Introduction

Figure 1: A CCTV camera in an 8" pipe.
Photo courtesy of Plumbers Depot Inc.

Closed-circuit television (CCTV) inspection continues to gain acceptance as a means of investigating the condition of all types of buried assets. Widespread adoption of CCTV inspections has been driven by the high-quality video images and records these systems produce. As an investigative tool, CCTV systems are unmatched. Operators can highlight concerns and more importantly, the reports create historical records of the condition of pipe at the time of final acceptance. This visual record is an important reason for many agencies requiring CCTV inspection as a part of the final acceptance testing on newly installed pipelines.

> **Information from a variety of inspection tools should be used to make better decisions: CCTV is only one aspect of assessment and should not be used in isolation.**
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> *– Condition Assessment of Wastewater Collection Systems, EPA/600/R-09/049 White Paper; Feeney, Thayer, Bonomo, Martel (2009)*

As valuable as a CCTV inspection can be, human and software errors can and have resulted in expensive and unnecessary "repair" projects. A Low-Pressure Air Test, per ASTM C828 (*Standard Test Method for Low-Pressure Air Test of Vitrified Clay Pipe Lines)*, provides an operational-based test of the full installation.

Operators and reviewers of CCTV footage are looking for problems. Erroneous CCTV reviews have led to decisions that become difficult to justify or explain. Some repairs based on guidance from video inspections have shown the problem described to either be non-existent or of significantly less magnitude than indicated.

Whenever there is doubt, operators should contact the pipe manufacturer for further review. To minimize the risk of misinterpretation, operators should be certified to use the specific software and hardware. For more information and a few examples of cosmetic imperfections in clay pipe, see pages 18 and 19.

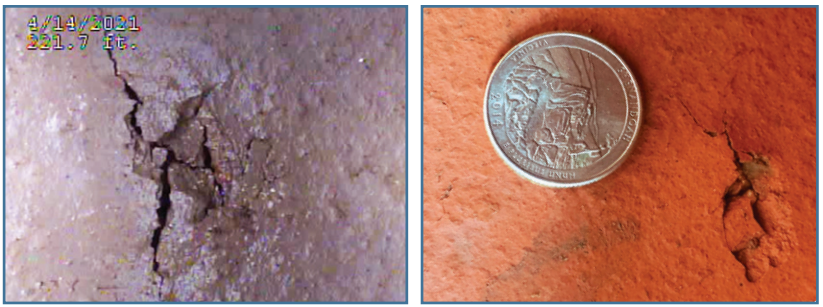

Figure 2: The picture at left was the observed condition of an 8-inch pipe in a CCTV inspection. The photo at right is the recovered pipe that passed the air test. The cosmetic imperfection is well-within the chip allowance specified in ASTM C700 and would have had no impact on long-term performance. For more examples of cosmetic imperfections, see pages 18 & 19.

To address some of these concerns, the National Clay Pipe Institute and Cues, Inc. worked together to update an earlier study exploring the actual versus perceived results of televised inspection. New equipment, better lighting and higher resolution viewing screens are just a few of the advances in equipment

and tooling that made this update necessary. The plan was to revisit conditions that had previously proven to be problematic. It is by no means a full exploration of all issues that may be encountered. When in doubt, err on the side of caution, run a Low-Pressure Air Test and contact the pipe manufacturer.

For this study, 8-inch VCP pipe sections were setup in a laboratory in straight alignment and with known and measured instances of parallel offsets, pulled joints, joint sags, vertical/ horizontal joint deflection, service connections, and cosmetic imperfections. These sections were inspected using CCTV. The images were captured by a Cues, Inc. Digital Universal Camera (DUC) with 3.1-megapixel high-resolution camera and high output strobe lighting system.