

Investigate the Effects Internal Inspection Tools on PE Pipe

Description: To study the potential effects on internal PE pipe surfaces, if any, when using internal inspection devices.

Status: Plans developed and test activities underway.

BENEFITS

In the gas industry there are a growing number of tools and inspection devices that are being applied to internally inspect pipelines. As a result of these inspections and the wide use of PE pipe materials, there is concern (but no documented evidence) that these devices could potentially leave scratches/gouges behind that may impact the integrity of the pipe. With a better understanding of whether scratch/gouge defects are created, the industry can not only assume continued safety, but it can also define limits of acceptability and develop an industry guideline for gas operators.

BACKGROUND

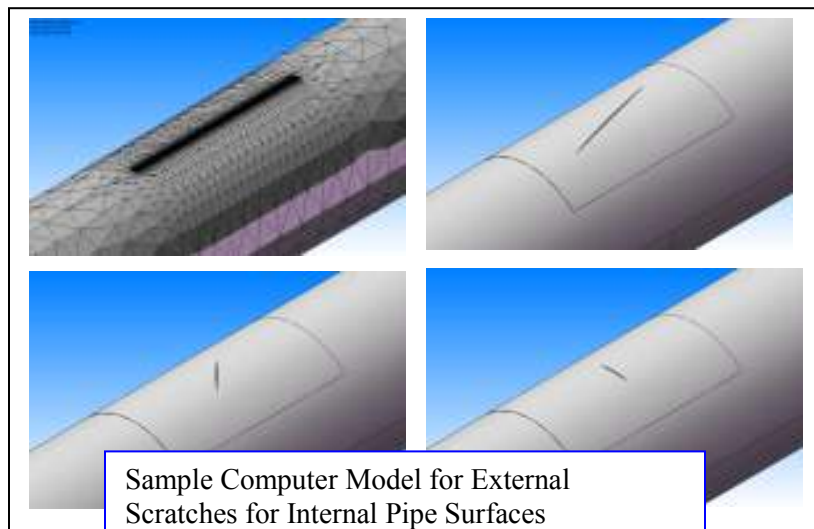
NYSEARCH member companies are planning to utilize *Explorer I* and *Explorer II* inspection robots in their buried underground gas distribution systems. In addition to these tools, there are also other tools that may present internal scratching concern such as line pigs and internal inspection cameras. While steel piping systems are the higher priority application for these inspection tools, there are instances where sections of plastic piping are intermingled within the steel network.

affect the long term performance of plastic pipe

TECHNICAL APPROACH

There are two main objectives to the study: 1) to develop an in-depth, technical understanding of the potential for an impact of internal scratches on PE pipe materials on the basis of comprehensive testing and evaluation, and, 2) to recommend improved design specifications and inspection targets (i.e., critical scratch depths) for internal inspection devices to minimize, if not eliminate, the risk of detrimental scratching in plastic pipe. Two contractors have been selected for this program: TEJ Group and ULC Robotics. TEJ Group will provide the computer modeling and lab testing. ULC Robotics will operate and test the internal inspection tools through special pipe test runs designed by NYSEARCH.

The evaluation of potential sharp-tipped scratches and



their potential to grow over time by slow crack growth (SCG) requires the use of the technology of fracture mechanics. Therefore the program is designed to investigate the impact of internal scratches with respect to the long term PE pipe for various vintage materials. Computer modeling and the latest in finite element techniques will be applied, in addition to extensive experimentation/lab testing.

To obtain a better understanding of the impact of these inspection devices on internal pipe surfaces, actual 6" PE pipe specimens are being prepared by ULC Robotics. The design of the pipe runs are intended to replicate worse case conditions including a 20 D deflection, an offset and pipe debris. The inspection tools that are being operated by ULC will be pulled or blown through the pipe. The pipe sections will be visually examined and any defects found will be removed and sent to TEJ Group for further analysis and lab testing.

On the basis of the analytical modeling results and the actual empirical testing to simulate internal scratches, the results may ultimately demonstrate that additional work may not be necessary since the extent of the internal scratches may be well within performance requirements for PE materials.

At the conclusion of the program, a final report will be issued to summarize the technical details with respect to all facets of the program and a gouge/scratch guideline for a variety of PE materials, diameters and wall thicknesses.

PROJECT STATUS

The project has been initiated and it includes early stages of computer modeling. Pipe run materials are being acquired from member companies and are being readied for testing.

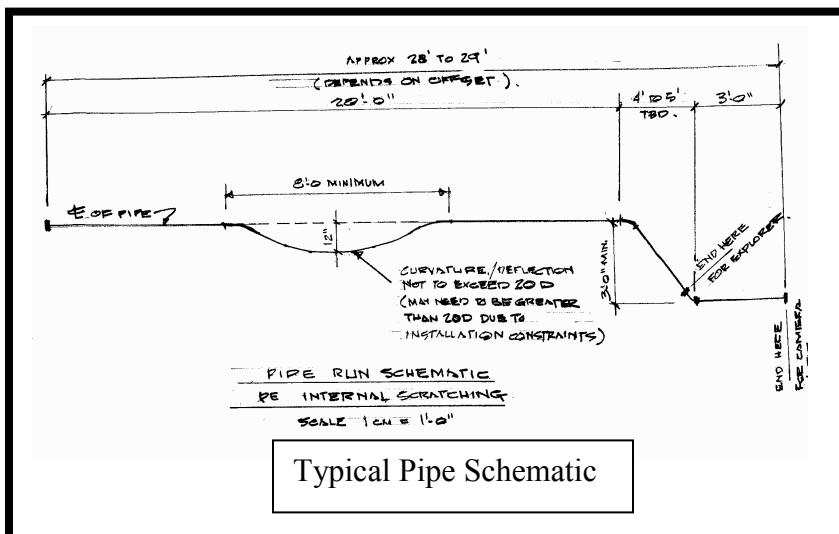
Highlights

- Characterize inspection tool defects on the internal surface of 6"-DR 11 medium density and high density PE pipe.
- Define internal stresses in relation to well-known scratching on external surfaces.
- Identify shape and size of the scratches and gouges.
- Establish threshold limits of detection where needed.

FOR ADDITIONAL INFORMATION

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Typical Pipe Schematic