

WATER MAIN BREAKS, FAILURE ANALYSIS, ENGINEERING SOLUTION AND CORROSION RISK ASSESMEN AT MATERGENICS



WATER MAIN BREAKS



Water main failures are very expensive for municipalities because they typically result in expenses associated with repair costs, flood damage, and loss of revenue to affected businesses. Water main failures also interrupt the operation of vital services, such as medical care and fire-fighting operations. Currently, millions of dollars are spent annually by industry and by municipalities on the repair of failed components of the water distribution infrastructure, such as components that are made from gray cast iron or "gray iron" pipe.

The rate of municipal water main failure is expected to increase as the existing gray iron infrastructure continues to age. The cost of repairing damages caused by broken water mains (and subsequent flooding damage) may become an important item in many municipal budgets.

Team Matergenics can be at the site of a water main break immediately for failure analysis, to determine if it is due to corrosive soil, water main material, galvanic actions or stray current corrosion. Soil analysis, failure analysis and corrosion risk assessment will be performed after the onsite investigation and collection of samples.

We also provide engineering solution, design and installation of cathodic protection systems to protect these important assets, which can add 20 years to their remaining life. At your request our NACE Certified Corrosion / Coating/ Cathodic Protection Specialist, Engineers and Technicians will perform corrosion risk assessment at sites that exhibit accelerated corrosion.



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› MATERGENICS CAPABILITIES FOR ANALYSIS OF WATER MAIN BREAKS



Our overall approach to corrosion risk assessment and corrosion mitigation:

- Pre-assessment stage
- Indirect assessment stage
- Direct assessment stage
- Recommendations for Remediation

✓ **Pre-assessment stage:**

- Desk study of soil types (USGS data) in the area encompassing the affected water district

✓ **Direct assessment stage:**

- Visual observation of pipe condition, with a major goal of determining whether the primary corrosion losses are internal (water side) or external
- Test to check for the presence of stray currents
- Check for the presence of galvanic corrosion conditions
- Collection of soil samples for corrosivity analysis
- Installation of Anodes and Test Station

✓ **Recommendations for Remediation:**

- Matergenics will develop specific, practical mitigation strategies based on findings and data from the direct and indirect assessment phases.
- This will be performed by an experienced NACE Certified Cathodic Protection Specialist.

✓ **Indirect assessment stage:**

- Four pin soil resistivity measurements
- Electrochemical potential measurements, if test stations are present

✓ **Laboratory Failure Analysis Investigation of cut Pipe-Section:**

- Visual Documentation of failed pipe at low and high magnifications
- Microexamination of the cross-sections extracted from the failed pipe
- Energy Dispersive Spectroscopy of sample extracted from the failed location
- Chemical and corrosivity analysis of soil samples in Matergenics soils lab and modeling for remaining life
- Primary Cause of Fracture (break)

✓ **Matergenics' project team:**

- PhD-level specialist; NACE-certified in corrosion, cathodic protection, coating, material selection / design
- PhD-level Professional Engineer (PE); NACE-certified in cathodic protection (CP2) and coatings (CIP1)
- PhD-level Technologist; with expertise in computer-aided design (CAD) and simulation
- Corrosion Engineer; NACE-certified in cathodic protection (CP2) and experienced in failure analysis
- GIS mapping scientist
- Senior soil testing specialist
- Geologist

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