

Study of Pre- and Post-Rehabilitation of Cured-In-Place Pipe for Florida Utility Shows 63% Increase in Infiltration

Landmark 4-Year Study of CCTV & FELL Inspections Confirms Major Problems Using Visual Inspection to Detect Infiltration or Certify Pipe Repairs as Watertight

SACRAMENTO, CA, UNITED STATES, April 7, 2025 /EINPresswire.com/ -- [Electro Scan Inc.](#) today announced results of a 4-year wastewater collection study that evaluated the effectiveness of sewer repairs, including the use of closed circuit television (CCTV) cameras and trenchless rehabilitation to reduce sewer infiltration and sanitary sewer overflows (SSOs).



A major Florida wastewater utility completes a 4-year pre- and post-rehabilitation effectiveness study comparing CCTV to AI-FELL technology.

Each year storm-related sewer backups and flooding cause tens of billions of dollars in property damages, contaminated rivers & streams, and beach closures; previously unable to accurately traced the source of sewer infiltration or exfiltration.

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Chuck Hansen, Chairman & Founder, Electro Scan Inc.

The Florida wastewater study evaluated 89 sewer mains totaling nearly 5 miles (25,822 linear feet) of pipe over a 4-year period, before and after rehabilitation.

The study compared assessment results using high resolution CCTV cameras and AI-based Focused Electrode Leak Location (AI-FELL), to identify & quantify specific locations of infiltration, recommend rehabilitation and certify sewer pipelines for operational readiness.

A major objective of the project was to quantify the percent (%) reduction of infiltration, before and after repairs. And, identify specific locations where rainfall can percolate through the soil and enter sewers through pipe cracks, leaking joints, and poor service connections.

The company had already shown AI-FELL to deliver flow measurements similar to results provided by flow meters.

But, FELL is able to deliver same-day maximum estimated flow measurements by individual pipe segment. Instead of requiring multi-year results waiting for peak wet weather flows using flow meters covering large areas only.

The Florida utility was experiencing persistent and unexplained high levels of infiltration and sanitary sewer overflows (SSOs) during wet weather events. Despite multiple sewer evaluation studies, flow monitoring, and large annual capital expenditures (CAPEX) for sewer main repairs and rehabilitation.

"Wastewater utilities continue to grapple with high rates of infiltration which do not appear to be declining; even after major expenditures," stated Chuck Hansen, Chairman & Founder, Electro Scan Inc.

For instance, after spending \$4 billion to rehabilitate its wastewater network in response to a 1989 Consent Decree, the [City of Houston](#) recently finalized a new Consent Decree mandating an additional \$9 billion to be spent on sewer rehabilitation.

Increasingly linked to the inability of CCTV cameras to properly assess sewer mains and a camera's inability to deliver accurate pipeline quality assurance testing, a growing number of communities have been unable to reduce levels of wet weather or tidal infiltration by relying on



Low voltage conductivity allows utilities to automatically identify location and severity of defects in Cured-In-Place Pipe (CIPP) and other trenchless rehabilitation.



AI-CCTV is not able to determine if defects go through a pipe wall, but AI-FELL easily pinpoints to accurately recommend rehabilitations and certify repairs as watertight.

visual inspections.

Details of the Florida wastewater study are expected to be released later this month.

In the meantime, results showed that repairs of the 89 sewers achieved a 53% reduction in defect flow; far below expectation based on individual pipe comparisons of pre- and post-rehabilitation inspection results.

CCTV & FELL testing were completed in 2020 to establish a baseline defect level and again after all repairs were completed by August 2024.

But, CCTV had few if any defects recorded in accordance with NASSCO Pipeline Assessment Certification Program (PACP®) coding standards; neither before and after rehabilitation, offering little to no recommendations to reduce infiltration.

For the 89 sewer mains CCTV recorded 29 defects compared to 1,719 by FELL. For the 283 service connections, CCTV recorded 5 defective laterals compared to 178 identified by FELL.

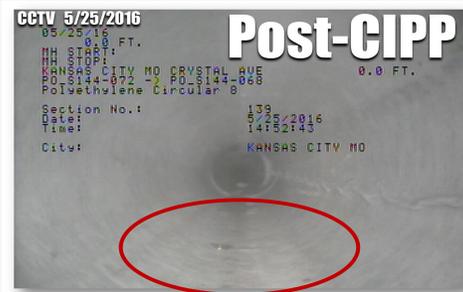
As a result, repairs and rehabilitation that were recommended by an independent international consulting engineering firm were based on FELL results, including the use of cured-in-place pipe (CIPP). All repairs were completed from 2022 to 2024.

Pipe rehabilitation included repairs to existing CIPP, vitrified clay pipes (VCP), and polyvinyl chloride (PVC) pipes.

CIPP Wrinkles That Leak. Missed by CCTV.



Missed by Closed-Circuit Television (CCTV) Cameras, New Standards Locate & Measure Leaks in Gallons per Minute or Liters per Second.



Another common reason for CIPP to leak more after rehabilitation is damage caused by Post-CIPP CCTV inspection and/or lateral reinstatement equipment.

A major factor contributing to the limited reductions in defect flow were poorly installed CIPP liners that showed a combined 63% increase in defect flows; primarily due to poorly reconnected service connections.

In other words, cumulative leaks at joints (i.e. successfully covered by CIPP liners) were exceeded by cumulative leaks at re-connected service lines. And, not detected by certified CCTV operators either before or after rehabilitation.

First introduced in the United Kingdom in the 1970s, CIPP is a trenchless rehabilitation solution with total trenchless pipe rehabilitation forecasted to reach an annual spend of \$8 billion a year by 2030.

CIPP typically uses a resin-soaked liner inserted into an existing pipe, inflated, then cured (hardened) in place using either steam, boiling water (thermal), UV, or LED curing methods. Creating a new pipe within the old pipe, without excavation.

Service laterals connecting individual households to sewer mains are temporarily covered during the CIPP lining process. And, therefore must be remotely cut from inside the pipe to re-establish residential flow to utility-owned sewer mains.

As confirmed by German-based Institut für Unterirdische Infrastruktur (IKT), also known as the Institute for Underground Infrastructure, if laterals are not properly reconnected the same amount of rainfall that previously entered a pipe through defective joints, may now enter through defective service connections or other openings.

If further damage occurs, especially from CCTV inspection or lateral reinstatement equipment, infiltration rates can be much greater after rehabilitation.

FELL technology utilizes the same electrical resistance testing technology as the company's flagship SWORDFISH lead detection product.

SWORDFISH's electrical resistance testing technology is the only commercially available solution recognized by the US EPA that can detect buried copper, galvanized, plastic, and lead water drinking water pipes, without excavation.

An alternative method to test CIPP liner quality has included fiber optics. But, the inability to test 360-degree full-length pipe walls and without a water tightness testing capability, the use of fiber optics is severely limited.

Last year, a UK water utility completed a similar pre- and post-rehabilitation survey of CIPP, with individual FELL reductions ranging from 99% (near watertight repairs) to 11% (almost no improvement from CIPP).

[New CIPP certification standards](#) now being adopted in the US, UK, and UAE, replace CCTV with FELL to certify operational pipelines of sewer mains.

In 2017, Electro Scan Inc. teamed with British-based WRc plc to conduct leak testing of eighteen (18) CIPP lining suppliers at IKT, Gelsenkirchen, Germany.

In 2014, Kenneth Kerri, PhD, PE, former director of the Office of Water Programs, was the first to acknowledge the need for advanced technologies to overcome shortcomings of video inspections and use of CCTV cameras.

Unable to properly assess the water tightness of joints, service connections, and newly installed CIPP for leaks, Dr. Kerri began searching for alternatives to CCTV camera technology.

Overseeing testing of Electro Scan's earliest benchmarks, Dr. Kerri suggested the company focus on CIPP liners, where pipes were suffering unexpected failures within their first few years of installation.

Confirming Electro Scan's Focused Electrode Leak Location (FELL) advantages over CCTV cameras, Dr. Kerri authored a chapter on Electro Scanning in Operation and Maintenance of Wastewater Collection Systems, A Field Training Program, Volume 1, Seventh Edition, ISBN, 978-1-59371-066-8, published 2015.

Later this month, Electro Scan Inc. is expected to release 'AI-FELL for Sewer Assessment and Rehabilitation' to coincide with the launch of AMP 8 in the UK.

ABOUT ELECTRO SCAN INC.

Founded in 2011, Electro Scan is an international supplier of machine-intelligent pipeline assessment and quality assurance products & services for the water, sewer, and oil & gas markets. The company develops and markets proprietary equipment and SaaS-based cloud applications that automatically locates, measures, and reports pipeline leaks and water service line pipe materials, including lead pipes. The company's products and services detect buried lead water services, typically not found by legacy inspection methods.

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