

# HARVEST INNOVATIONS FOR INTEGRATED PIPE REHABILITATION

DIAGNOSTICS, APPLICATION AND EVALUATION  
— A DEEP DIVE INTO PIPE RELINING.

*By Tom Bowman*

**F**rom ice pigging of water mains, water jetting of sewer lines to the advanced and complex multi-step pipe relining technologies, the pipe rehabilitation industry has come a long way.

Today, there are technologies for almost every type of piping system — pressurized and non-pressurized, plumbing and mechanical — utilized in homes and businesses, commercial and industrial facilities and even cruise ships and navy vessels. The need to remediate piping infrastructure worldwide grows only stronger as piping systems all around continue to age and deteriorate.

## THE MANY REHAB OPTIONS

For non-pressurized pipes (pressurized pipe will be discussed in another issue), the common rehabilitation

methods include cured-in-place pipe, close-fit lining, sliplining, mechanical spot repair, pipe bursting, spiral wound lining and spray lining.

After the diagnostic assessment and a well-strategized rehabilitation plan, contractors will have chosen the most suitable pipe-lining method (learn more from the podcast on how to determine the relining technology). This article will zoom in on CIPP in particular.

To implement CIPP, the pipe will go through the appropriate cleaning method, often involving rotational cutting heads, chain flails or hydro jetting (again, based on the diagnostic data).

Then a resin-impregnated felt tube, which could be made of polyester, fiberglass cloth or a few other flexible materials, is inserted or pulled into a degraded pipe sys-



tem. After curing, the new pipe will form and perform within the existing pipe. But the process is not yet complete for reinstatement until a comprehensive camera inspection is conducted to verify the final result. Field samples are often taken and sent for third party analysis.

The lining resin used for CIPP is a critical component. Epoxy is simply one type of resin. Other resins include polyester, vinyl ester and silica resins. In my pipe rehabilitation experience, the use of epoxy and its ability to not shrink over time, its properties of a higher strength with the same thickness and potential chemical bonds with certain pipe types are unique advantages.

### WHY CIPP

The growth of CIPP is largely attributed to CIPP's versatility and non-disruptive nature. It's capable of lining a wide range of pipes including non-circular pipes, pipes with bends, offsets and misaligned joints.

CIPP is also able to be deployed through existing access points, which eliminates the need of additional excavation. It can be especially cost effective for small-diameter pipes, a reason why it is often a go-to for remediating small-diameter pipe systems inside and outside buildings.



Seen here are holistic and high-quality lining equipment that ensure relining success, Nu Flow states. *Photo courtesy: Nu Flow*

Given CIPP's wide applicability — and thanks to emerging innovations and specialization for the multi-stage pipeline rehabilitation — this article will further explore an integrated approach to relining non-pressurized pipes with CIPP.

The integrated and systematic approach should incorporate pipeline diagnostics for choosing the right type of rehabilitation technology/method and after the rehabilitation is complete, a verification needs to follow through.

### PIPE DIAGNOSTICS

Pipe relining is cost-effective for asset owners and profit-friendly for the installing parties, but it requires due

diligence. Therefore, evaluating and understanding the current condition of the piping systems beforehand is foundational for choosing the right relining option, optimizing costs and reducing rehabilitation-related loss.

A combination of the tests listed below is a comprehensive way of quantitatively and qualitatively diagnosing the reasons for pipe problems such as slow / stopped drainage, leaks or seepage, internal / external corrosion, etc.

- Non-destructive testing (NDT)
- Closed circuit televising (CCTV)
- Dye testing
- Hydrostatic / pressure testing
- Infrared thermography (IRT)
- Laser profile testing
- Pipe mapping and locating
- Smoke testing
- Ultrasonic testing (UT)
- Visual inspection
- Water chemistry / quality / temperature testing (effluent)

## WHAT TO ASK

When considering adding any relining options into a toolbox, or choosing relining services to move forward,

an in-depth consultation with a variety of manufacturers as well as getting to know the people and culture behind the products and the technologies are critical.

Here are a few important questions to ask:

- 1) What are the roles of the support team?
- 2) What is the experience of the support team?
- 3) Is the company able to support growth inside the industry and most importantly with your company?
- 4) What are the extra added benefits of working with the company in terms of operations, estimating, marketing, sales, etc.?
- 5) Does the manufacturer have strict quality-assurance and quality-control standards?
- 6) Is the production plant ISO 9001:2015 certified? **RJ 2.0**

*Tom Bowman has been a licensed plumber for nearly 20 years. His career in the pipelining industry started as an apprentice plumber with the Illinois Department of Public Health – Plumbing Program to establish cured-in-place pipe lining as an approved alternative to conventional replacement. He is currently the director of technology for Nu Flow Technologies (2000) a position he has held for more than 6 years. Readers can reach Bowman at [tbowman@nuflowtech.com](mailto:tbowman@nuflowtech.com).*