



The Engineer is The Gate Keeper to Quality and Long-Term Performance

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CIPP REHABILITATION

- Since 1971 thousands of miles of sewer rehabilitated with CIPP
- 740,000 miles of main sewer pipes
- 500,000 miles of lateral pipes
- We haven't scratched the surface
- A 50-year-old industry; but what about our best practices?
- Are we really achieving best results?



CURED-IN-PLACE-PIPE



FROM THE EARLY DAYS

- CIPP initially driven by structural repairs & roots
- Cities began to spend more dollars on CIPP as I/I reduction became more important
- But in many cases the reduction of I/I was insignificant





LATERAL LINING THE NEXT BIG THING IN CIPP

Lateral CIPP is a vital part of sewer rehabilitation today



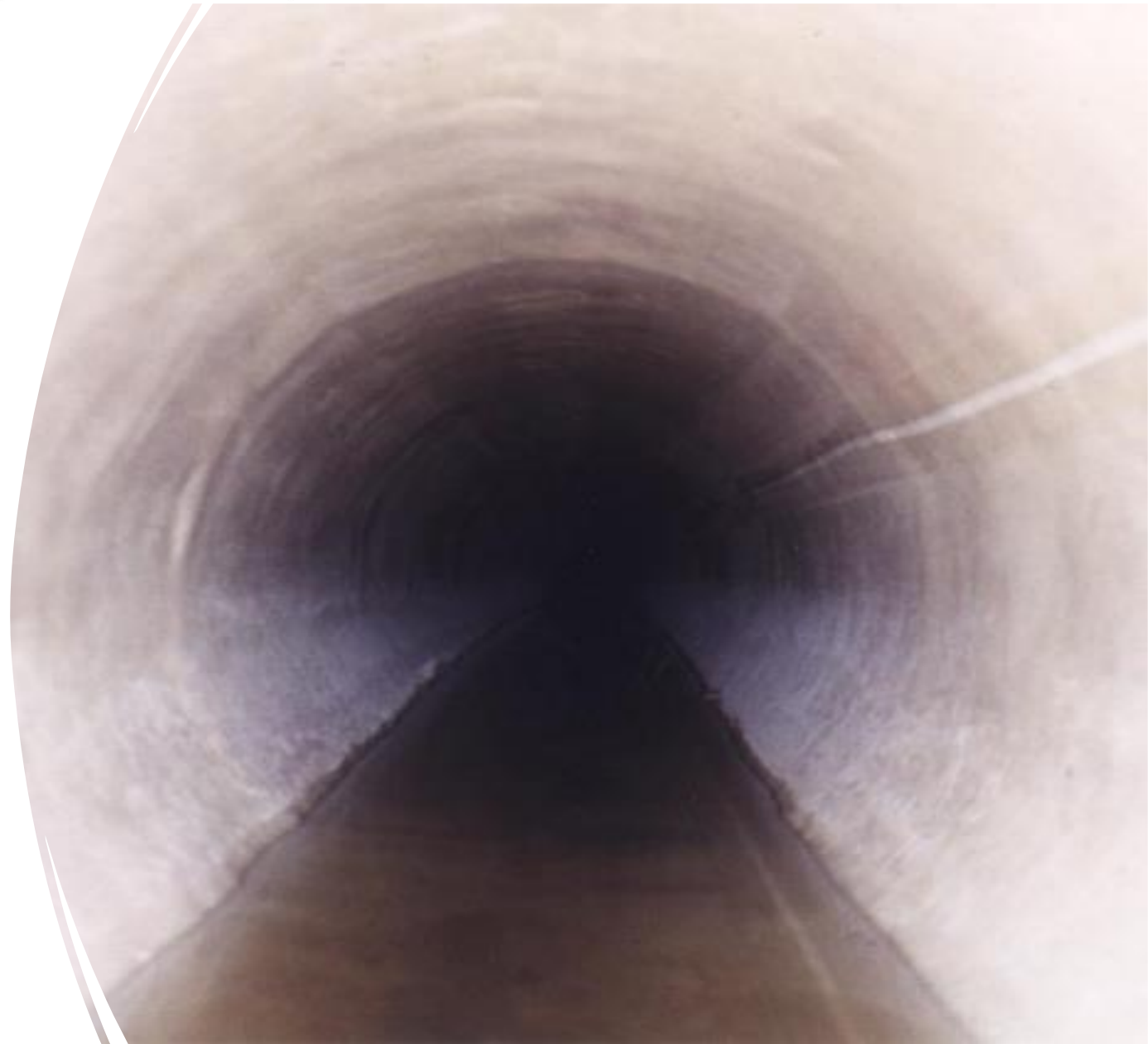
- ASTM F2561
- CIPP Gasket Lateral Liner End
- CIPP Connection is gasket sealed
- ASTM F3240 CIPP gasket sealing



“SYSTEM” REHABILITATION

Today, most cities are addressing the entire system

- Main CIPP
- Lateral CIPP
- Cleanouts
- Manholes/Pump Stations
- Pipe inspection, cleaning, descaling, grouting, point repairs, well pointing, MOT...





TECHNICAL SPECIFICATIONS

Most project specifications fail to specify best practices

- Utility Owner does not receive best results
- Hit the mark for quality?
- Necessary steps to protect the public?





CIPP IS THE ONLY PIPE MANUFACTURED UNDERGROUND

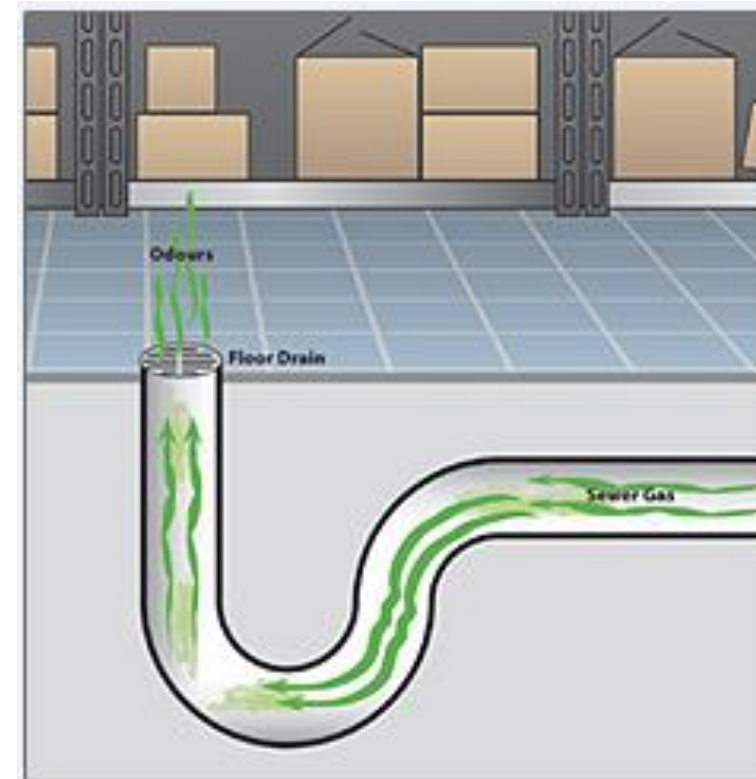
- CIPP is the only pipe manufactured where sewage can mix with the pipe.
- In the case of CIPP it is the thermosetting resin.





SPECIFICATIONS FAIL TO ADDRESS

- Most sewer rehab projects fail to take steps to prevent sewage flow during CIPP
- Most municipal projects fail to take steps to protect residents from CIPP emissions entering a home or business
- Industry Standards are being developed that addresses these issues
- The Medical Clinic





Every public works project should take appropriate steps to protect the public and require high-quality

The solution can be found in the engineers' technical specifications

- The specifications must address a proper sequence of order
- Require compliance with industry standards
- Require stopping all system flows during CIPP
- Hold contractors accountable for defective work such as blisters, delaminating coating, lifts, patches, and leakage



PROPER SEQUENCE OF ORDER

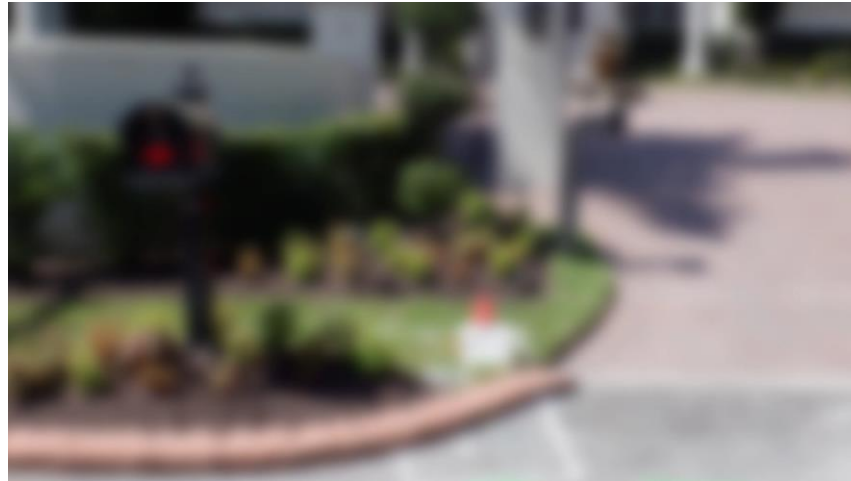
Residents receive a written notice

- ✓ describes the upcoming sewer work
- ✓ the date the work is scheduled
- ✓ a request to not use any water on the day the CIPP work is scheduled





NEXT - INSPECTION LOCATING MARKING





NEXT – MUNICIPAL CLEANOUT

The municipal cleanout is set in the public ROW. It is essential that cleanouts are installed prior to any CIPP pipe installations (mains or lateral). This requirement sets the stage for a safe-high-quality project.



ASTM F3097 Minimally Invasive Cleanout In Sidewalk



NEXT – THE PIPE IS PREPPED

Before any CIPP (main or lateral) is installed, all system flows must be stopped.

- ✓ The main pipe shall be plugged
- ✓ Each service pipe is then plugged by placing a plug on the upstream side of the cleanout.





NEXT – PLUG EACH CLEANOUT

Special cleanout plugs have been developed that allows for fast and simple placement and provides bypass options.

- ✓ rehabilitation and maintain service
- ✓ protects homeowner



Figure 4 Cleanout Pump-through Plug



BENNEFITS FOR TAKING SYSTEM OUT OF SERVICE

Taking the system out of service before any CIPP is installed offers many benefits. These may include:

- ✓ Prevent sewage from mixing with the resin saturated liner
- ✓ Prevent head of sewage in contact with the liner
- ✓ Ability to assist in identifying connections for robotic reinstatement
- ✓ Ability to reinstate a service connection from the cleanout
- ✓ Prevents CIPP gasses/odors migrating into homes or businesses



A LICENSE TO STEAL

How can a specification set the stage

- If a cheap low-quality product is bid as an equal to a high-quality product that cost more,
- The low-quality product raises its price just under the high-quality product,
- Rate payers get a low-quality product at a higher price than normal,
- The cheap product doesn't last as long or perform as good,
- It is a license to steal.



THE ENGINEER IS THE GATE KEEPER

It is the specifying engineer's technical specifications and trained inspectors that control the overall project quality.



Quality Cured CIPP



Blistered CIPP



UNDERGROUND CONSTRUCTION TECHNOLOGY

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THANK YOU