

## Cased Pipe Inspection via Vents

**Description:** A tethered camera for cased pipe inspection using vent pipes

**Status:** A feasibility study is underway to determine the viability of envisioned concepts.

### BENEFITS

This program is developing a system which helps operators meet ECDA or ICDA requirements under the rules of the Pipeline Hazardous Materials Safety Association (PHMSA). Video inspection through casing vent pipes will help prioritize casings for further inspection with other technologies. Excavations will be significantly minimized by using this technology as the first step in the inspection process. Additionally, the preliminary inspections enabled with this technology are not weather dependent and may be performed by one person, allowing year round pre-inspections.

### BACKGROUND

The 2002 DOT/OPS Pipeline Integrity ruling requires integrity assessment of pipes in high consequence areas without exception to special areas such as cased crossings. NYSEARCH and NGA members have evaluated an assortment of inspection options with initial focus on guided wave ultrasonic inspection technologies. While guided wave has made significant advances, tests have shown that improvements are required. Therefore, NYSEARCH has been evaluating and developing technologies addressing the issue and filling technology gaps. A suite of options can enable pipeline integrity engineers to judge the integrity of cased sections through the use of a combination of tools and technologies.

Early attempts of casing inspections with pushrod-mounted cameras yielded limited success due to inadequate positioning of the camera and insufficient inspection distances. Additionally, they required excavation for removal of the casing end seals. Such activities

inspired NYSEARCH and ULC Robotics to develop a tethered robot with a video camera and dedicated sensors designed for inspections via the annular space of a cased pipe. While this approach continues to be valuable and attractive, a pre-inspection for feasibility of inspection is also desired by some members. Pre-inspections and subsequent use of the casing robot require excavation and removal of the casing end seal. Integrity engineers have suggested that even a limited robotic video inspection via the casing vent pipe (Figures 1 and 1a) could help prioritize the casings for further inspection with other technologies.



Figure 1: Urban-Style Cased Pipe Casing Vent

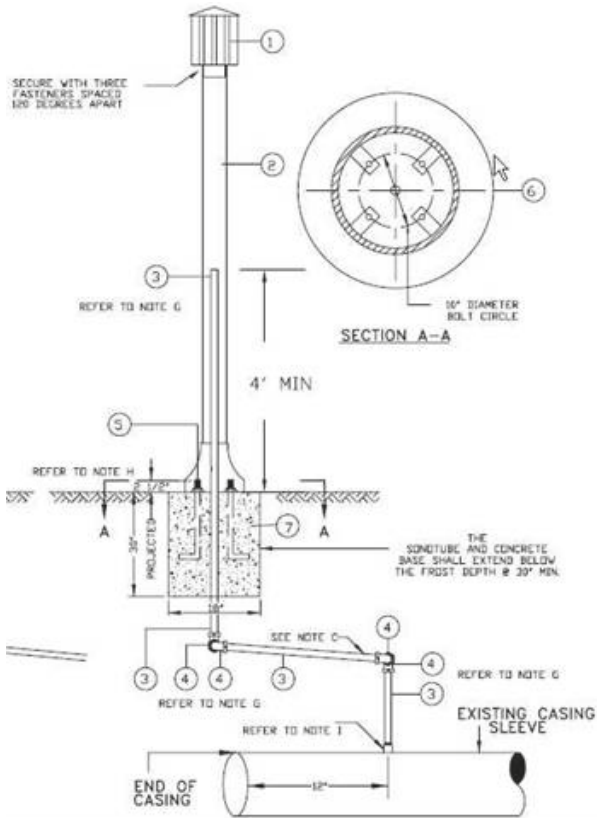


Figure 1a: Drawing of a Typical Cased Pipe Casing Vent

## TECHNICAL APPROACH

Honeybee Robotics is working with NYSEARCH to retrofit commercially available video inspection tools to allow cased pipe

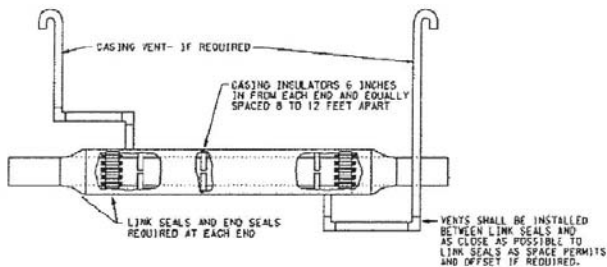


Figure 2: Drawing of a General Cased Pipe Design having Casing Vents

inspection using vent pipes. Standard cased pipe configurations (Figure 2) will define the specifications of the new tool. Mobility enhancements will allow the inspector to propel a video camera past pipe fittings and casing spacers (Figure 2a) with directional control. The project has begun with a feasibility study on a vent/cased pipe test apparatus. The development of a prototype and live field testing will follow if the feasibility study yields positive results.

## PROGRAM STATUS

The feasibility study is underway to test concepts for accessing the annular space through a casing vent. The study examines mobility enhancement concepts that enable the propulsion of the video camera. Maneuverability of the camera through pipe fittings encountered in typical vent pipe configurations and past casing spacers is also being tested.



Figure 2a: Modern Casing Spacer

## Highlights

- Video inspection without excavation
- Inspections independent of weather conditions
- Prioritization of cased pipe for further inspections with other technologies

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