

VIDEO INSPECTION DETERMINE INTERNAL PIPELINE CONDITIONS

The laser video inspection is designed to provide the contractor, owner, or consulting engineer with the ability to determine internal pipeline conditions after the initial installation.

inside of a pipe. A robot travels down the pipe finding the profile in real time using a laser and a camera. The laser is used to draw a line around the edge of the pipe; this line is then extracted from acquired images using recursive Gaussian filtering.

video camera technology. During the inspection process, an electronic unit transports the technology ahead as it collects information.

The concept - simple and easy:

- A ring of laser light is projected onto the internal pipe surface
- The laser image is in the field of view of the camera while the camera moves through the pipe
- Analysis is performed on the ring of light using the Laser Video software to build a digital pipe profile



Typical Inspection Camera with Crawler

The Laser Profiler is a stand-alone tool for use with a closed circuit television video (CCTV) survey system to collect survey data and create pipeline reports using innovative machine vision software to obtain the measurements of faults and features inside the pipeline. This includes measurements of pipe size, water levels, cracking, and hydraulic capacity.

Analysis of pipe ovality is available showing pipe distortion such as crown flattening and vertical and horizontal deflection up to 30 times per second. The Pipeline Video laser tool uses a laser to build a 3D model of the

Three methods were examined for fitting a circle to the profile, two variations of the Hough transform and a random sampling method. The random sampling method was found to be the most flexible and efficient. The extracted profile points were used to construct a 3D model of a pipe section. This model can be viewed using a model viewer written using OpenGL. Results are presented showing the system to be effective and robust.

The Laser Circle Viewer Technology is developed for commercial use of pipe inspection in combination with



Deep Well Rotation Unit

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BackEye Camera



Camera Head

Video Laser Benefits:

- Real time and accurate measuring of the internal pipe wall circumference
- Geometric changes, IE corrosion is easily discovered
- Defects and other foreign body size can be detected
- Easily adaptable to different pipe sizes
- Can be used in liquid-filled pipes, this will also increase visibility in contaminated fluids
- Comprehensible, and easily understood variance presentation
- Good quality control, easy to evaluate inspection and digital storage of information.

Range of use:

- Internal diameter measurement
- Point out and measure foreign objects, and defects
- Point out and measure

- burnouts in connection with welding*
- Point out and measure damages to concrete lining
- Point out and measure ovality
- Point out and measure corrosion

Several studies demonstrate the difficulties in achieving a problem free installation of HDPE pipe and that the pipe does not always perform in accordance with theory. It also brings into question the long-term properties of the HDPE material and current material tests used to verify future performance. These problems are an indicator of future failure.

Studies such as the Kentucky and Ohio DOT projects clearly show the benefits of using Laser-Video testing to ensure the proper installation and performance of the pipe installed on their projects.

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