

A method to detect sewer lateral defects – including laterals not currently sources of infiltration

Sewer Lateral Electro Scan Field Verification Pilot (INFR4R12)

The Central Issue

As many sewer system owners are continually plagued by wet weather flow issues, the potential for finding the source of this extra flow is always of interest. This study attempted to field test a technology for assessing a pipe's infiltration potential using an electrical field focused at the pipe wall.

Context and Background

Municipalities looking to reduce wet weather flows that originate from private property are often limited to methods that assess the overall condition of the sewer lateral or provide a limited perspective of its condition. Ideally, municipalities would have an inspection tool that would be relevant to wet weather concerns and provide condition information with greater detail than a pass/fail rating. This research was an intensive field test of an innovative lateral inspection technology. Researchers performed side-by-side correlation tests to other means, including lateral closed-circuit television (CCTV) inspection, dye water/rainfall simulation testing, and water exfiltration testing.

The researchers sought to determine if lateral inspection with Electro Scan technology evaluating the infiltration potential of laterals would prove to be a much more productive and cost-effective method of prioritizing lateral rehabilitation programs. They also sought to find *where* laterals were found to be of poor condition: throughout their length, or just near water sources, such as storm sewer crossings.

The Milwaukee Metropolitan Sewerage District (MMSD) and the City of Wauwatosa (Wauwatosa) prepared the test areas and performed other tests for comparison to Electro Scan. WERF funds were used to test the Electro Scan approach against dye water/rainfall simulation testing techniques to derive convincing condition information both in general, and on specific properties. A side-by-side test of these methods was used to determine the viability of Electro Scan as a low-cost, rapid assessment tool for sewer lateral infiltration.



A lateral being tested with Electro Scan.

Findings and Conclusions

Electro Scan testing provides an unambiguous evaluation of the condition of a lateral and the location of lateral defects. With Electro Scan, the identification and location of defects does not rely on the experience of the user, as is the case with CCTV inspections. In addition, Electro Scan detects all defects, including those that may not currently be providing infiltration, but that may become infiltration sources over time, as the lateral deteriorates.

Several laterals were scanned more than once in order to demonstrate the repeatability of the technology. The results showed very good comparison between duplicate scans overall. The technology was able to detect the presence of potential infiltration defects in a consistent manner.

Management and Policy Implications

The best conditions for performing the Electro Scan test are with an external cleanout. These are rarely found on laterals in the Milwaukee metropolitan area, but may be more common in other parts of the United States. As a result, testing may require installation of an external cleanout, which may limit the use of this technology to areas where cleanout installations are planned, such as prior to CIPP lining.

It is unlikely that an Electro Scan test would replace CCTV inspection altogether. The research team believes it is important to perform a visual inspection of the tested lateral prior to filling it with water and beginning the Electro Scan test to reduce the risk of the sewer plug or the probe getting stuck in the lateral during the test. CCTV inspection may also discover that the lateral needs cleaning, or a point repair, prior to performing the test. Both televising and cleaning actions would likely be required before doing any rehabilitation of the pipe. While no clear correlations between Electro Scan test results and other field tests were found, one level of review suggests that the technology, at a minimum, is able to detect the presence of potential infiltration defects in a consistent manner.

Executive Summary



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Related WERF Research

Project Title	Research Focus
Condition Assessment Strategies and Protocols for Water and Wastewater Utility Assets (03CTS20CO)	Provides information on how to effectively use condition assessment tools and techniques to improve both long-term planning and day-to-day management of assets. The report is structured for utility planning managers who want to use cost-effective condition and performance assessment programs to support long-term planning decisions and engineering/maintenance managers that want to identify tools and techniques for measuring the condition and performance of utility assets to support daily maintenance and operation of assets.
Condition Assessment for Wastewater Pipes – WATERiD (INFR9SG09)	Web-based, interactive, national, database base of condition assessment and rehabilitation case studies, and technology provider information.
Condition Assessment for Wastewater Pipelines (INFR9SG09caww)	Describes technologies and methodologies currently in use for condition assessment of wastewater pipelines. Provides a synthesis of condition assessment technologies contained in WATERiD.
Web-Based Decision Support Tools for Selection of Condition Assessment and Rehabilitation Methods for Laterals (INFR2SG09)	Web-based portal provides sewer agencies and property owners with current information on sewer lateral condition assessment and inspection techniques, repair and rehabilitation methods, legal and financial issues, and a forum for resolving related issues.

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