

Reducing Riser/Meter Set Corrosion to Lower Lifecycle Costs

In this project, investigators researched improved, simple, and more effective methods to clean, prepare, and coat atmospherically exposed risers and meter sets that have experienced corrosion. With an improved method for the constant rehabilitation of riser/meter sets, the useful life of the systems can be significantly extended and utility costs reduced.



Project Description

Most gas meter sets – including the riser, pressure regulator (if required) and meter – are located outside of the customer’s home or business. Depending on the specific location, meter set equipment can be exposed to chlorides from deicing, salts from roads or a coastal environment, nitrates from lawn and garden fertilizers, or other corrosive substances. Tools and other equipment (including weed whackers) can damage coatings and materials. In addition, meter sets are exposed to varying temperatures, humidity, and sunlight.

When a corroded meter set is found, it is either repaired on-site by a work crew or removed and sent to a meter repair shop. The piping and associated equipment is cleaned (usually wire brushed) and then recoated with paint, tape wrap, epoxy, or other liquid-based system. Many times, this recoating fails and the corrosion continues, requiring re-repair in as little as two years.

Driven in part by the Department of Transportation’s Regulation 49 CFR 192.481 (which addresses atmospheric corrosion control and requirements for monitoring), project researchers investigated enhanced methods to clean, prepare, and coat exposed equipment to reduce corrosion.

Deliverable

While it is known that better cleaning provides better coating performance, published data for pipeline coatings are scarce.

This project provided detailed information (through laboratory tests and field demonstrations) on tools, materials, and procedures to improve cleaning and surface-preparation processes for meter sets and risers.

A summary report on the project is available.

Benefits

Through the development of improved methods for addressing corrosion in meter sets and risers, the industry will realize the following benefits:

- Lower lifecycle costs of this equipment
- Improved customer relations due to fewer call-backs, less service interruptions, and an improved appearance of meter sets
- Reduction in the number of replacement meter and riser sets
- Enhanced system integrity and safety
- Improved ability for operators to meet the requirement for atmospheric corrosion monitoring called for in 49 CFR 192.481.

There are approximately 60 million gas meter sets in service in the U.S. Industry surveys indicate that the average cost to provide corrosion control maintenance on meter sets, using current practices, is \$150 per set. Much of this cost is dependent on the time and methods used to prepare the meter set surface for recoating. Researchers estimate that the industry



At right, top-down view of meter uncoated (top) and coated (bottom). At left, a fully coated meter.

currently spends \$15 million annually to repair meter sets, a figure that could be reduced to \$4.5 million (a 70% reduction) with the development of improved rehabilitation methods.

Technical Concept & Approach

Research activities focused on:

- Verifying the most critical shortcomings of current riser and meter set rehabilitation practices that lead to high lifecycle costs
- Developing pre-cleaning, cleaning, and coating processes that overcome the current shortcomings at a reasonable cost
- Performing accelerated testing on the most promising coating systems
- Performing field demonstrations for gas utilities and deploying the technology.

Results

Research began with an industry survey, assessments of current practices, and site visits to participating utilities.

During 2005, researchers tested numerous pre-cleaning liquids designed to clean surfaces of salt and dirt. Tests were also conducted on various power tools, abrasive wheels, discs, and fittings designed to clean surfaces of rust and provide a surface profile.



In addition, research was conducted with coating manufacturers to more thoroughly understand meter/riser set conditions, application constraints, and protection requirements.

Various coating systems were tested at Gas Technology Institute's Corrosion Laboratory to identify those that provide the optimal performance under various environmental conditions.

Researchers have found that when recoatings fail on meter/riser sets, the failure is often the result of:

- *Inadequate removal of the previous coating from the meter sets and risers.*
- *Inadequate removal of environmental materials from the equipment (such as chlorides and nitrates).* It is virtually impossible for a wire brush to remove all contaminants, most of which are not visible.



Investigators researched enhanced methods to clean, prepare, and coat exposed equipment to reduce corrosion and extend system life.

- *Poor surface preparation for the new coating process.* The surface of the pipes needs to be scarred or pitted to increase the surface area for the recoating adhesive. A wire brush cannot adequately prepare the surface. A dry abrasive blasting system provides an appropriate surface; however, it is expensive, may damage surrounding property, and may introduce oil and salts into the pits.
- *Inappropriate selection of the recoating material for the equipment's environment.* Previously, there was limited testing of coatings under various outdoor conditions. The wrong choice will lead to continued corrosion.

Status

A Final Report details various research results, including information on surface preparation, meter-riser materials, power tools, corrosion tests, surface salt contamination, and the best-performing coating systems. In addition, researchers provide recommended procedures to properly clean equipment, remove surface contamination, and coat the meter sets.

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