Florida Department of Transportation Research

Best Practices for Quality Management
of Stormwater Pipe Construction
BDK75977-56

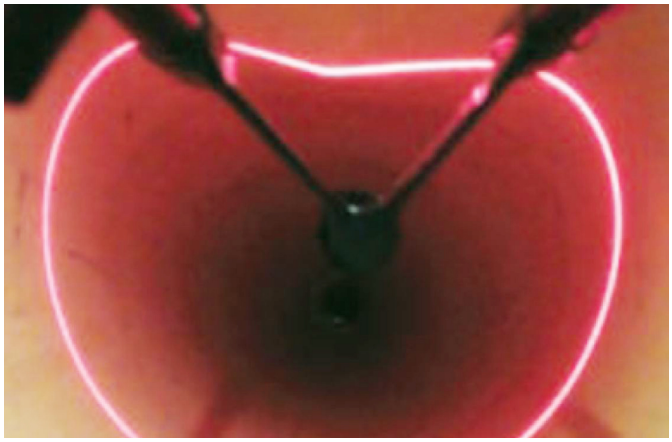
Although largely unseen, stormwater pipe systems are integral and important features of the transportation network. Stormwater systems support the safety and integrity of roadways by directing stormwater away from roadway structures to discharge areas. Because of their importance, the Florida Department of Transportation (FDOT) has set standards for proper installation and inspection of pipe culvert systems.

Improper installation of a pipe culvert can result in costly repairs, delays, and/or hazardous system failure. Faults can be detected by video inspection and laser profiling in which a mobile unit equipped with a laser and a closed circuit television camera travels inside a pipe and records all joints and observable defects. Laser profiling is efficient and objective in locating and identifying defects in pipe systems. But there exists no standardized testing procedure for profiling equipment operators, leading to problems with consistent and accurate use of laser profiling equipment.

In this project, University of Florida (UF) researchers explored the development of a certification program for laser profiling and video inspection operators by developing a method to validate inspection equipment and written and field exams to test operator knowledge of inspection procedures and certify operator proficiency with profiling systems.

The researchers reviewed development of laser profiling and video inspection from its beginnings up to modern profiling systems, which yield information about cracks and corrosion, pipe ovality, and horizontal and vertical deflection. The researchers also investigated method limitations and how devices from several manufacturers differed. However, they found that some so-called limitations resulted when operators used profiling equipment outside its specifications.

The researchers reviewed use of laser profiling and video inspection equipment according to FDOT standards, in other U.S. states, and in several other countries. Interviews were conducted with state departments of transportation for all 50 states, Puerto Rico, and the District of Columbia, focusing on requirements for and methods of inspection. The research team both hosted and participated in courses in the Pipeline Assessment and Certification Program offered by the National Association of Sewer Service Companies.



One type of laser profiling projects a ring of light onto the interior of a pipe. Notice the depression at the top of what was originally a perfectly round pipe.

Two exams were written based on project investigations and FDOT standards. A field exam was developed, and the researchers worked with FDOT to define exam content and select a location for the test facility. The field exam requires space for full-scale pipes and access for delivery of pipes. Once the location was set, the researchers worked with FDOT staff to create the field test facility. Feedback from the written test and use of the field test facility revealed strengths and limitations to be addressed in the future.

In this project, UF researchers and FDOT took an important first step in developing a certification program for laser profiling operators in Florida. More accurate inspections can lead to early detection of problems, preventing traffic interruptions and more costly maintenance.

Project Manager: Larry Ritchie, FDOT Construction Office
Principal Investigator: Ed Minchin, University of Florida
For more information, visit http://www.dot.state.fl.us/research-center