

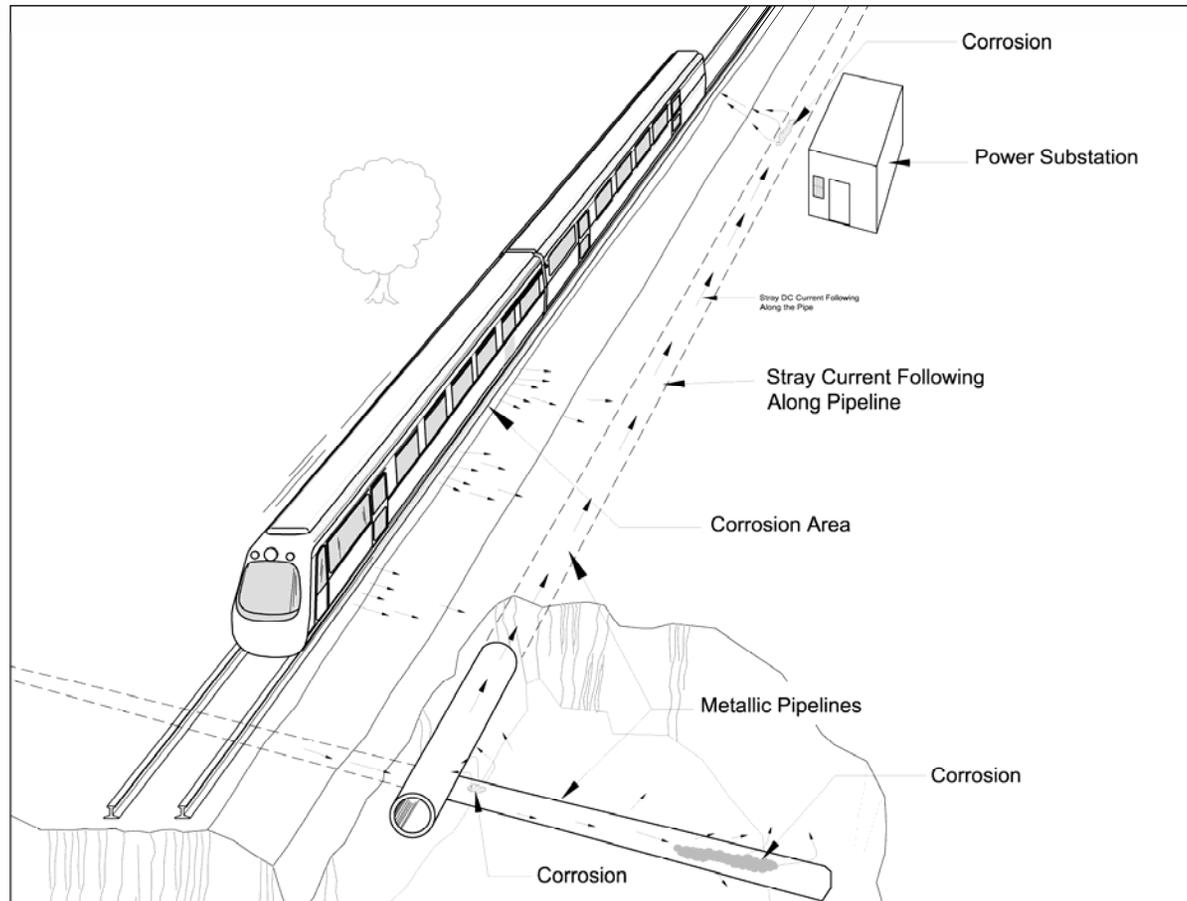


# Light Rail Transit Systems Stray Current: A Pipeline Owner's Guide

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# Light Rail System Operation



# Why Care?

- ❖ Historically (pre-1920s) stray current was a problem
- ❖ Without measures, can effect your pipe
- ❖ Present current mitigation measures do work

# Why Care?

- ❖ “Do no harm”
- ❖ Light Rail system owner is responsible for mitigation

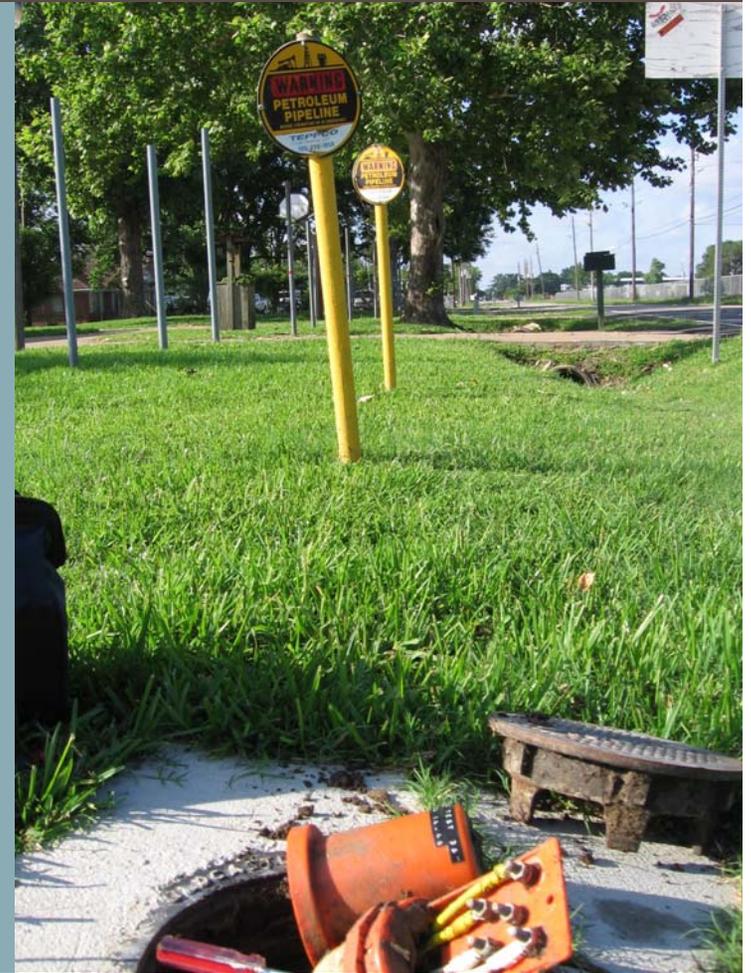


# What the Utility Owner Should Know

- ❖ Location of all light rail crossings
- ❖ Type of trackwork at your crossing
- ❖ Location of traction power substations

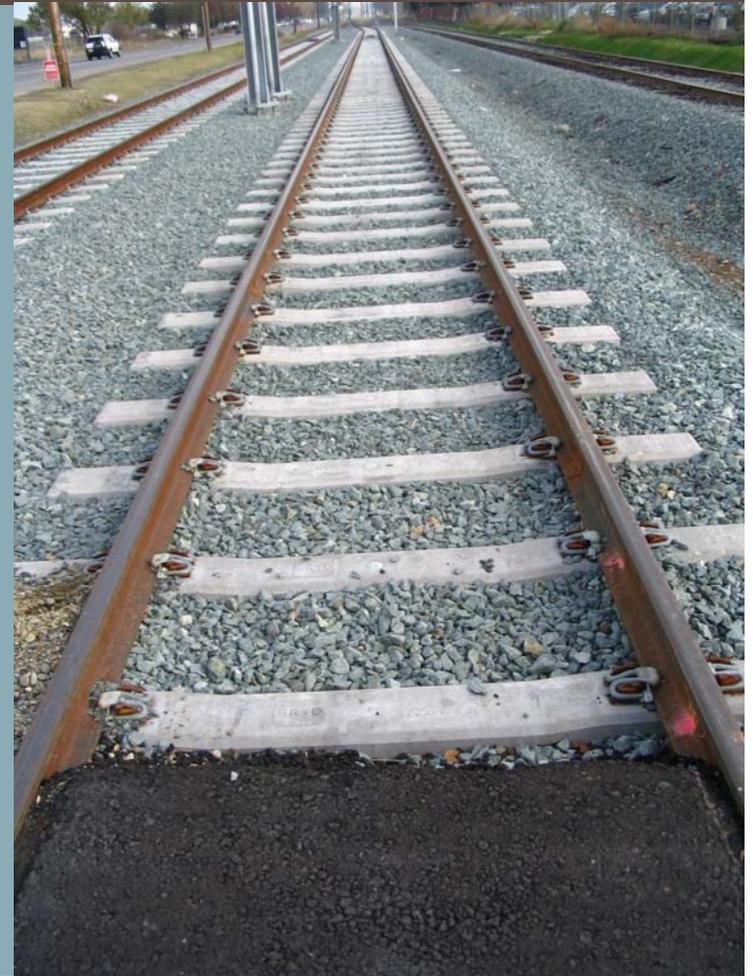
# What the Utility Owner Should Know

- ❖ Baseline pipe-to-soil potential testing prior to light rail system



# Rail Designers

- ❖ Locate all light rail alignment utility crossings
- ❖ Determine the depth of crossings
- ❖ Determine what utilities need to be relocated
- ❖ Set up maintenance testing and inspection program



# Factors Affecting Vulnerability

- ❖ Rail-to-earth resistance
- ❖ Substation spacing & placement
- ❖ Voltage/train load (current)



# Factors Affecting Vulnerability

- ❖ Soil resistivity
- ❖ Distance of piping from track
- ❖ Quality of piping coating



# Factors Affecting Vulnerability

- ❖ Orientation and geometry of piping to the trackwork
- ❖ Long electrically continuous piping
- ❖ Crossings



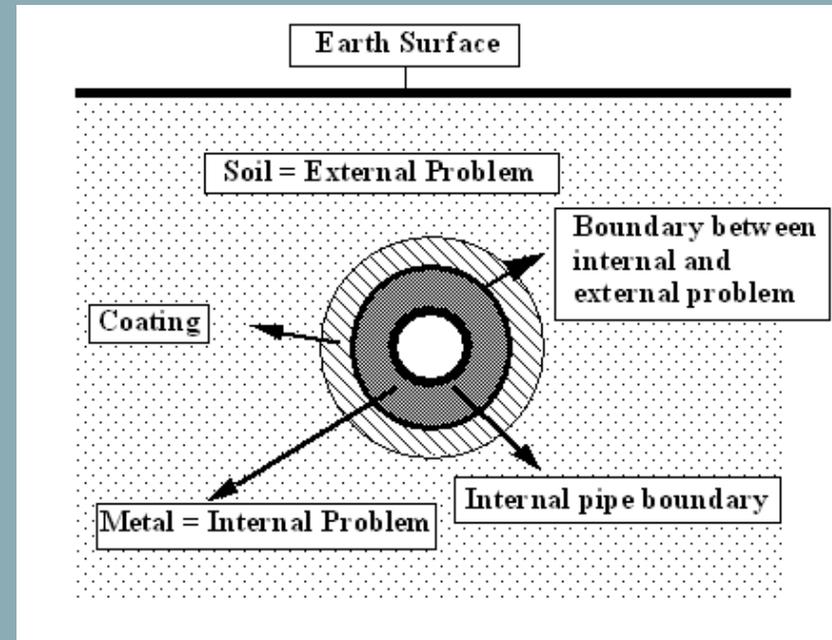
# Means to Reduce Stray Current

- ❖ High resistance fasteners
- ❖ “Rail Boot” (embedded trackwork)
- ❖ High resistance tie materials



# Means to Reduce Stray Current

## ❖ Computer simulations



CatPro Approximation

# Recommendations for Utility Owners

- ❖ Establish committee with owner/utility companies/industry
- ❖ Ensure Light Rail System Owner has stray current testing program
- ❖ Perform pipe-to-soil potential testing prior to and after the Light Rail System energization
  - ◆ Use 24-hour recorders

# Recommendations for Utility Owners

## ❖ Crossings

- ◆ Install insulation joints on each side of crossing
- ◆ Install cathodic protection system
- ◆ Install neoprene mat
- ◆ Use plastic pipe

# Recommendations for Utility Owners

## ❖ Parallel

- ◆ Install test stations
- ◆ Install cathodic protection system





# Q&A