1-1-2007

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DOI: 10.5703/1288284315811

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Recommended Citation

ECT Team, Purdue, "Sewer Scanner and Evaluation Technology (SSET)" (2007). *ECT Fact Sheets*. Paper 102.
<http://dx.doi.org/10.5703/1288284315811>

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SEWER SCANNER AND EVALUATION TECHNOLOGY (SSET)

THE NEED

The investment in sanitary sewer collection system represent a major component of \$20 trillion of U.S. investment in civil infrastructure systems. Many of the sewer systems are eroding and needs proactive sewer management system to collect data and assess the condition of these systems. Closed Circuit Television (CCTV) has been a traditional technique utilized for inspecting the inside of sewer pipe lines. While the technology of CCTV has advanced, such as the enhancement on color image, articulating pan and tilt camera heads, the basic process and result have remained unchanged. Yet this technique still has two basic weaknesses: it relies too heavily on the judgment of the field technicians in identifying and classifying defects, and it is hard to estimate the productivity since the time required to inspect a line is variable depending on the number and degree of deterioration of the defects.

FIGURE 1 SSET PROBE UTILIZES A FISH-EYE LENS AND A FIBER OPTIC GYROSCOPE

FIGURE 2 OUTPUT FROM SSET UNIT

THE TECHNOLOGY

Sewer Scanner and Evaluation Technology (SSET) will overcome these weaknesses and provide the engineer with more and higher quality information for rehabilitation

decision making process by utilizing optical scanner and gyroscope technology. By using a fisheye camera lens to observe the pipeline in the forward direction and at near right angles to the camera's direction of travel, the information collected by SSET will provide the engineer with the ability to see the total surface of the pipe from one end to the other.

The scanned images is digitized for generation of color-coded computer images. Defects are illustrated by a designated color code. A written description of each defect is produced at the appropriate location along the pipeline. SSET will work on any type of pipe from 8" to 18".

SSET provides the following information:

- A digitized, forward-looking view
- A full-circumference scanned image of the pipe for the total length
- A color-coded computer printout of the defects
- A written description of defects at each location along the pipe
- Horizontal pipe deflections
- Vertical pipe deflections
- Statistical data

FIGURE 3 SCANNED IMAGE ANALYSIS DETECTS JOINT, CORROSION AND LATERAL

The latest model of this system has two major component, a fish-eye optical scanner and a three-axis mechanical or fiber optic gyroscope. The machine has a diameter of 4.25 in (110 mm) and a length of 33.5 in (850 mm) and weighs 33 lbs. (15 kg). The system can travel through pipe at a uniform speed and can produce the mean daily production rates of up to 5,000 ft (1,500 m) per day.

Other component of the system consist of the necessary cable, control box, and monitors for forward looking and unfolded scanned view. The control box collects all data that will be transferred to a central data processing location where it is processed, checked, printed and developed into a professional report.

THE BENEFITS

- The engineer will have more and higher quality data to make critical rehabilitation decision.
- Defects can be magnified to provide a closer look.
- Better documentation of the condition of the pipe is provided.
- Horizontal and vertical pipe deflections are measured and illustrated graphically.
- Field work is expedited because the technician is not required to assess the defects.
- The defects can be color coded for better illustration and analysis.
- Statistical data can be generated on the defects.
- All of the information is available in addition to the frontal view.
- The total evaluation process is more cost effective.

STATUS

SSET was initially developed by Japan-based Toa Grout, Core Corp. and the Tokyo Metropolitan Government's Sewer Service (TGS) in 1994, and was introduced to North American market in 1997 as a part of the Civil Engineering Research Foundation (CERF) evaluation program which consists of 13 municipalities. The field trials have been done successfully over a year and covered 126,612 ft of sewer inspection in 13 participant cities.

Recently, a 19,000 feet sewer evaluation project for City of Atlanta and a project for Eastman Chemical Company, Tennessee, have been completed. Iseley Enterprises, Inc. has the commercial rights for North America region.

BARRIERS

- Fogging and Staining of the scanner lens can occur during the inspection along the pipeline, and for larger diameter of pipe more light intensity is needed.

POINTS OF CONTACT

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REVIEWERS

Peer reviewed as an emerging construction technology

DISCLAIMER

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PUBLISHER

Emerging Construction Technologies, Division of Construction Engineering and Management, Purdue University, West Lafayette, Indiana