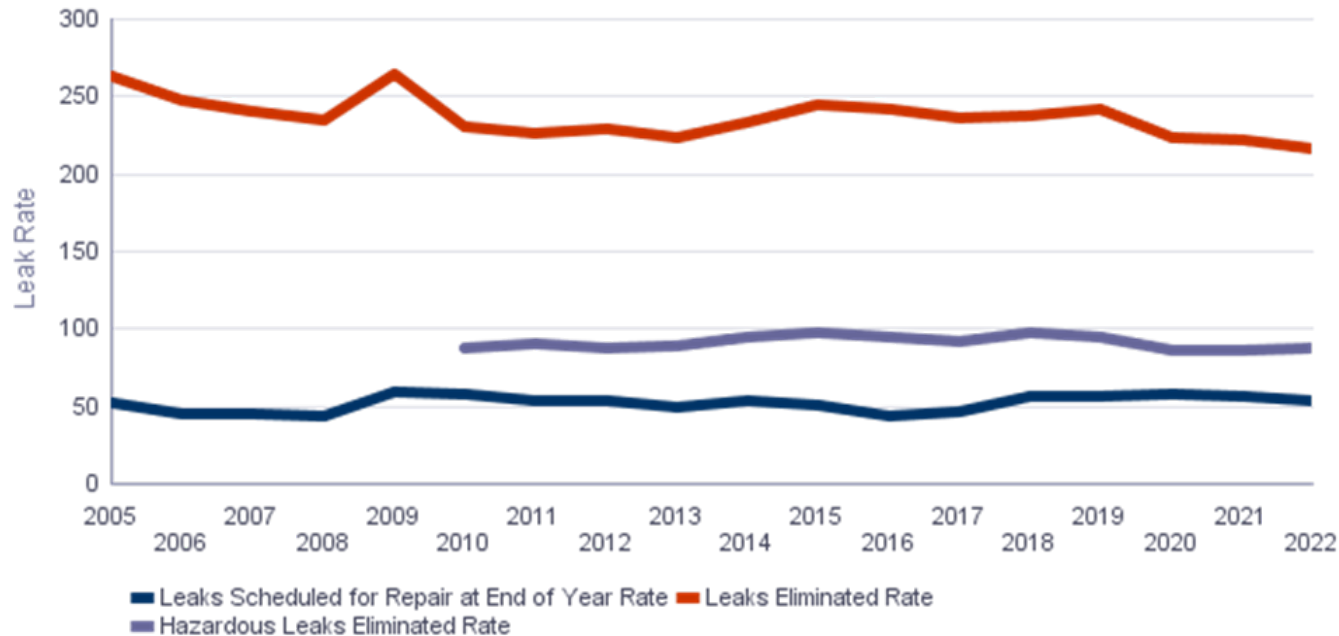
# Gas Distribution Leaks per 1,000 Miles 2005-2022

Rate for **Hazardous Leaks Eliminated** has decreased 3% since 2010

The effective date for PHMSA's gas distribution integrity management (DIMP) regulations was 2011. PHMSA expects an eventual decrease in the rate as pipeline operators identify integrity threats and implement measures to reduce risk.

Rate for all **Leaks Eliminated** has decreased 15% since 2005

Rate for **Leaks Scheduled for Repair at End of Year** has increased 9% since 2005



Data as-of 3-22-2023



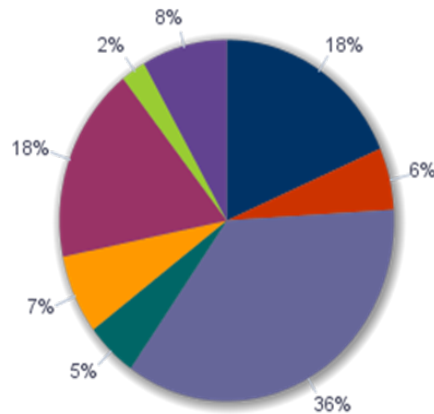


# Gas Distribution Leaks Eliminated by Cause 2005-2022

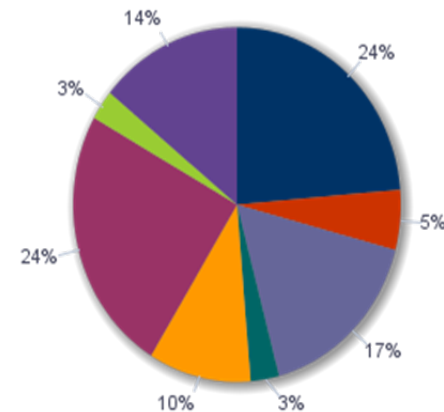
Leading cause of **Hazardous Leaks** is Excavation Damage which accounts for 36% of Hazardous Leaks, but only 17% of Leaks

For more than a decade, PHMSA has been an active participant in national, regional, and State efforts to improve excavation damage prevention.

Hazardous Leaks Eliminated



Leaks Eliminated



- Corrosion
- Natural Force Damage
- Excavation
- Other Outside Force Damage
- Materials/Welds
- Equipment
- Operations
- Other

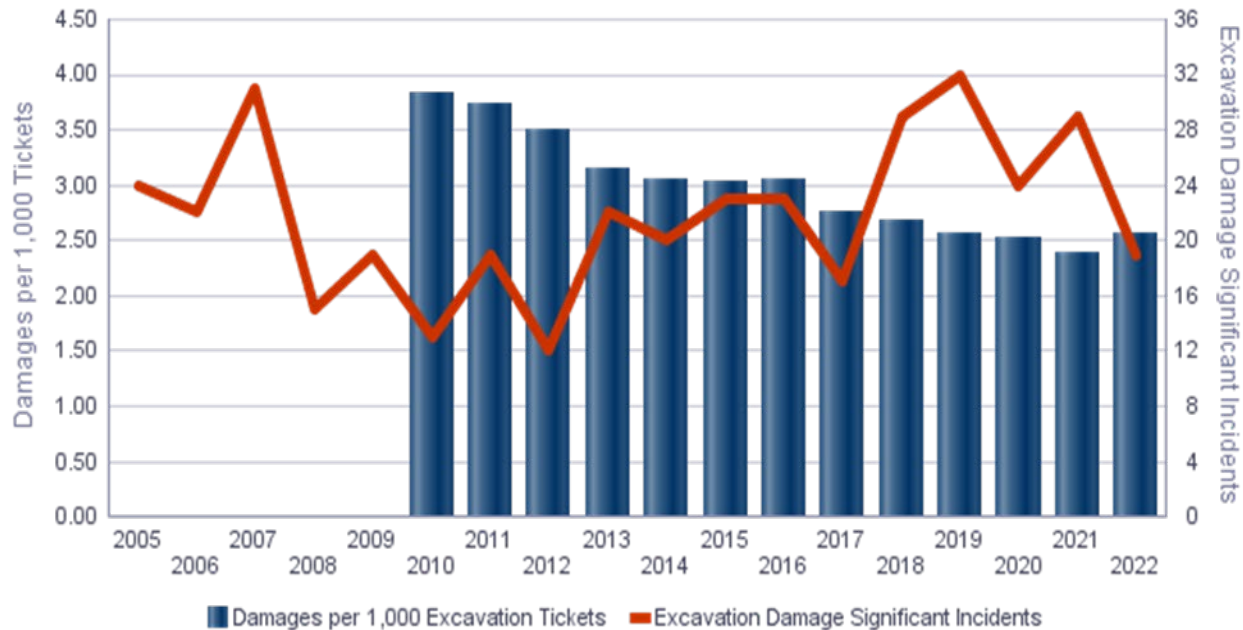
Data as-of 03-22-2023



# Gas Distribution Excavation Damage 2005-2022

Number of **Significant Incidents** caused by **Excavation Damage** has fluctuated since 2005 but trending upwards since 2012

**Damages per 1,000 Tickets** has decreased 33% since 2010



Data as-of 03-22-2023



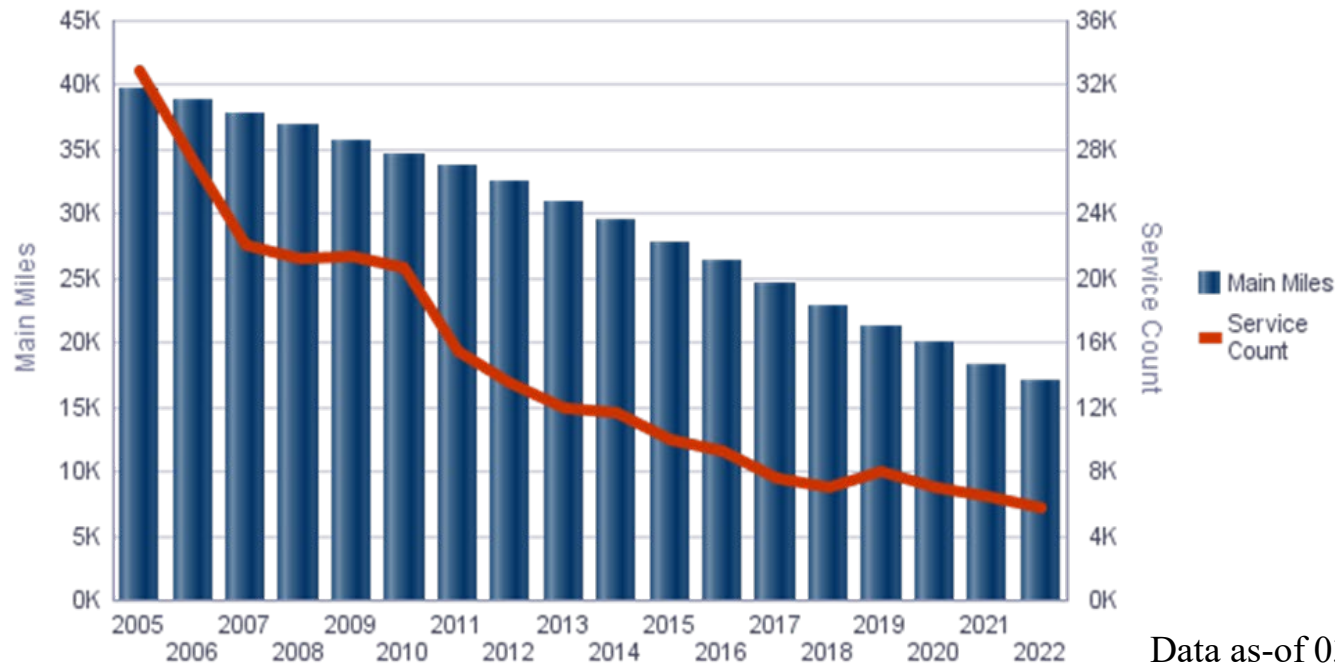
# Gas Distribution Cast and Wrought Iron 2005-2022

**Cast and Wrought Iron Main Miles** have decreased over 57% since 2005

Cast Iron mains make up 1% of the total gas distribution main miles

**Cast and Wrought Iron Service Count** have decreased 82% since 2005

Less than .01% of all gas distribution services are Wrought Iron



Data as-of 03-22-2023



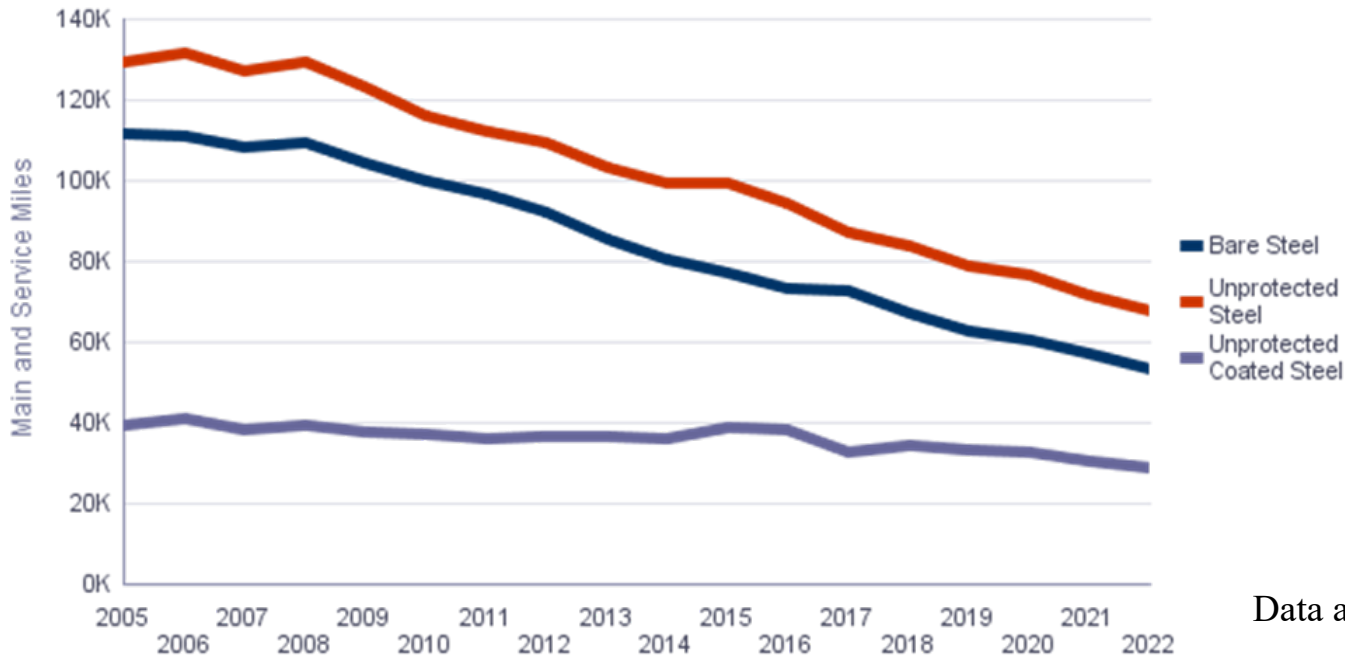
# Gas Distribution Steel Miles Bare and Unprotected 2005-2022

Miles of **Bare, Unprotected, and Unprotected Coated Steel** have declined steadily since 2005

**Bare Steel** decrease since 2005 is 52% and constitutes 2% of GD systems

**Unprotected** decrease since 2005 is 48% and constitutes 3% of GD systems

**Unprotected Coated** decrease since 2005 is 26% and constitutes 2% of GD systems

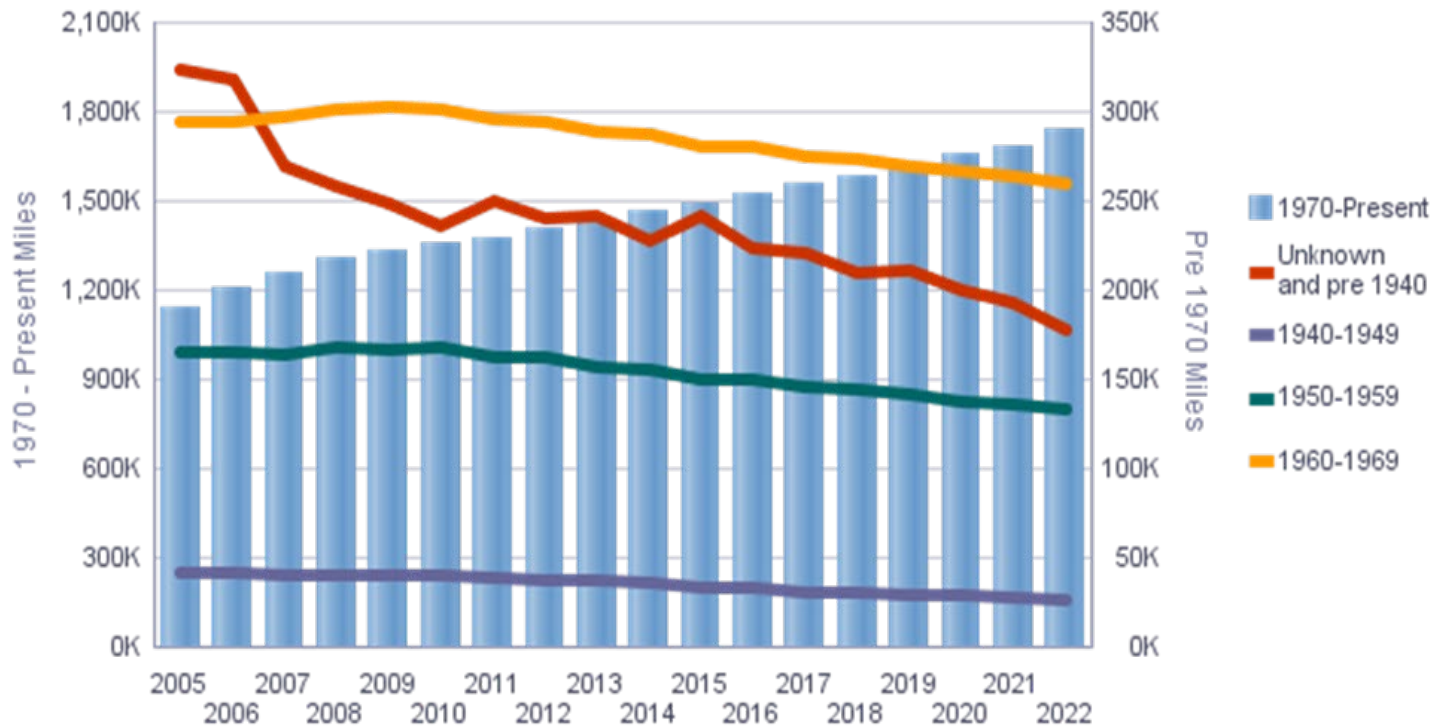


Data as-of 03-22-2023



# Gas Distribution Miles by Decade Installed 2005-2022

Miles of pipeline system installed **Pre-1970** has declined 28% since 2005  
 26% of gas distribution systems were installed Pre-1970

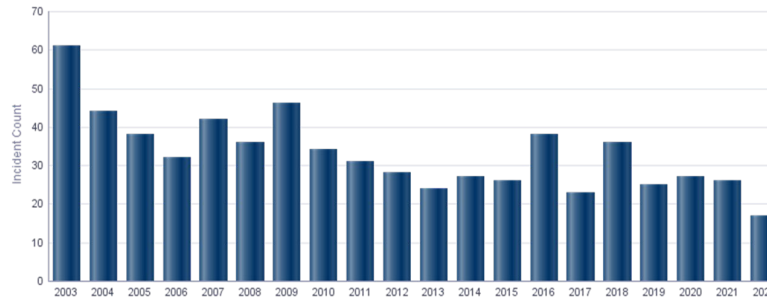


Data as-of 03-22-2023



# Gas Transmission Serious Incidents 2003-2022

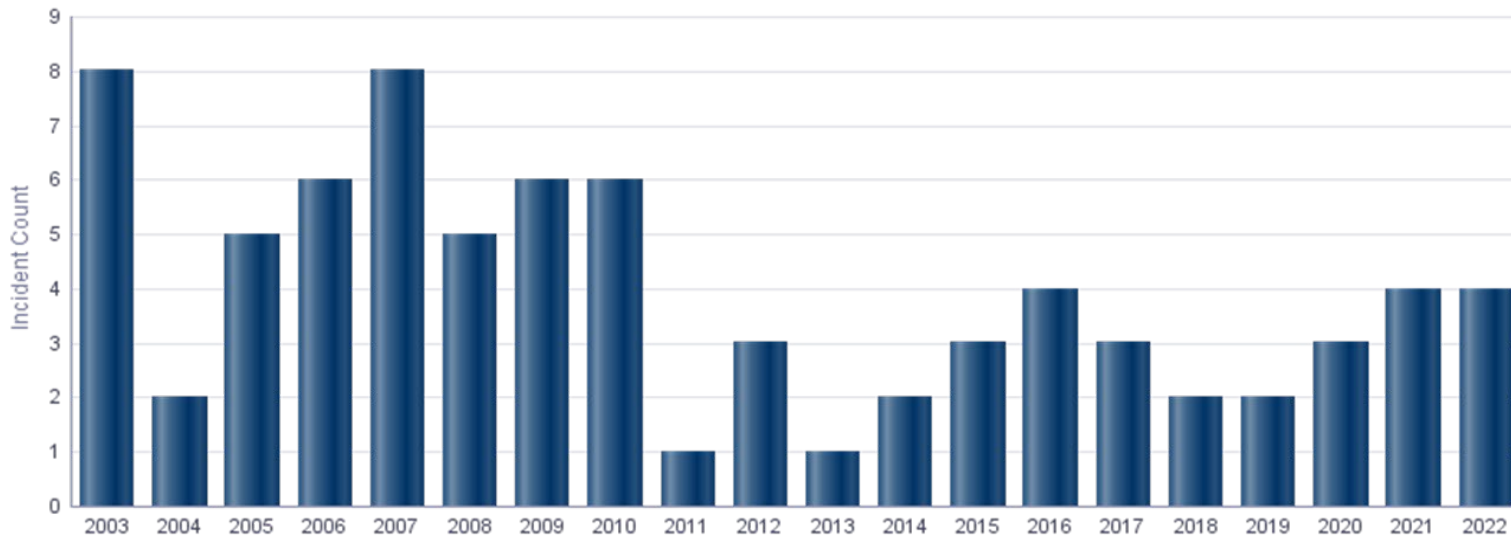
**All System Types  
Decreased in 2022**



## Gas Transmission

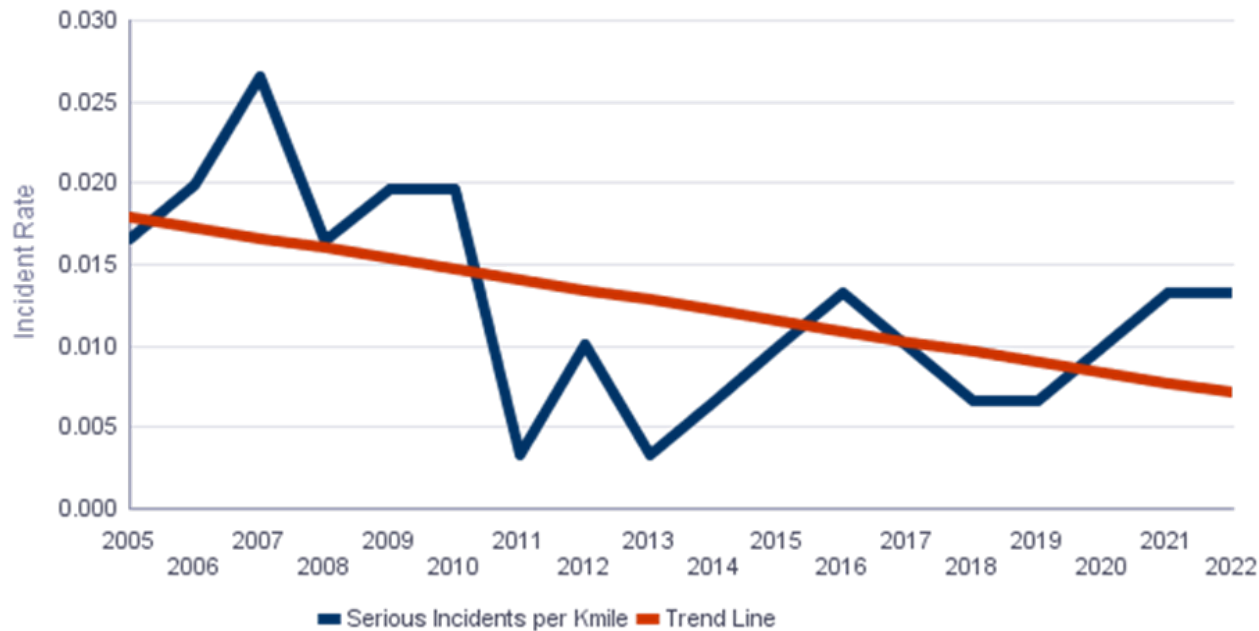
No change between 2021 and 2022

Data as-of 3-23-2023



# Gas Transmission Serious Incidents per 1,000 Miles 2005-2022

The rate has declined since 2005 with a sharp decline after 2010.

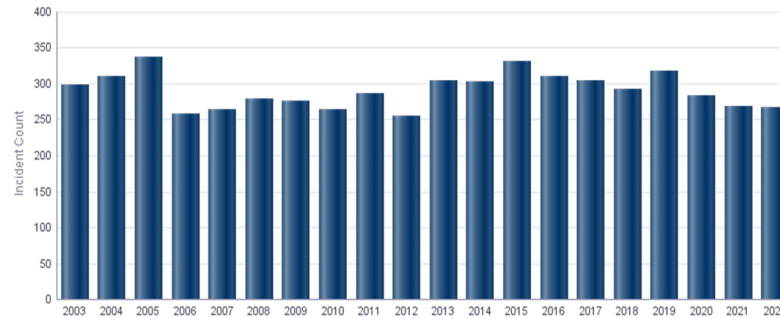


Data as-of 03-22-2023



# Gas Transmission Significant Incidents 2003-2022

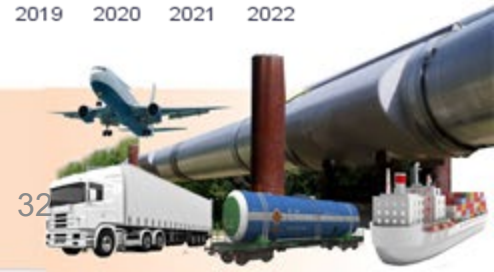
**All System Types**  
Slight decrease from  
2021 to 2022



## Gas Transmission

Increased 24% from 2021 to 2022

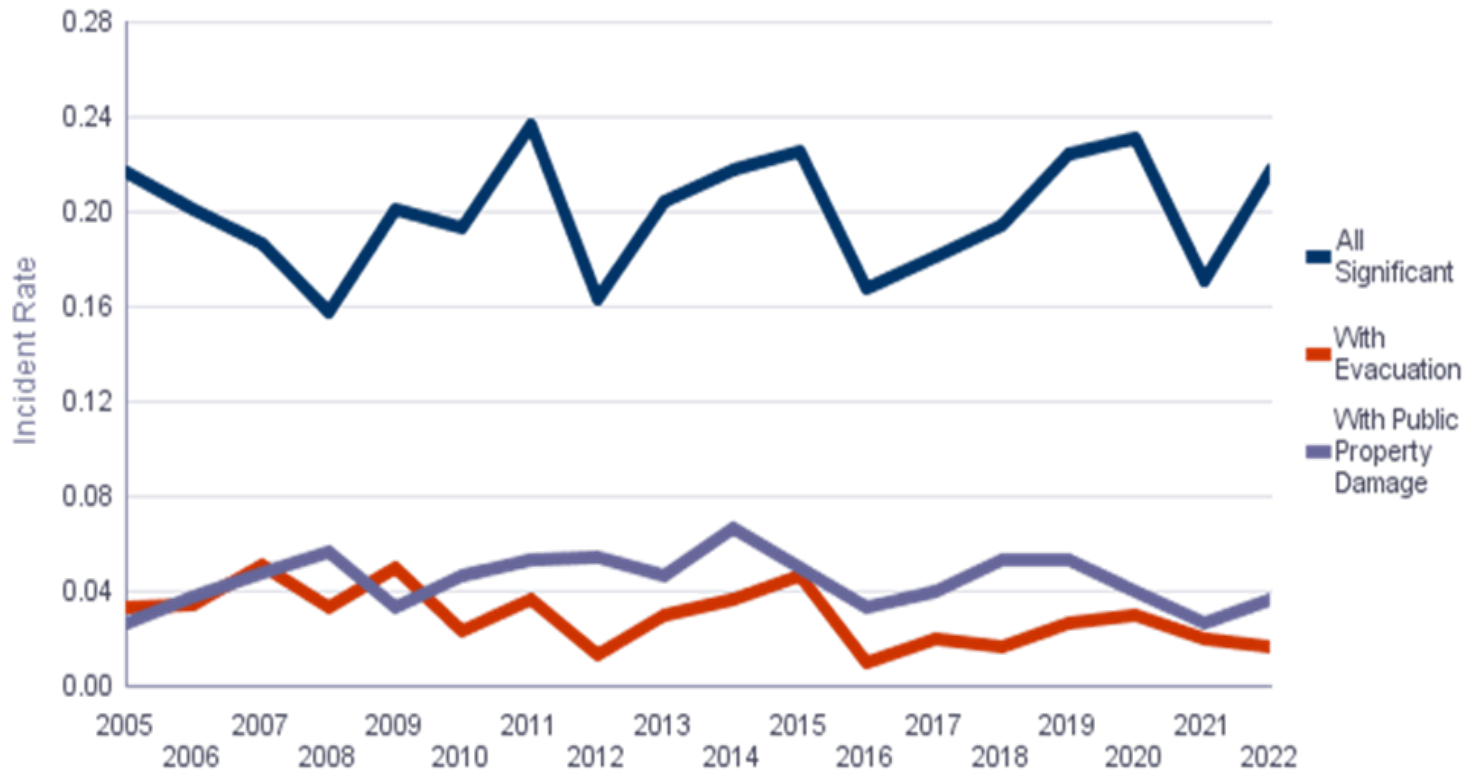
Data as-of 3-22-2023





# Gas Transmission Onshore Significant Incidents per 1,000 Miles 2005-2022

In 2022, Evacuations occurred in 15% and Public Property Damage in 22%



Data as-of 3-27-2023



# Gas Transmission Significant Incidents 2022

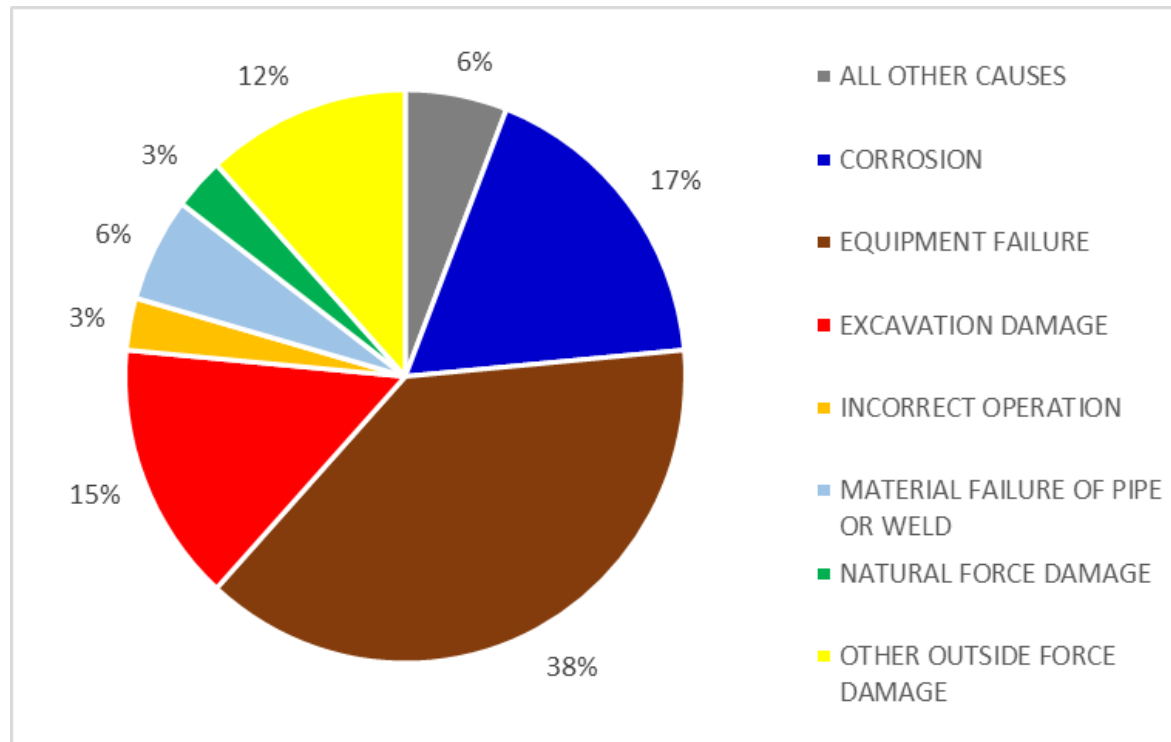
## Leading Causes:

Equipment Failure (Control/Relief Malfunction)

Corrosion

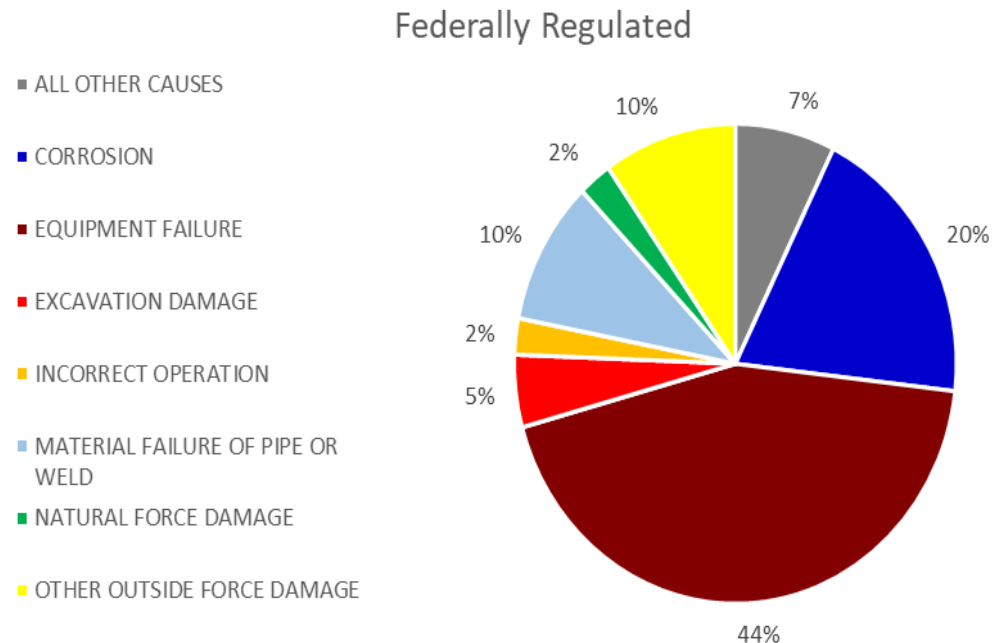
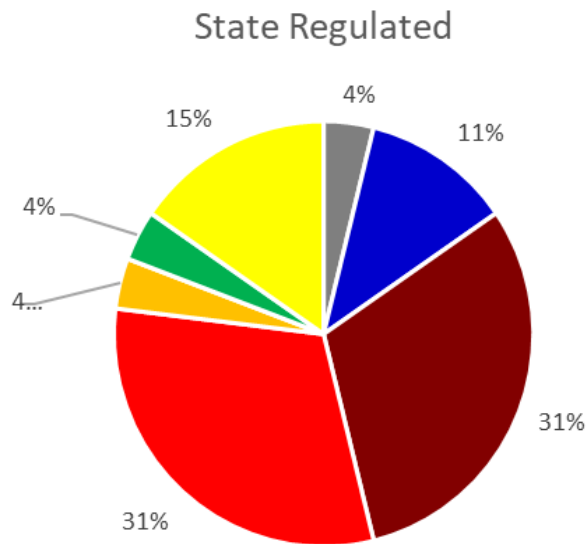
Excavation Damage

Data as-of 3-22-2023



# Gas Transmission Significant Incidents State vs Fed in 2022

Leading cause for both **State-Regulated** and **Federal-Regulated** is Equipment Failure

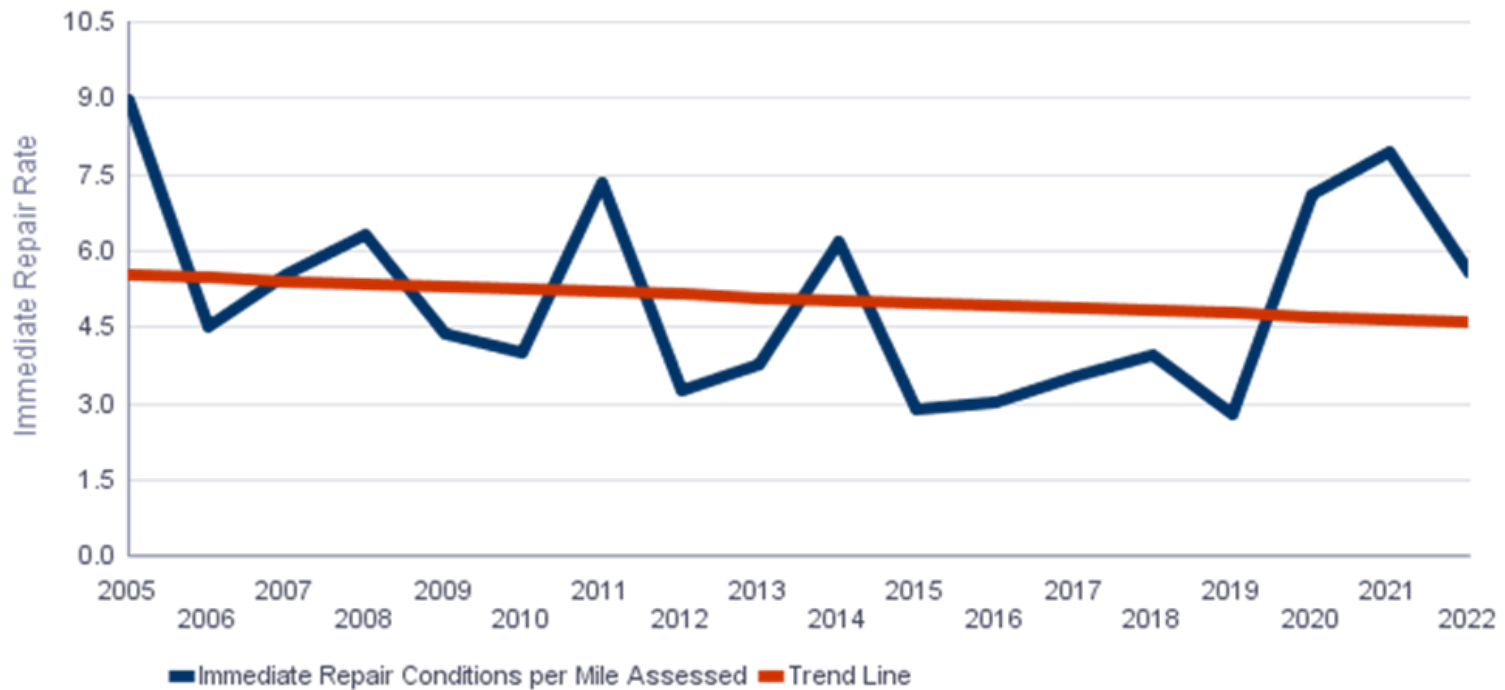


Data as-of 3-22-2023



# Gas Transmission HCA Immediate Repairs per 100 HCA Miles Assessed 2005-2022

The rate of **Immediate Repairs** per 100 HCA mile assessed has fluctuated since 2005. The overall decrease since 2005 is 38%.



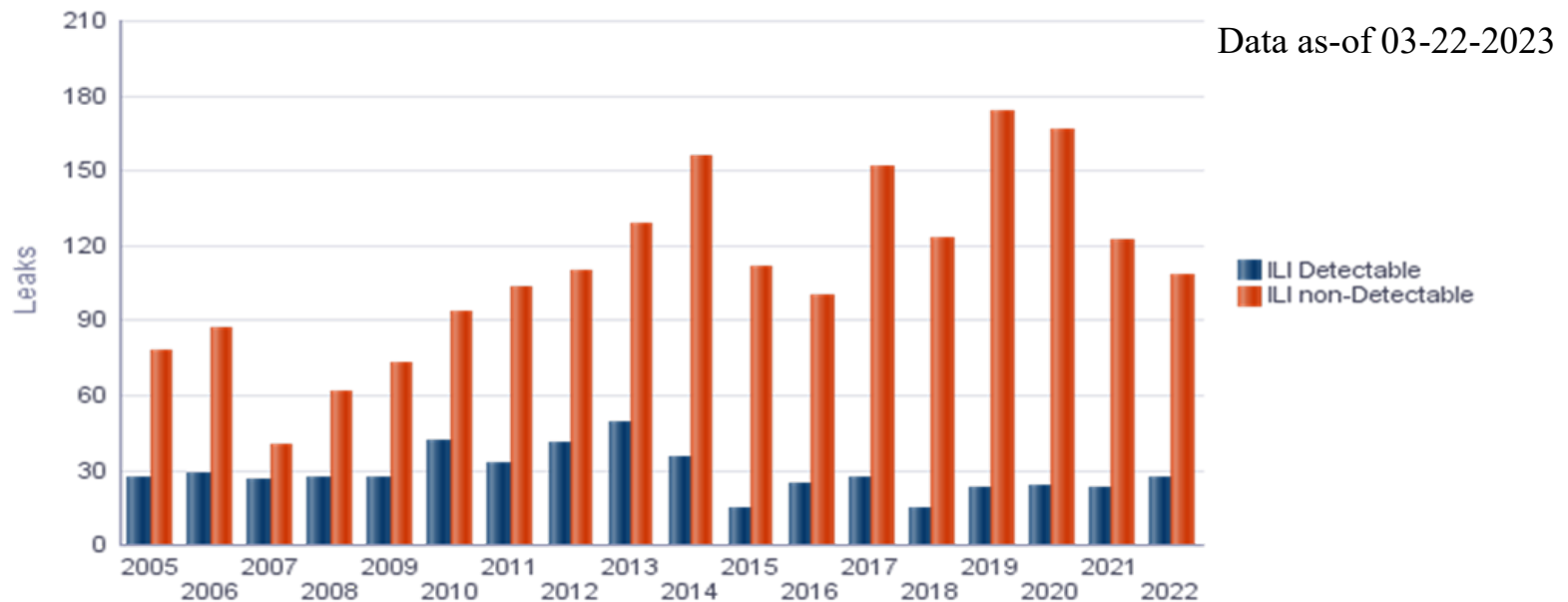
Data as-of 03-22-2023



# Gas Transmission HCA Leaks 2005-2022

**ILI Detectable leaks** are caused by Corrosion, Stress Corrosion Cracking, Manufacturing, and Construction.

**ILI non-Detectable leaks** are caused by Equipment, Incorrect Operations, Third Party Damage, Weather Related, and Other.

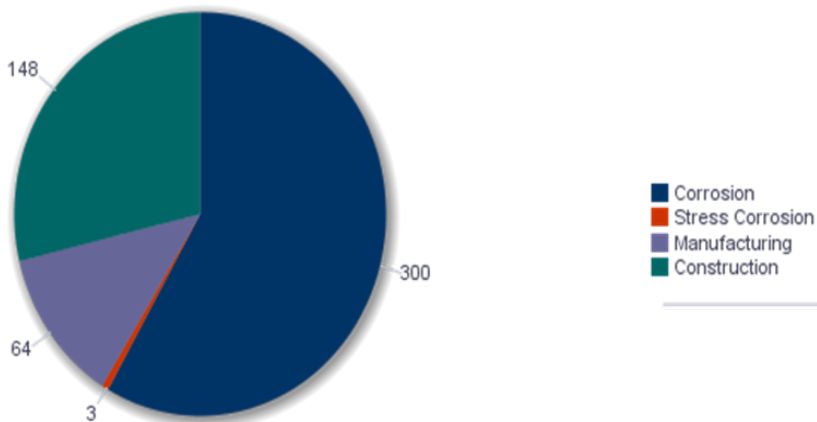


# Gas Transmission HCA Leaks by Cause 2005-2022

Corrosion is the predominant cause of **ILI Detectable** leaks

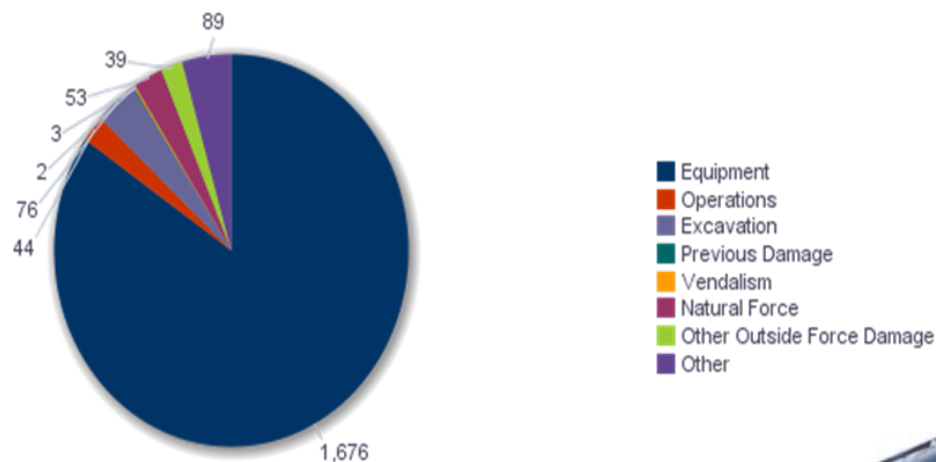
ILI Detectable

Data as-of 03-22-2023

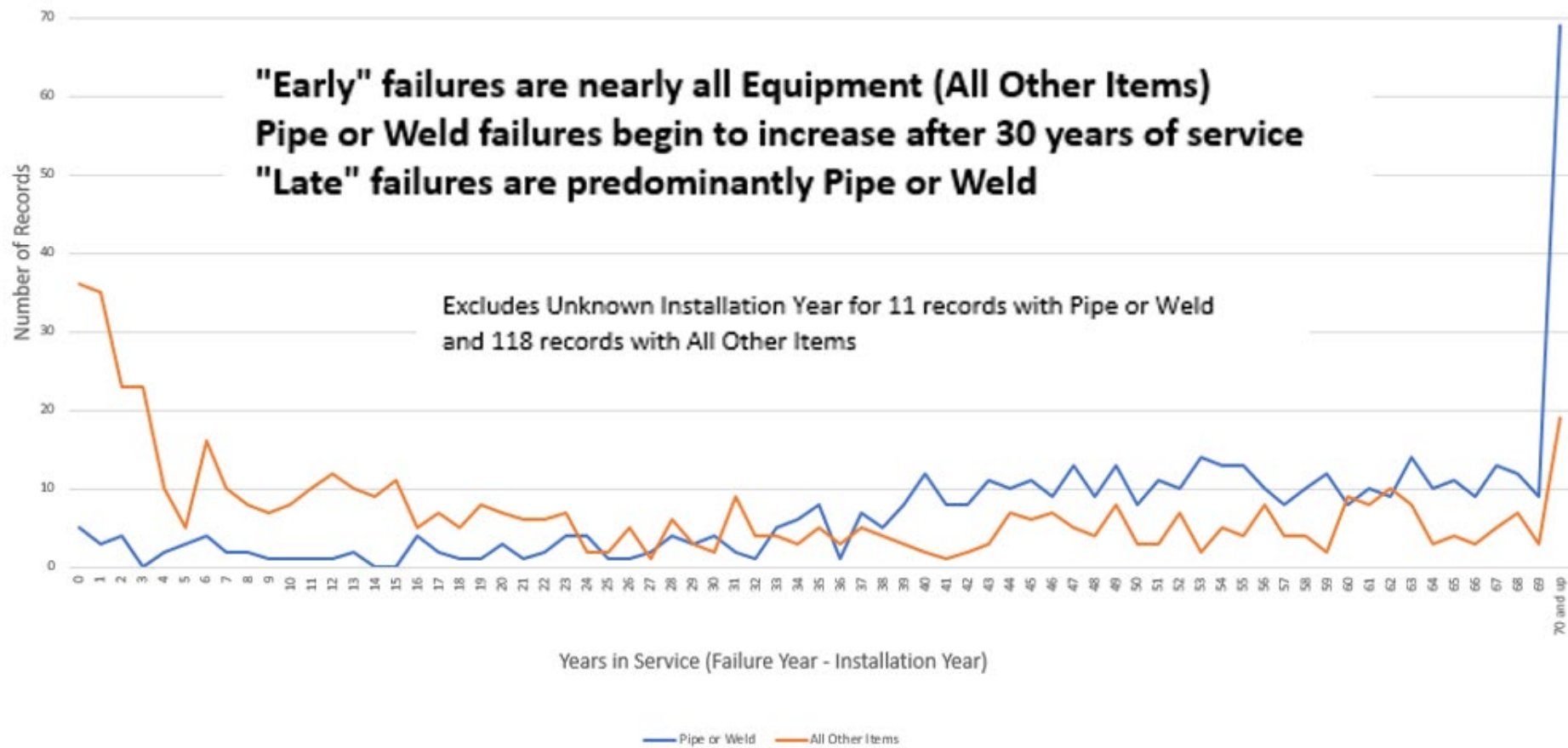


Equipment Failure is the predominant cause of **ILI non-Detectable** leaks

ILI non-Detectable



# Gas Transmission All Reported Incidents 2013-2022 Years in Service



Data as-of 3-22-2023



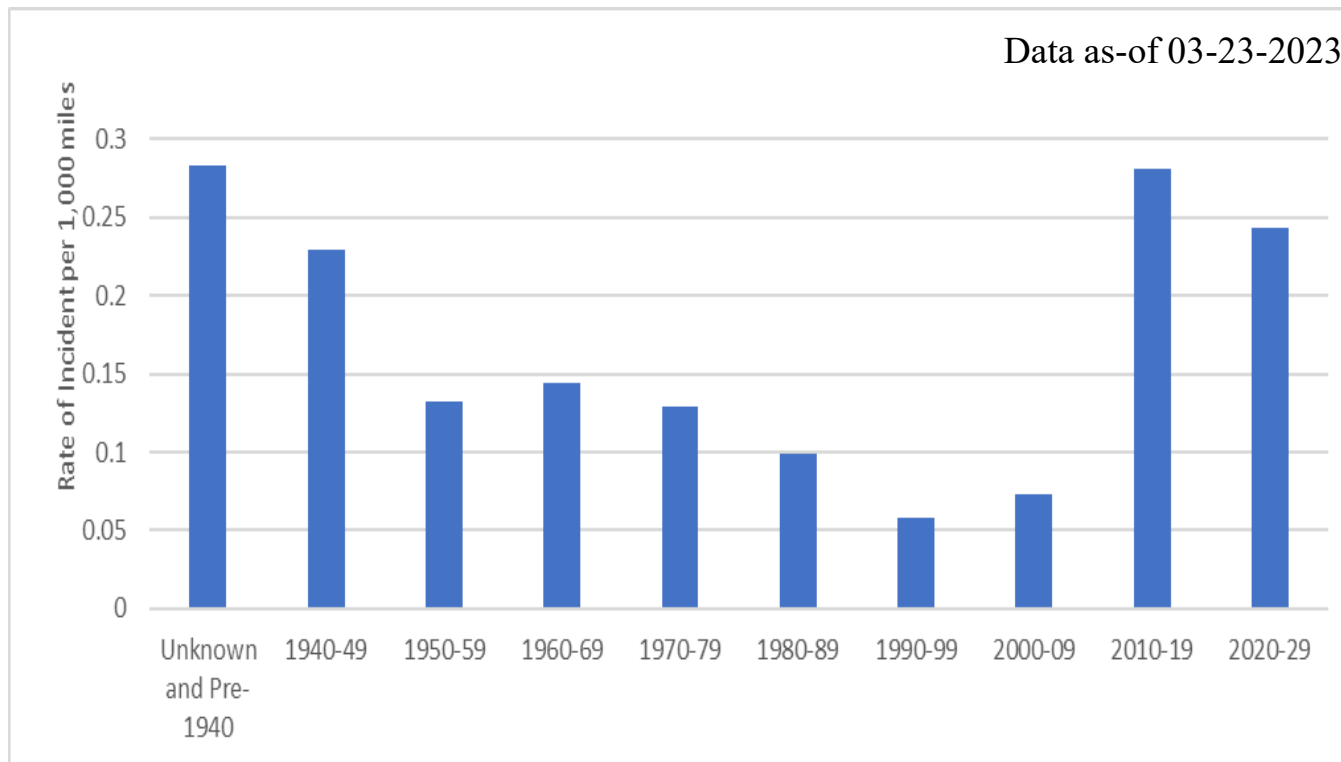
# Gas Transmission Onshore Pipeline Significant Incident Rates per Decade 2005-2022- Incidents per 1,000 Miles

“Unknown and Pre-1940” leading cause is Corrosion

“1940s” leading cause is Material Failure of Pipe or Weld

“2010s” leading cause is Equipment Failure

“2020s” has only two incidents - Equipment Failure and Incorrect Operation





# Pipeline Grants

PHMSA's Pipeline Safety Grant Programs include the following:

- Pipeline Emergency Response Grant (PERG)
- Natural Gas Distribution Infrastructure Safety and Modernization Grants
- Technical Assistance Grants (TAG)
- State Pipeline Safety Base Grants
- One Call Grant
- Research and Development
- Competitive Academic Agreement Program (CAAP)
- State Damage Prevention
- Underground Natural Gas Storage Grants



# Resources

## Pipeline Operators

National Pipeline Mapping System  
<https://www.npms.phmsa.dot.gov>

PHMSA  
<https://www.phmsa.dot.gov>

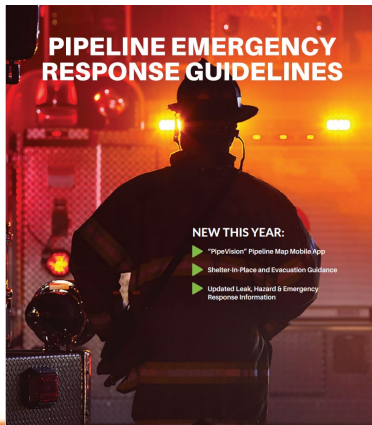
PHMSA's PERI Website  
<https://www.phmsa.dot.gov/pipeline/peri/pipeline-emergency-responders-initiative-peri-overview>

PHMSA's Stakeholder Communications Site  
<https://primis.phmsa.dot.gov/comm/>

Fire Department Pipeline Response Emergency Planning & Preparedness Toolkit  
<https://www.nvfc.org/pipelines/>

National Association of State Fire Marshals Training  
<https://nasfm-training.org/pipeline/>

Pipeline Association for Public Awareness  
<https://pipelineawareness.org/training>



Emergency Personnel Awareness (Introduction)



First Responders Operations (Intermediate)



Hazardous Materials Technician (Comprehensive)



# Thank You

William Lowry PE  
[bill.lowry@dot.gov](mailto:bill.lowry@dot.gov)

<https://www.phmsa.dot.gov>

