Is Same-Day Watermain Rehabilitation Possible?

Randall J. Cooper, P.Eng.

Dr. Mark Knight, P.Eng.

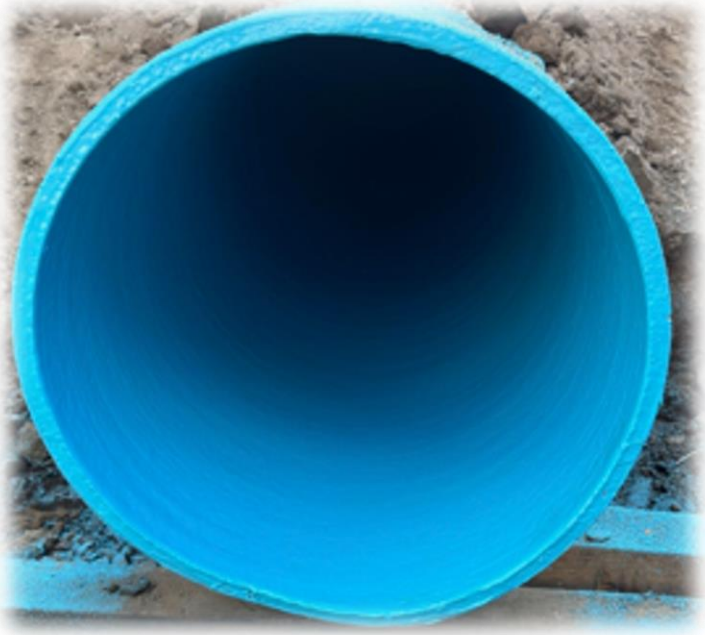
SIPP AMERICAS

www.sippamericas.com

Presentation Outline:

- ❑ What is Same-Day Return to Service (SDRTS)?
- ❑ What is the business case?
- ❑ How is it delivered?
- ❑ Background for SDRTS
- ❑ Key project variables
- ❑ Case study: How to get it right
- ❑ Future forward

What is same-day return to service for watermain rehabilitation?



It is the **removal and restoration** of drinking water service on the same day that the rehabilitation work is started.

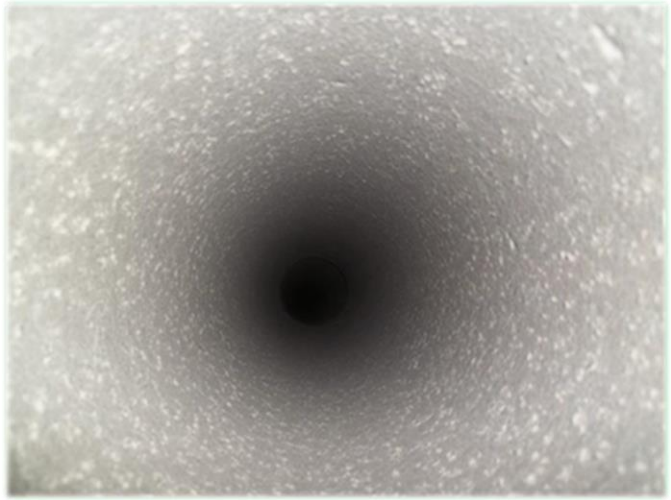
The Case for Same Day Return to Service (SDRTS):

- Minimizes water service disruptions (Happier Customers)
- Eliminates need for temporary water supply
- Much faster project completion
- Cost savings (of 35% - 40% for temporary water supply)
- Minimizes disruptions (traffic, neighborhood, businesses)
- Design flexibility (AWWA Classes I thru III & IV equivalency)

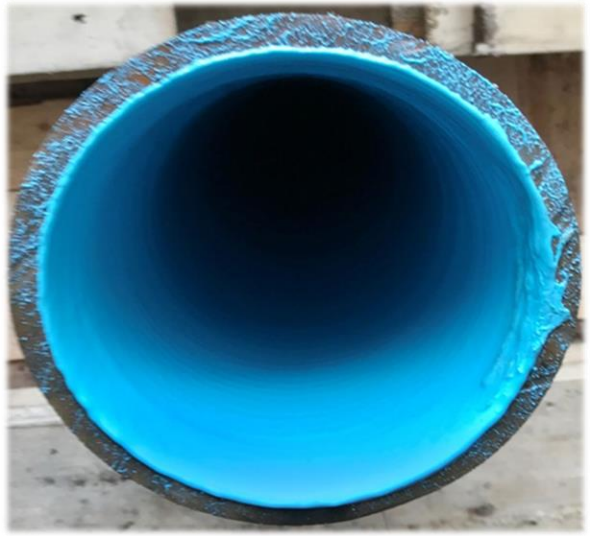
How is SDRTS delivered? Using Spray-In-Place Pipe (SIPP)

The SIPP Lining Process Summary for Same-Day

Before

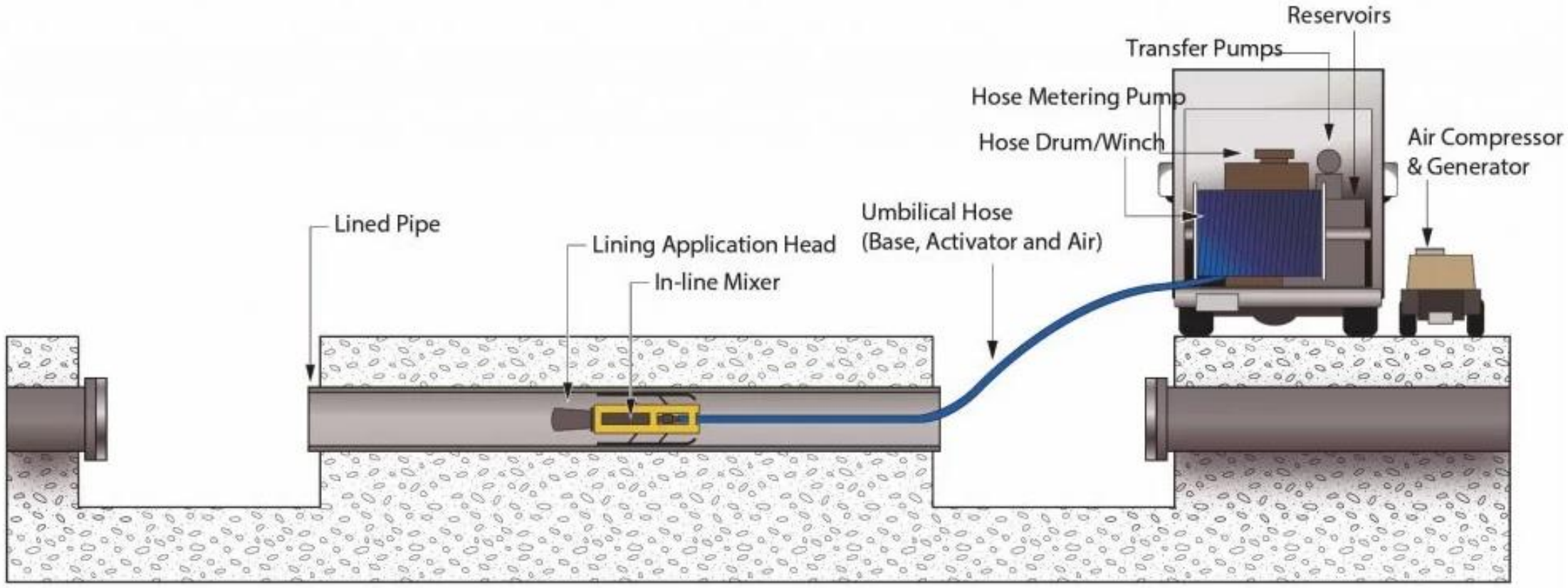


Cleaning, drying,
& surface prep



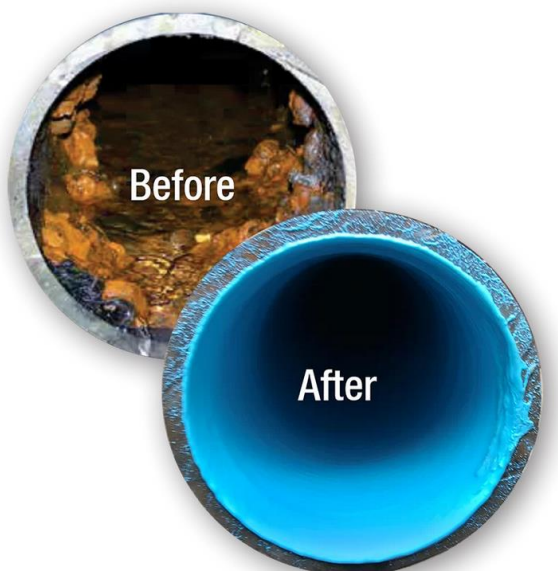
After

Anatomy of SIPP Lining



Background for Same-Day Return to Service (SDRTS):

- Epoxy resins (NSF 61 approved) were first used in the UK in the 1970s as a replacement for cement mortar lining.
- 16-hour cure times required multiple days for completion of rehabilitation.
- Introduction of rapid-setting polymeric resins (polyurethanes and polyureas) first trialed in UK in 1999 were game changers for faster cure and expanded capabilities.
- The first report of successful same-day return to service in the US was in Sandwich, MA in 2002 using spray-in-place pipe technology (SIPP).
- Same–Day has **since** been achieved **inconsistently,** largely due to the project variables that must be (but are seldom) **diligently** addressed.



What are the key project variables for Same-Day Success?

- Project Pre-planning
- Site Preparation and Excavation
- Lining Material Selection
- Equipment Selection
- Contractor Selection

Project Pre-planning – It all starts with the team!

All participants have to be 100% on board with clear understanding of the objective and their responsibilities to get there.

Project Pre-planning – Gathering Knowledge

- Pipe material, age, linings, layout, appurtenances
- Failure modes/history (breaks, leaks)
- Past repair records (photos)
- Soil types, corrosivity
- Location of other utilities
- Hydrant or C-Factor tests
- Water Table, Water Quality
- Design/spec requirements

Site Preparation & Excavation

- Locates and site walk
- Job safety plan & hazard assessment
- Traffic plan & controlled site access
- Lock–out and thrust blocking
- Shoring & pit requirements
- Valves and service - shut-offs **tested/repaired**
- Contingencies (water supply, buried anomalies)

Lining Material Selection

- Must be potable-water approved (NSF/ANSI/CAN 61)
- Must be rapid-setting polymer (fast return to service)
- High-build capability to meet design requirements
- Moisture tolerance (it’s a water pipe!)
- Low exotherm (no shrinkage during cure)
- High wet and dry strength properties
- Excellent adhesion to host pipe
- Full design compliance (tech data sheet review)

Equipment Selection

- All equipment must be selected and integrated to achieve SDRTS.
- It must be calibrated and potable-water ready (not wastewater).
- Cleaning equipment should deliver dry, prepared surface for bond.
- Lining rig must be certified & matched with rapid-setting polymer.
- Inspection technology should be capable of rapid deployment with HD resolution.
- Service reinstatement technology must be capable rapid, remote deployment.
- Disinfection equipment must enable minimum contact times prior to service reinstatement.

Contractor Selection

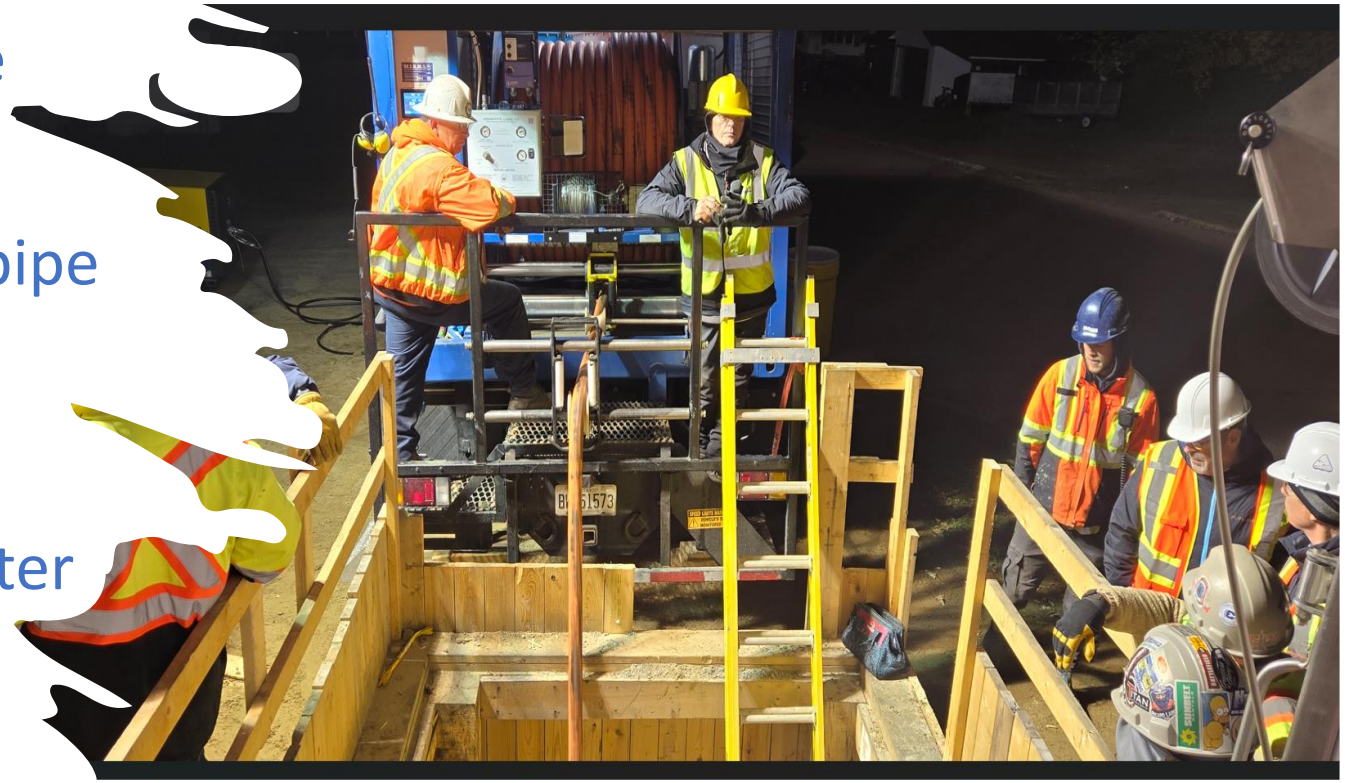
- Contractor must be experienced with potable water pressure pipe rehabilitation.
- Contractor must be certified by the material and equipment providers.
- Contractor must have a QA/QC program in place.
- Contractor must have team trained and incentivized in the delivery of SDRTS.

Cast Iron Case Study
Fall 2024 Deep River

- 6 and 8in unlined cast iron **1950s**
- **Problem**: poor water quality, some flow loss
- **History**: few leaks, minimal breaks, sand bedding
- **Objective**: to extend asset life
- Liner Design: 6in - 3mm Class III; 8in - 3mm Class II+

Case Study, Deep River, SDRTS Progression:

- 7am to 8:30am – Team brief, open pipe
- 8:30am to 12:30pm – pipe cleaned
- 12:30pm to 2pm - CCTV and vaculate pipe
- 2pm to 4:30pm – 2 x 1.5mm linings
- 4:30pm to 5:30pm - Disinfection
- 5:30pm to 7pm reconnect – no boil water



Site Preparation & Excavation:

Compact trenchless footprint with roads remaining open to local traffic.

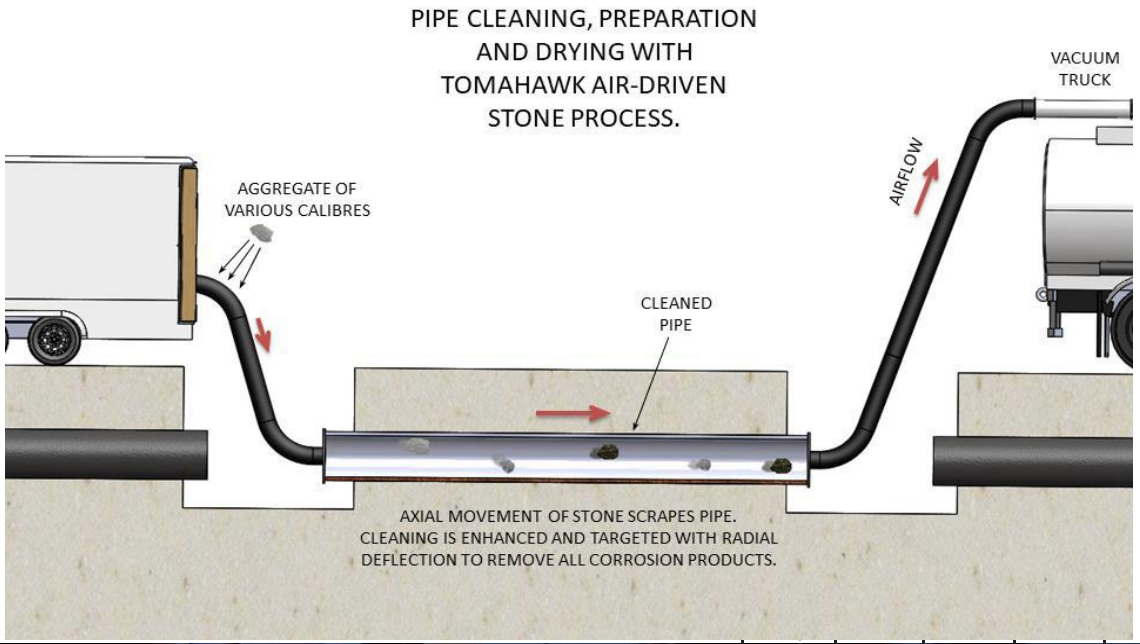
Pipe condition found:

Equipment selection: Pipe Cleaning/Prep for Adhesion

For SDRTS, speed and quality are key:

1) drag scraper **with vacuum** – to quickly remove wet encrustation;

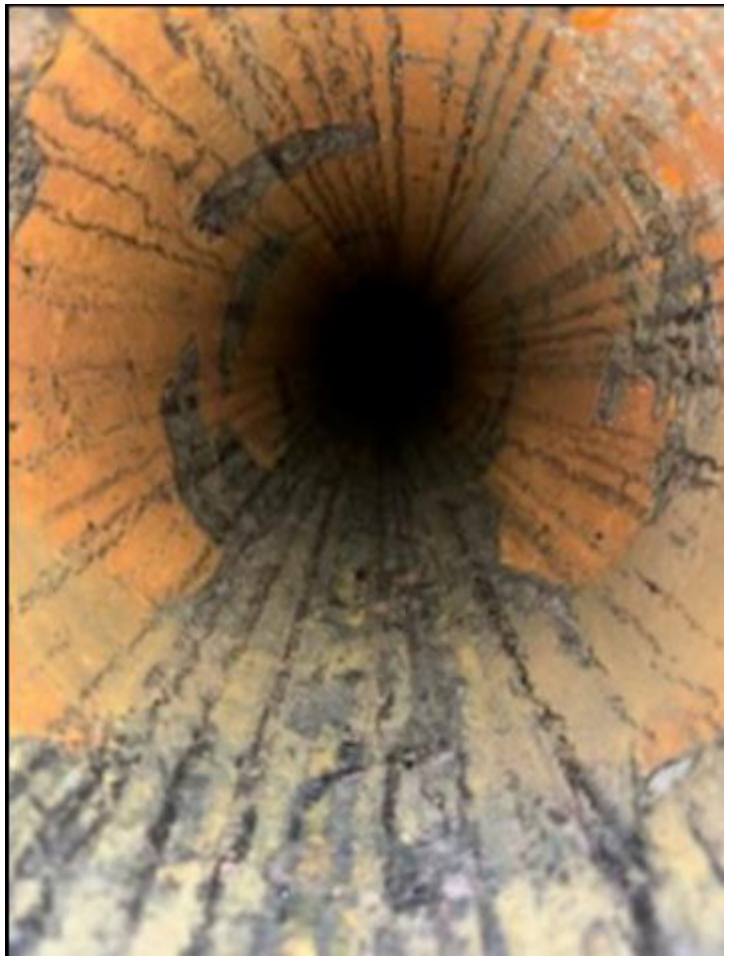
2) patented abrasive stone technology (Tomahawk) to clean, prep & dry pipe, & ensure liner adhesion.



Pipe Cleaning Stages:

9:00 am

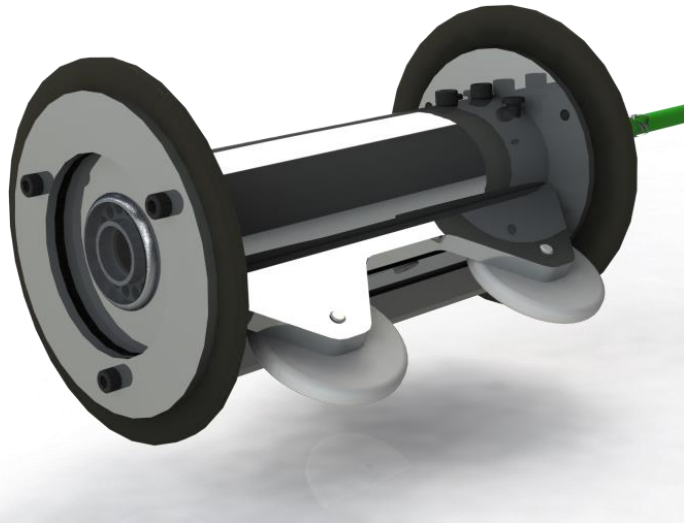
11:00 am



12:30 pm

Rapid Inspection & Assessment with Air-Powered HD Camera

- Camera is powered by low-pressure, high-speed air (supplied by vacuum truck).
- Camera travels up to five times (5x) faster than the speed of a motorized CCTV crawler.
- Technology delivers patented suction (vaculation) to clear services and joints, detect leaks, pinholes and cracks.
- Self-righting lens – camera never tips over and never has have to be retrieved for re-launch.



Material Selection - Resiline 320 (3rd Generation Polyurea)

- NSF/ANSI/CAN 61- 2018 approved.
  - up to 14mm thick in 4 to 42 in diameter pipes.
  - Moisture tolerant, aliphatic SIPP resin
- **CCTV can start 15 minutes after the lining is completed.**
- **60-minute cure time before return to service.**

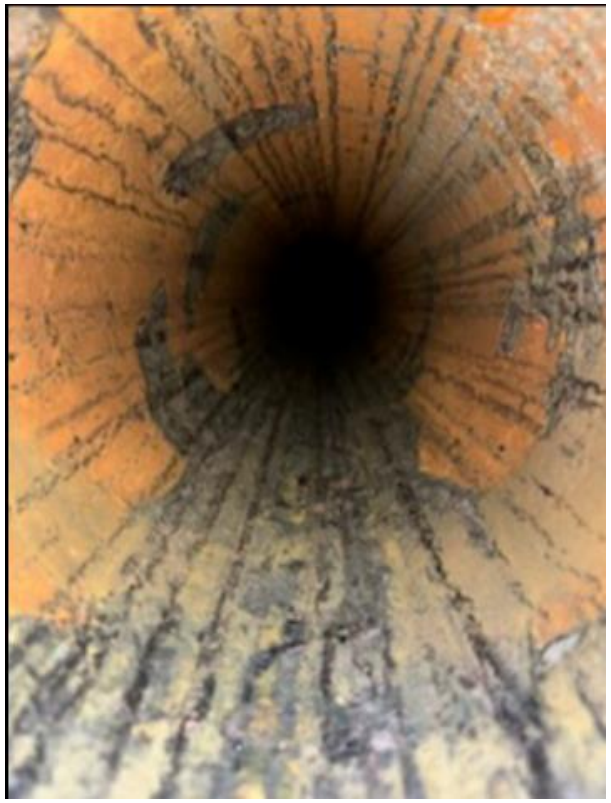
Resin Application: Computer-controlled Spray Rig

- Temperature controlled resin mixing/delivery.
- Computer-controlled resin flow.
- Computer controlled umbilical pull-back.
- Constant weight check & mix ratio checks.
- 2 x 1.5mm lining applications 2:00pm - 4:30pm.

Project Progression:

9am

11:00 am



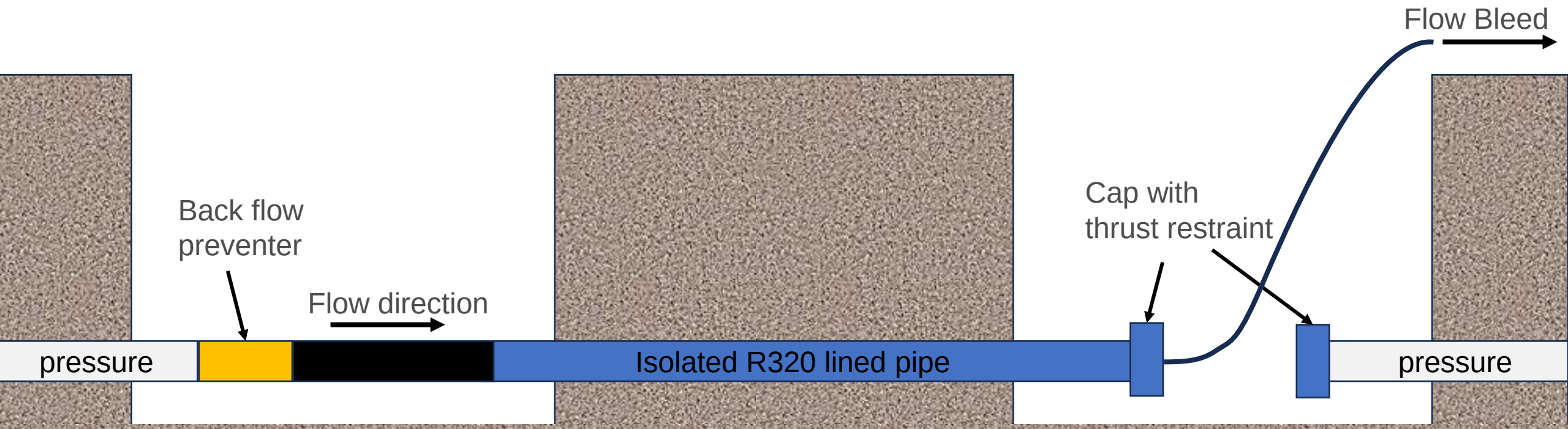
12:30 pm

4:30 pm

Computer-controlled, Pressurized Disinfection Process

- AWWA C-651 disinfection method used.
- Computer-controlled/logged pressure spray.
- High concentration soln: 200 mg/l chlorine.
- Reduced contact time to 30 minutes.
- Fill & flush to system levels of chlorine.

Fill & flush through backflow preventer. Flow dead-ended with bleed until bacterial testing results were okay. Final connections then made.



Future Forward: Is Same-Day Return consistently possible?

- Yes, the case for success can now be made.
- A team approach using advanced SIPP technology delivers Classes I – III lining designs.
- The potential time savings (weeks) and budget savings (35 – 40%) are game changers for customers & contractors.
- **Innovation in every aspect of SIPP technology & delivery enables SDRTS.**

Same-Day Watermain Rehabilitation is Possible!

Randall J. Cooper, P.Eng.

Dr. Mark Knight, P.Eng.

SIPP AMERICAS

www.sippamericas.com