Pipeline Safety: Industry Performance and Incident History

Industry Performance and Incident History

Joint Meeting of the

Gas and Liquid Pipeline Advisory Committees

October 20, 2021

National Pipeline Safety Performance Measures

- In 2015, OPS worked with the Pipeline Safety Trust (PST), the National Association of Pipeline Safety Representatives, the American Gas Association, the American Public Gas Association, and the Interstate Natural Gas Association of America to develop performance measures for gas distribution and gas transmission
- In 2017, OPS worked with the PST, the American Petroleum Institute, and the Association of Oil Pipe Lines to develop performance measures for pipeline systems transporting crude oil, refined petroleum, and biofuel

Regulated Pipeline Systems PHMSA and States

Pipeline Facilities by System Type from CY 2020 Annual Reports			
System Type	**Miles**	**% Miles**	**# Operators**
Hazardous Liquid	228,077 8,495 Tanks	8%	534
Gas Transmission	301,922	11%	1,099
Gas Gathering	17,301	< 1%	382
Gas Distribution	2,283,856	81%	1,340

Total Miles	**2,831,156**

Liquefied Natural Gas	165 Plants, 237 Tanks, 87 Operators Plants - 26 Interstate and 139 Intrastate
Underground Natural Gas Storage	403 Facilities, 455 Reservoirs 17,065 Wells, 127 Operators Facilities - 221 Interstate and 182 Intrastate

Data as-of 6-28-2021

Definitions

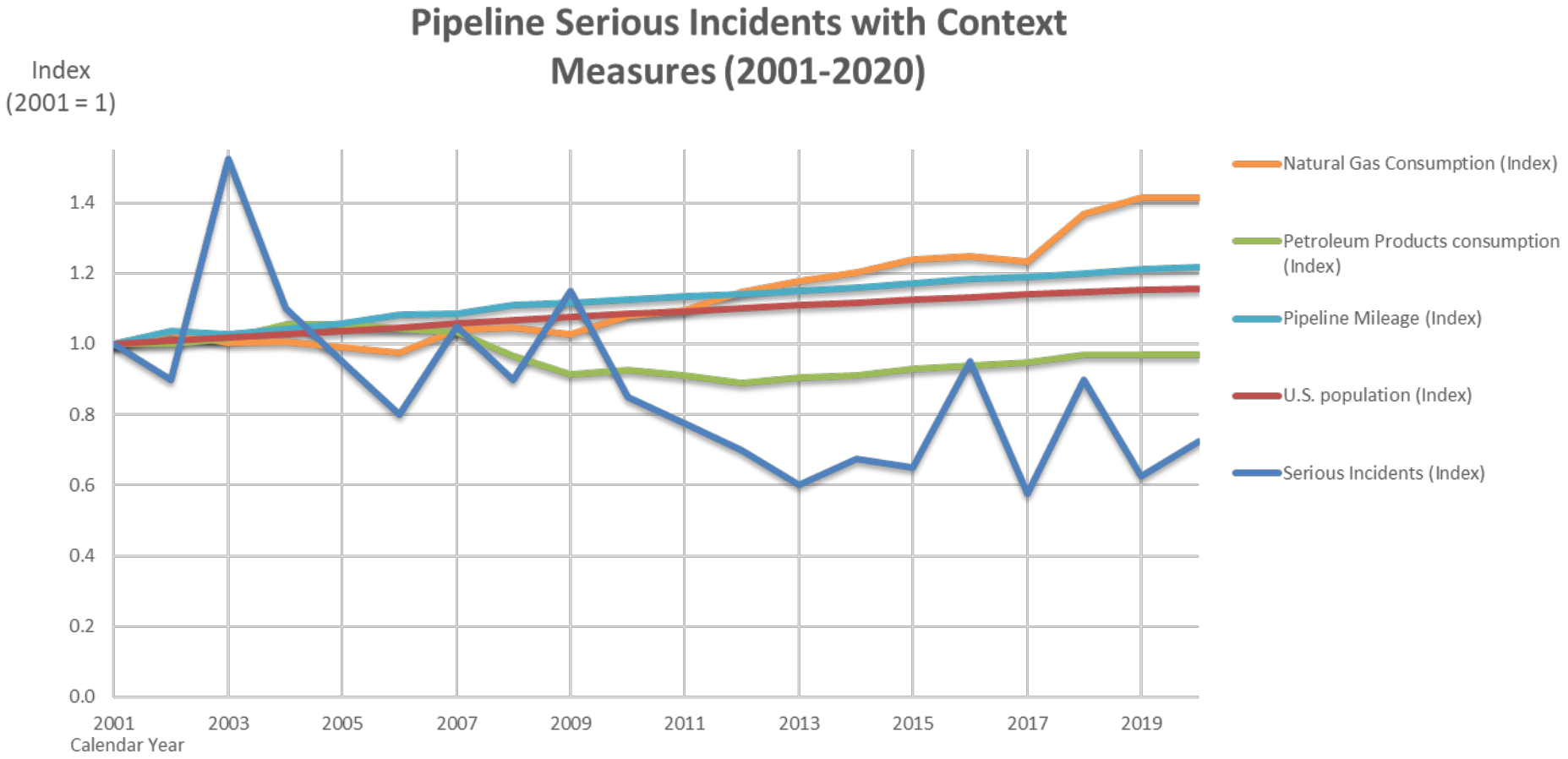
Serious – fatality or injury requiring in-patient hospitalization, but **Fire First** are excluded

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

Regulated Pipeline Systems
PHMSA and States



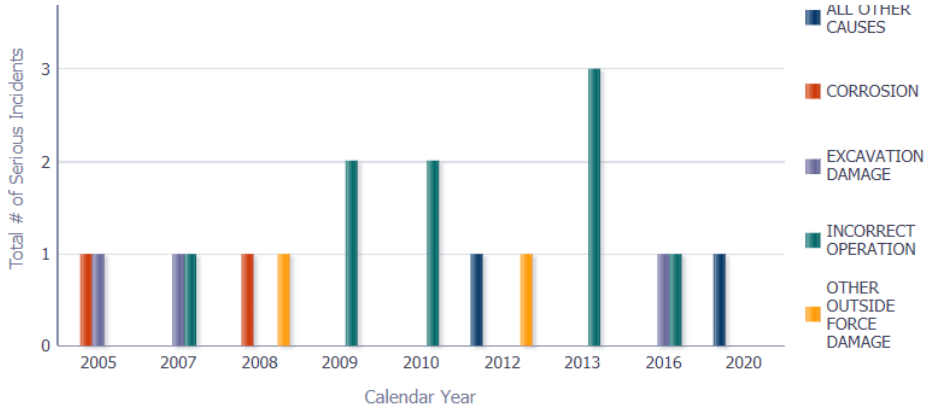
Data Sources: Energy Information Administration, Census Bureau, PHMSA 2019 Annual for Hazardous Liquid, 2020 Annuals for Gas Report Data, PHMSA Incident Data - as of 03-28-2021
Energy consumptions have been used as a proxy for 2020

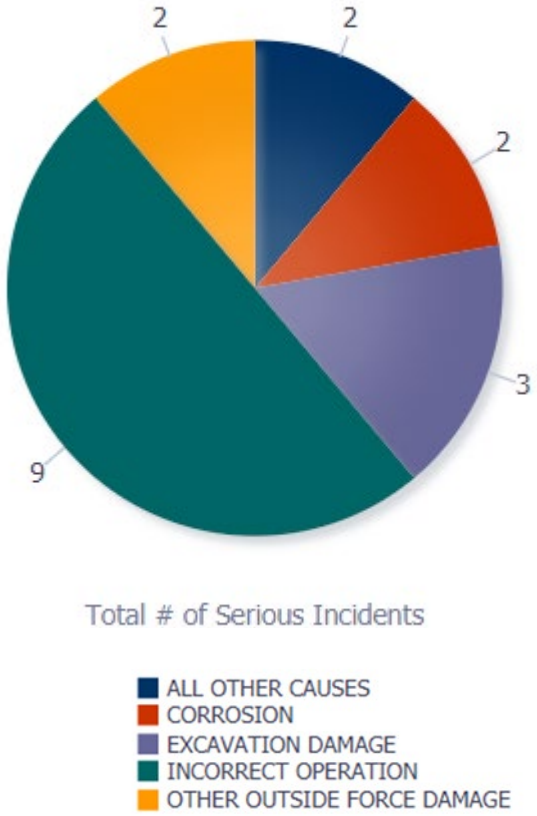
Crude Oil/Refined Petroleum/Biofuel Pipeline Performance Measures

- Serious Incident - rate per mile and causes
- Accidents Impacting People or the Environment - rate per mile and volume spilled per barrel-mile transported
- Miles Inspected - miles inspected by inspection method

Crude Oil/Refined Petroleum/Biofuel Pipeline Performance Measures

Serious Incident - rate per mile and causes

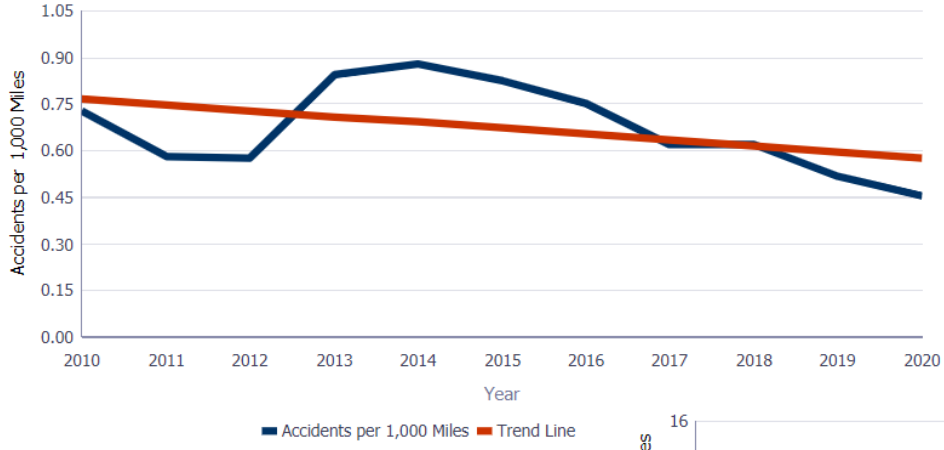




Data as-of
10-12-2021

Crude Oil/Refined Petroleum/Biofuel Pipeline Performance Measures

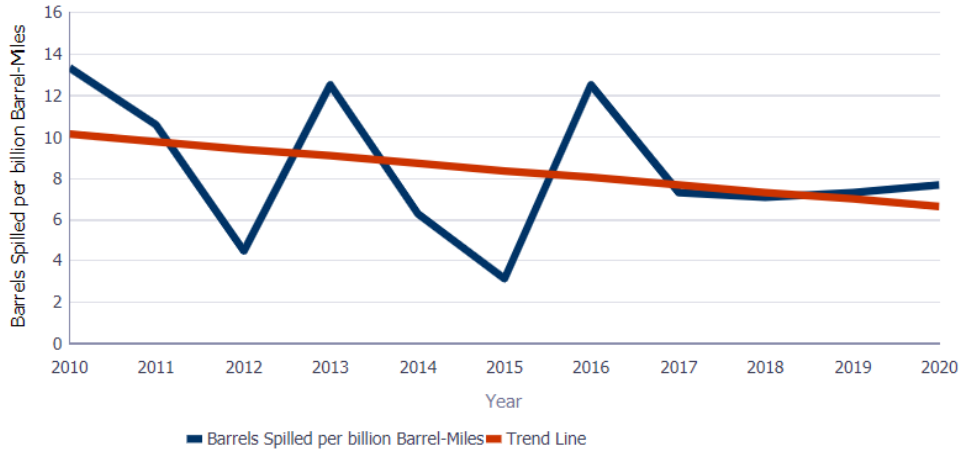
Accidents Impacting People or the Environment - rate per mile and volume spilled per barrel-mile transported



The leading causes of accidents:

1. Corrosion
2. Equipment Failure
3. Material Failure of Pipe or Weld.

These three leading causes account for 65% of accidents Impacting People or the Environment since 2010



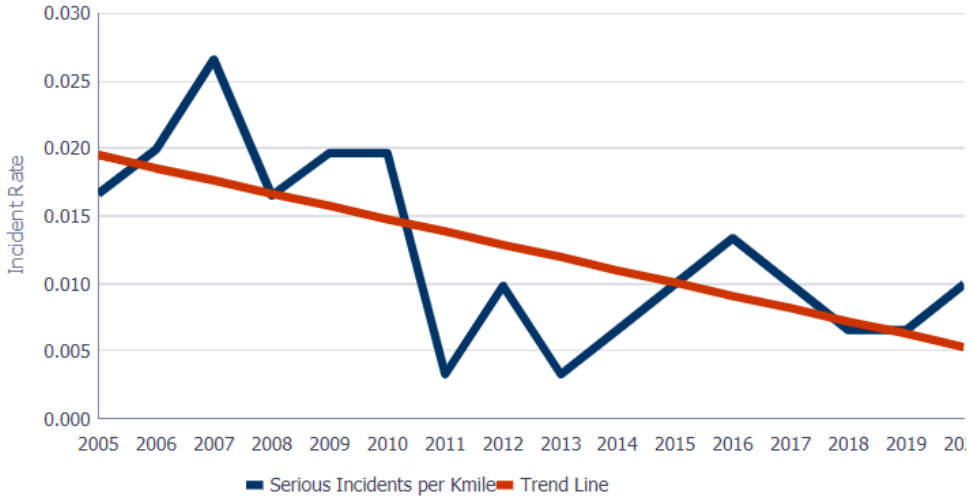
Data as-of
10-12-2021

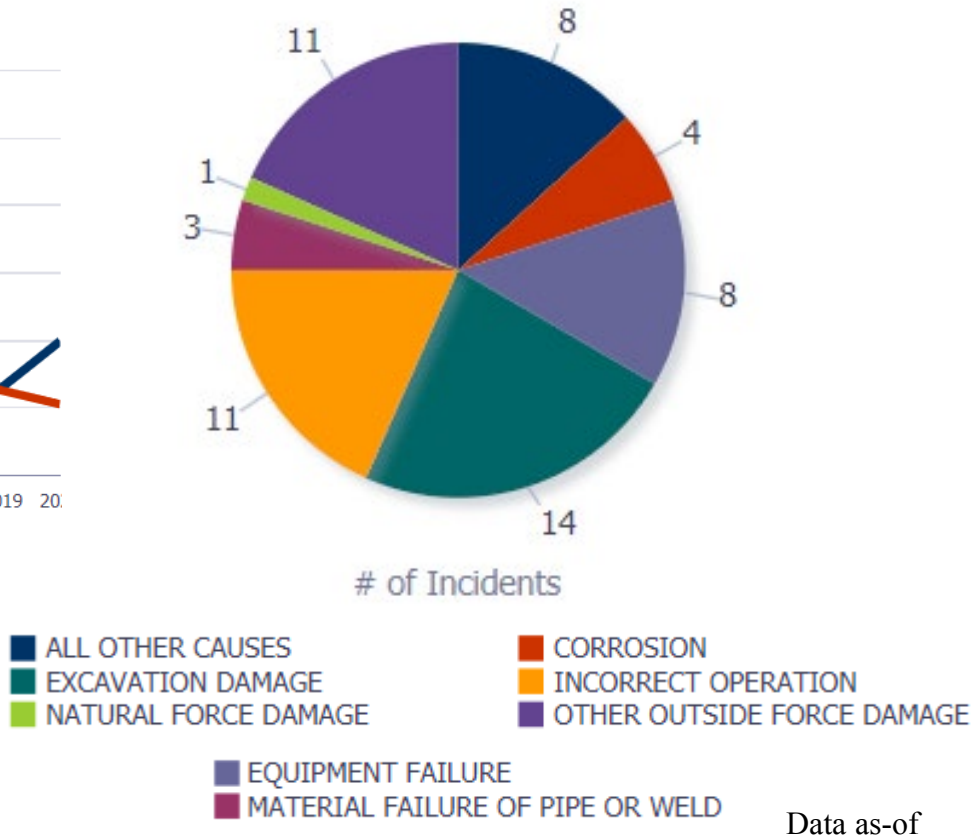
Gas Transmission Performance Measures

- Serious Incident Rate and Cause
- Onshore Significant Incident Rate and Cause
- Onshore Significant Incident High Consequence Areas (HCA)
- HCA Immediate Repairs
- HCA Leaks
- Higher-Risk Materials
- Onshore Significant Incident Rate by Decade

Gas Transmission Performance Measures

Serious Incident Rate and Cause

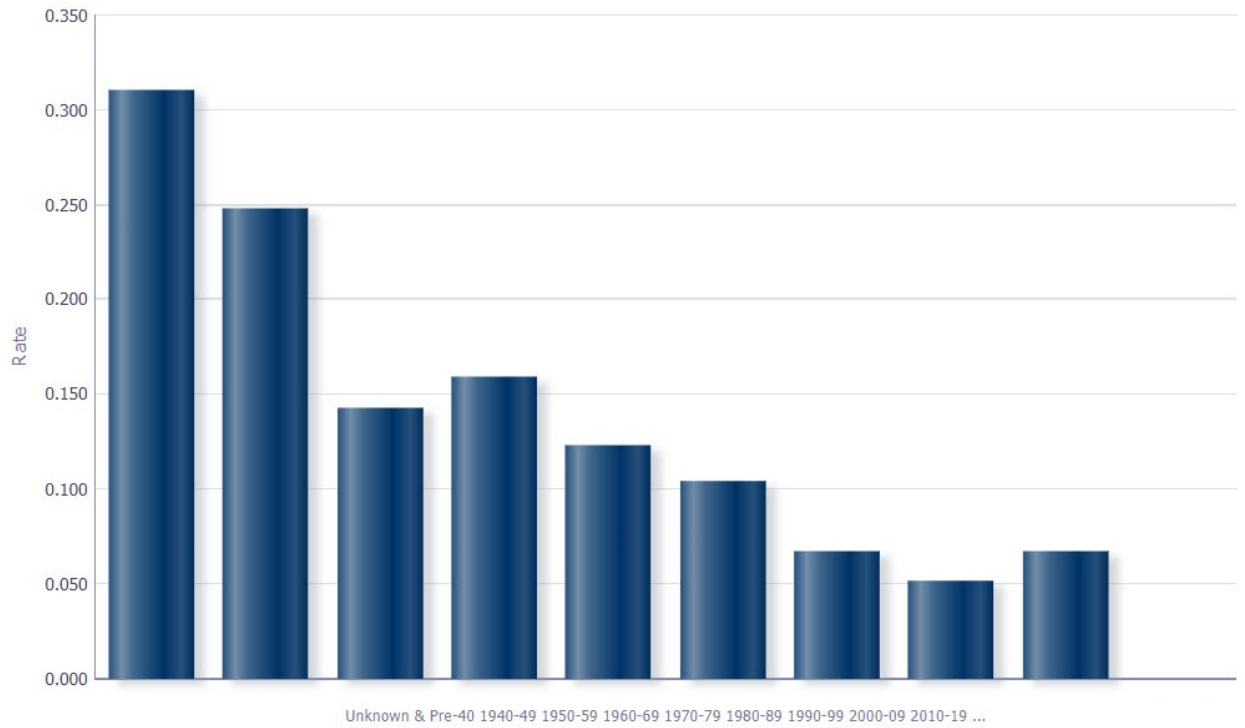




Data as-of
10-12-2021

Gas Transmission Performance Measures

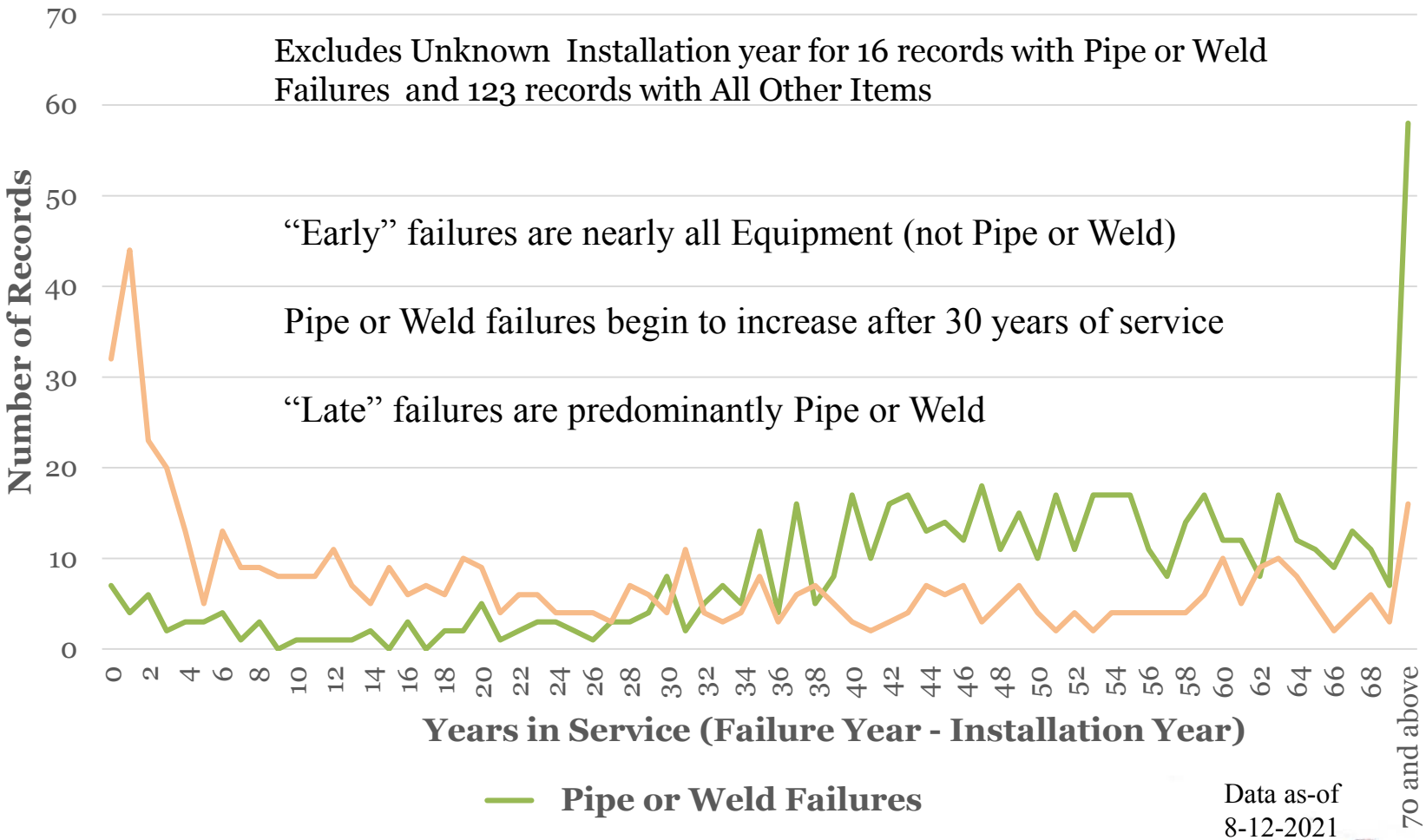
Onshore Significant Incident Rate by Decade



"Unknown and Pre-1940" decade leading cause is Corrosion
"1940s" decade leading cause is Material Failure of Pipe or Weld
"2010s" decade leading cause is Equipment Failure

Data as-of
10-15-2021

Gas Transmission Performance Measures



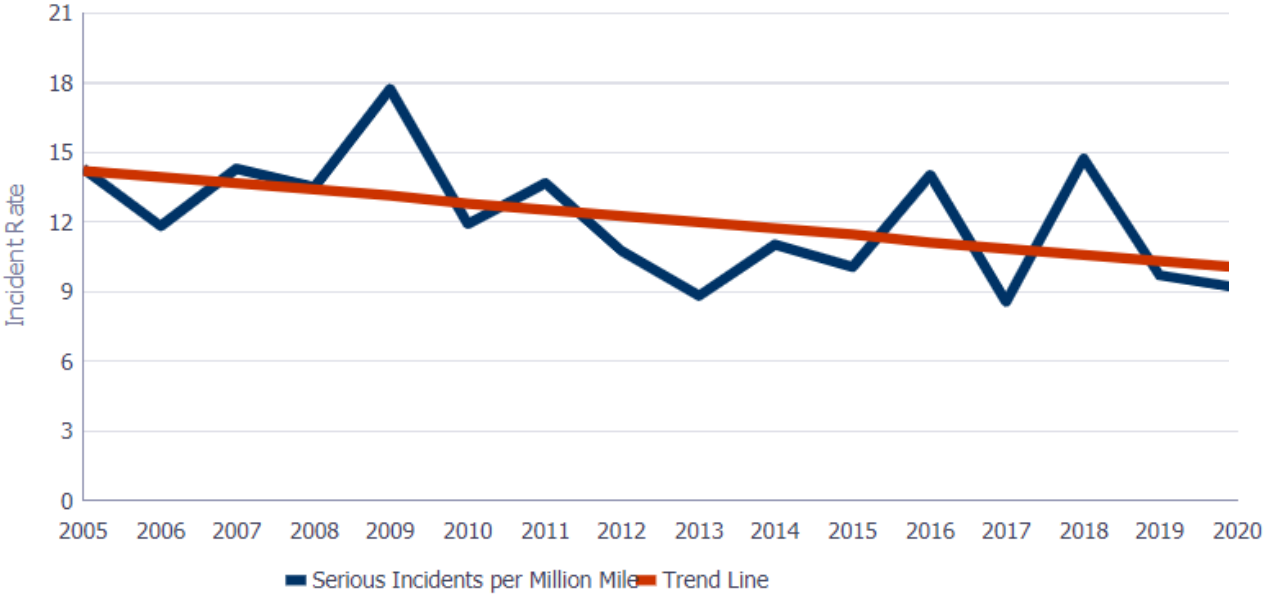
Data as-of
8-12-2021

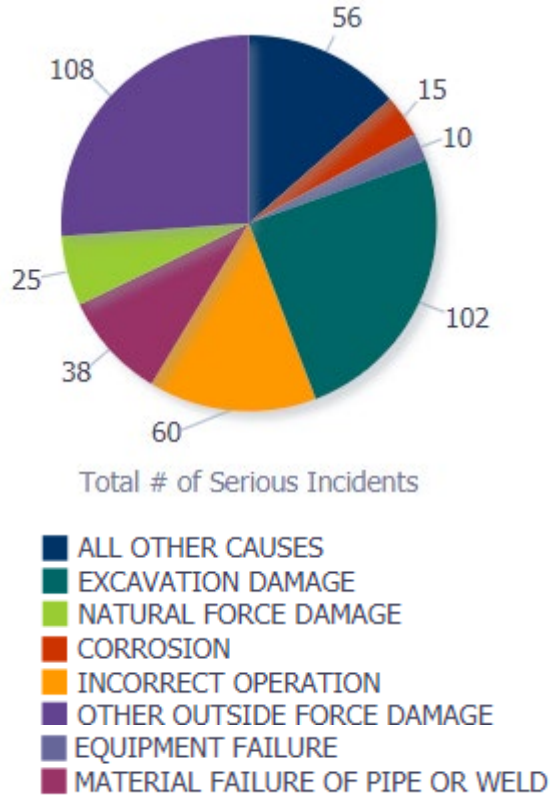
Gas Distribution Performance Measures

- Serious Incident Rate and Cause
- Significant Incident Rate and Cause
- Leaks
- Excavation Damage
- Higher-Risk Materials

Gas Distribution Performance Measures

Serious Incident Rate and Cause

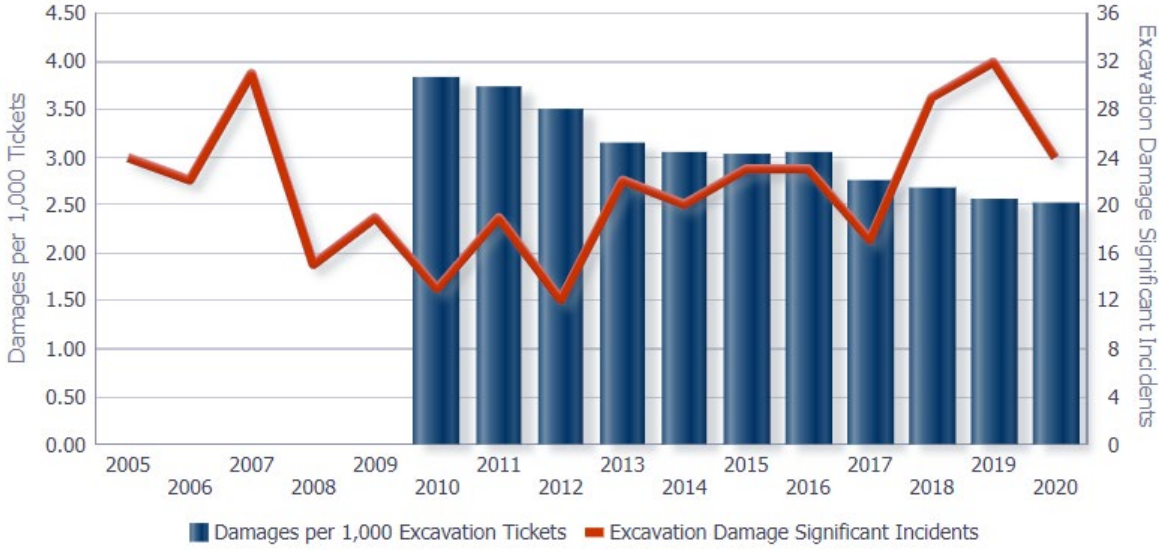


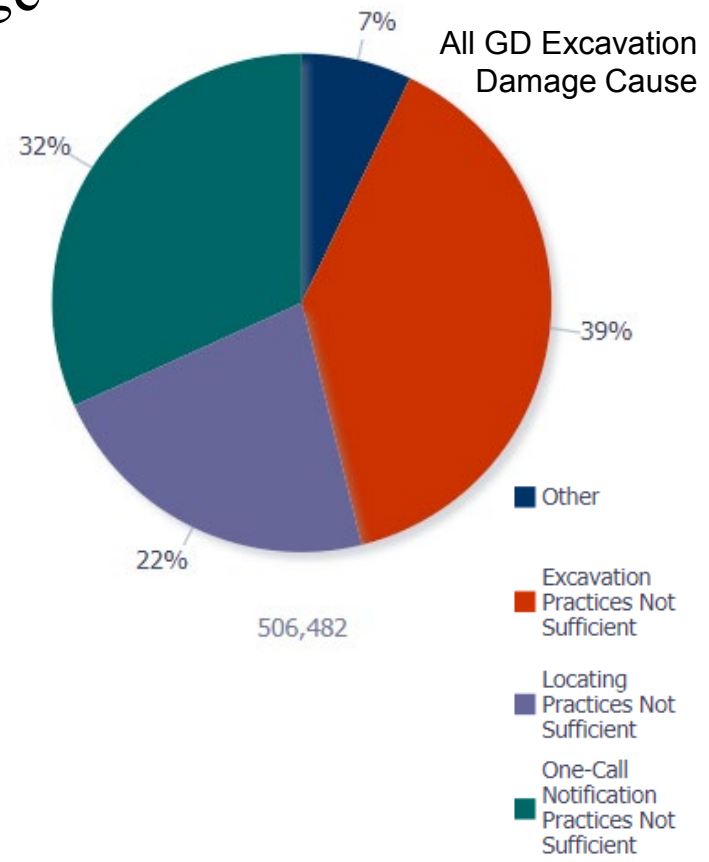


Data as-of
10-12-2021

Gas Distribution Performance Measures

Excavation Damage

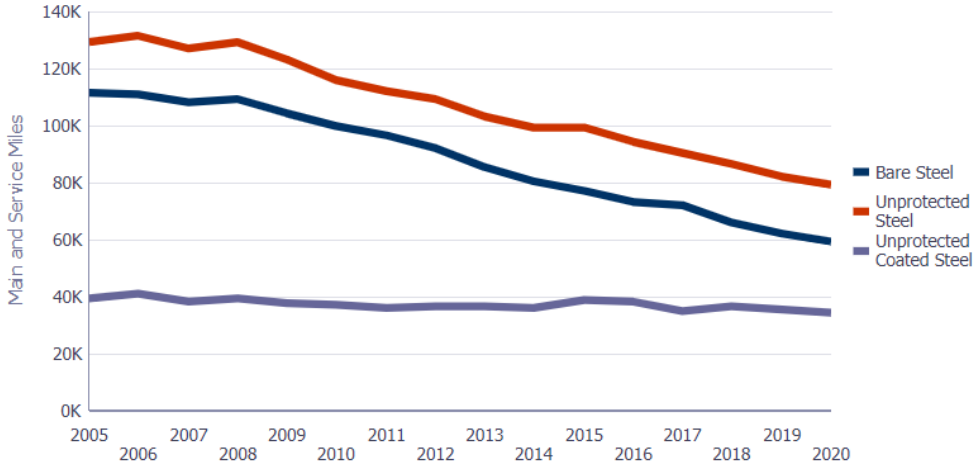




Data as-of
10-15-2021

Gas Distribution Performance Measures

Higher-Risk Materials

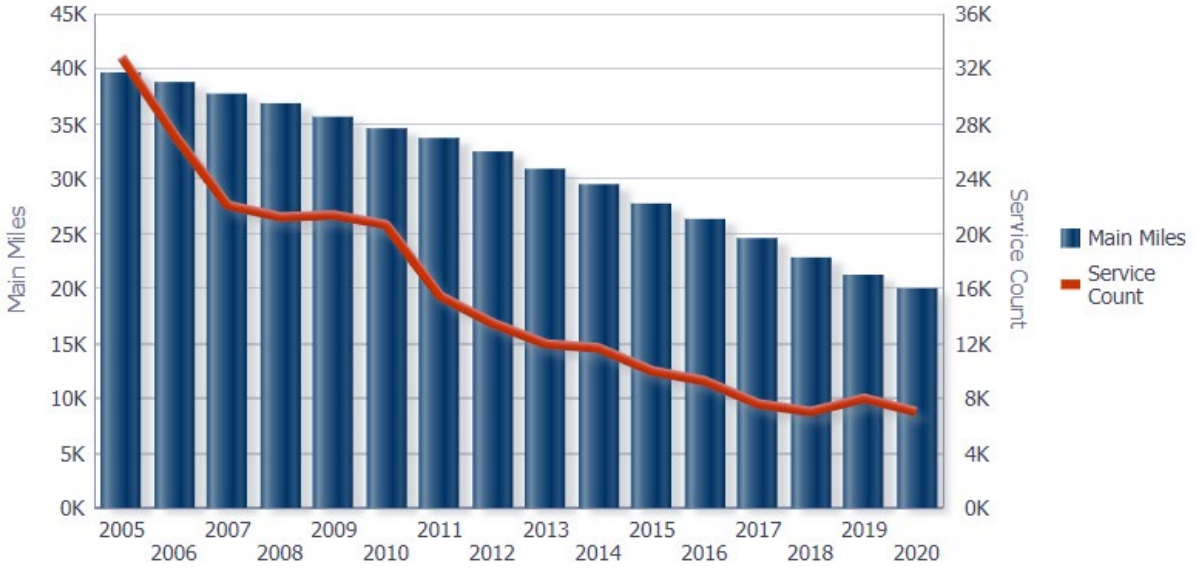


- Miles of **Bare, Unprotected, and Unprotected Coated Steel** have declined steadily since 2005
  - **Bare** Steel: 47% decrease since 2005; constitutes 3% of GD systems
  - **Unprotected**: 39% decrease since 2005; constitutes 3% of GD systems
  - **Unprotected Coated**: 12% decrease since 2005; constitutes 1% of GD
- 28% of gas distribution systems were installed Pre-1970
  - Miles of pipeline system installed Pre-1970 has declined 23% since 2005

Data as-of
10-12-2021

Gas Distribution Performance Measures

Higher-Risk Materials (cont.)



- **Cast and Wrought Iron Main Miles** and **Cast and Wrought Iron Service Count** have decreased significantly since 2005. Cast and Wrought Iron mains are less than 2% of the total gas distribution main miles; less than .01% of all gas distribution services are Cast and Wrought Iron

Data as-of
10-18-2021

Where to Get More Information

- Data and Statistics - https://www.phmsa.dot.gov/data-and-statistics/pipeline/safety-program-data-pipeline-and-lng-operators
- Excavation Damage - https://primis.phmsa.dot.gov/comm/DamagePrevention.htm

Thank You