

Trenchless Cured in Place Watermain Rehabilitation meeting NSF 61

Presented by

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Innovation: Cured in Place Watermain Rehab

- Minimum disruption
- NSF 61 compliance
- Over 1,000,000 lf of CIPP potable watermain installed
- Ability to preempt line breaks
- ASTM F 1743 Pull in Place Method
- 100 psi working pressure
- fifty (50) year design life



Certified to NSF/ANSI 61

Clinton Township Watermain Project Overview



- 3500 lineal feet
- 70 services
- Multiple recent pipe breaks in subdivision
- 50 year old cast iron watermain
- Tree lined streets
- Issues with water color/odor

CIPP Design Basis Review

Designation: F 1216 - 93

Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube^{1,2,3}

This standard is issued under the fixed designation F 1216; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates an editorial change since the last revision.

This practice describes the procedures for the reconstruction of pipelines and conduits (4 to 96-in. diameter) by the installation of a resin-impregnated, flexible tube which is pulled into the existing conduit by use of a hydrostatic air pressure. The resin is cured by circulating hot water or by the inversion of a calibration tube into the existing conduit and the inversion of a calibration tube into the tube. When the finished pipe will be continuous and tight-fitting, the construction process can be used in a variety of applications such as sanitary sewers, process piping, electrical conduits, and vent systems.

The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are



Designation: F 1743 - 96

Standard Practice for Rehabilitation of Existing Pipelines and Conduits by Pulled-In-Place Installation of Cured-in-Place Thermosetting Resin Pipe (CIPP)¹

This standard is issued under the fixed designation F 1743; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last revision. A number in brackets indicates an editorial change since the last revision or reappraisal.

 **LANZO**
LINING SERVICES

Engineering Design Manual
for Rehabilitation of
Cured-In-Place Pipe

This practice describes the procedures for the reconstruction of pipelines and conduits (4 to 96 in. (10 to 244 mm) diameter) by the installation of a resin-impregnated, flexible tube into an existing conduit and the inversion of a calibration tube into the existing conduit and the inversion of a calibration tube into the tube. When cured, the finished pipe will be continuous and tight-fitting. The construction process may be used in a variety of applications such as sanitary sewers, process piping, electrical conduits, and vent systems.

The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are

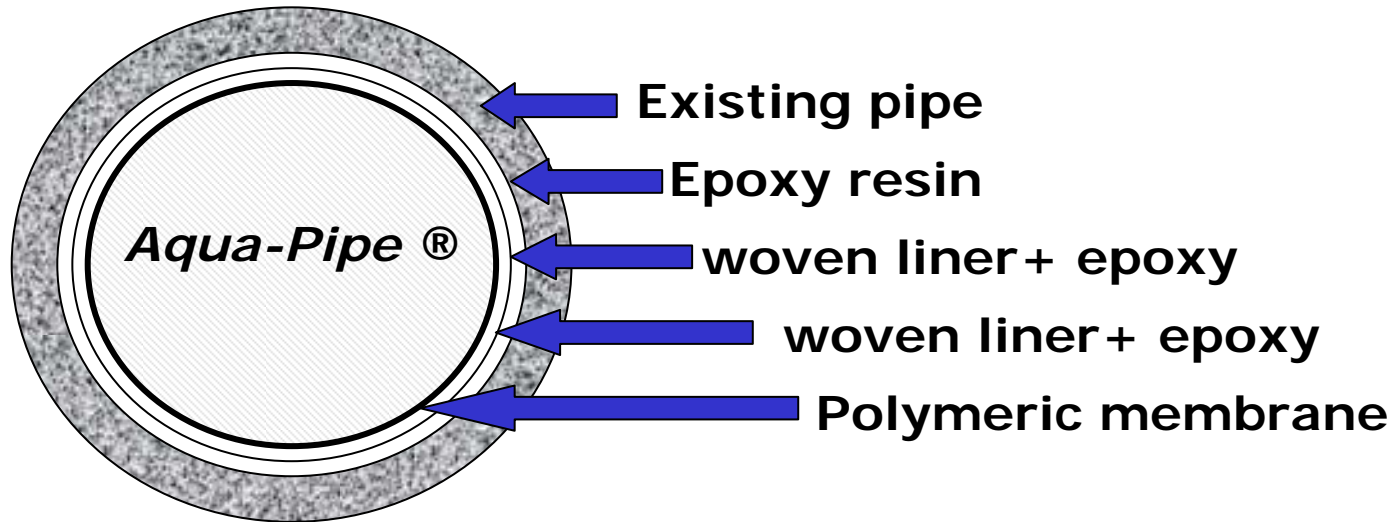
- D 4039 Test Method for Tensile Properties of Matrix Composite Materials¹
- D 3567 Practice for Determining Density of Cured Thermosetting Resin Pipe (CIPP)²
- D 4814 Specification for Automotive Engine Fuel⁷
- D 5813 Specification for Cured-in-Place Resin Sewer Pipe⁶
- F 412 Terminology Relating to Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube⁶
- 2.2 AWWA Standard: M28 Manual on Cleaning and CIP of Pipelines and Conduits
- 2.3 NASSCO Standard: Recommended Specifications for CIPP Installation

Benefits of CIPP watermain rehab



- Eliminate leakage
- Fully structural repair
- Minimal trench requirements
- Improve hydraulic capacity
- Time savings
- Reduced residential impact
- Internal pipeline reinstatements
- Maximum hydraulic radius

Water Main Renewal



Note: not to scale

Installed diameters	6 - 12 in
Installed lengths	up to 500 feet
Hazen Williams Coefficient	>120

Site specific criteria



General Installation Criteria

- 500 lf liner lengths
- Excavation pits required at each liner end
- Closure assemblies mirror utility material preference; C-900, DIP, Joint Restraints, etc.
- Temporary hydrant capacity
- Bacteriological test duration/redundancy
- Test pressure in excess of 100 psi

Pit construction / Bypass



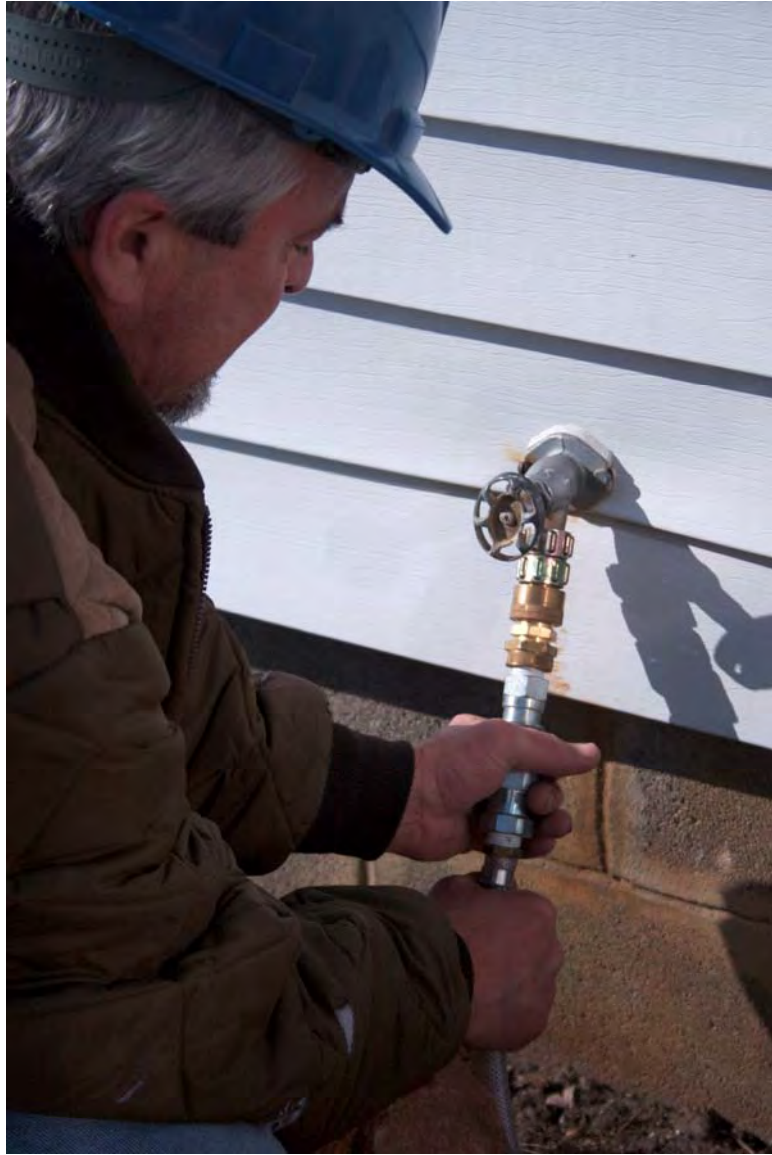
- Pits at 500 foot intervals
- Tees, 90's, dead ends, hydrants define pits
- Bypass assembled, pressurized, chlorinated, tested then connected
- Each home tied in
- Main isolated then accessed

Water Main Renewal

Install Temporary By-Pass



Connection through garden spigot



Bypass
established from
hose bibs at each
service
connection

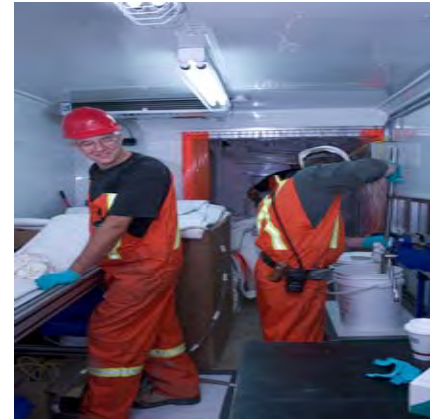
Detuberculate, rinse, televise



Internally plug corp stop prior to lining



Tube preparation and wet out



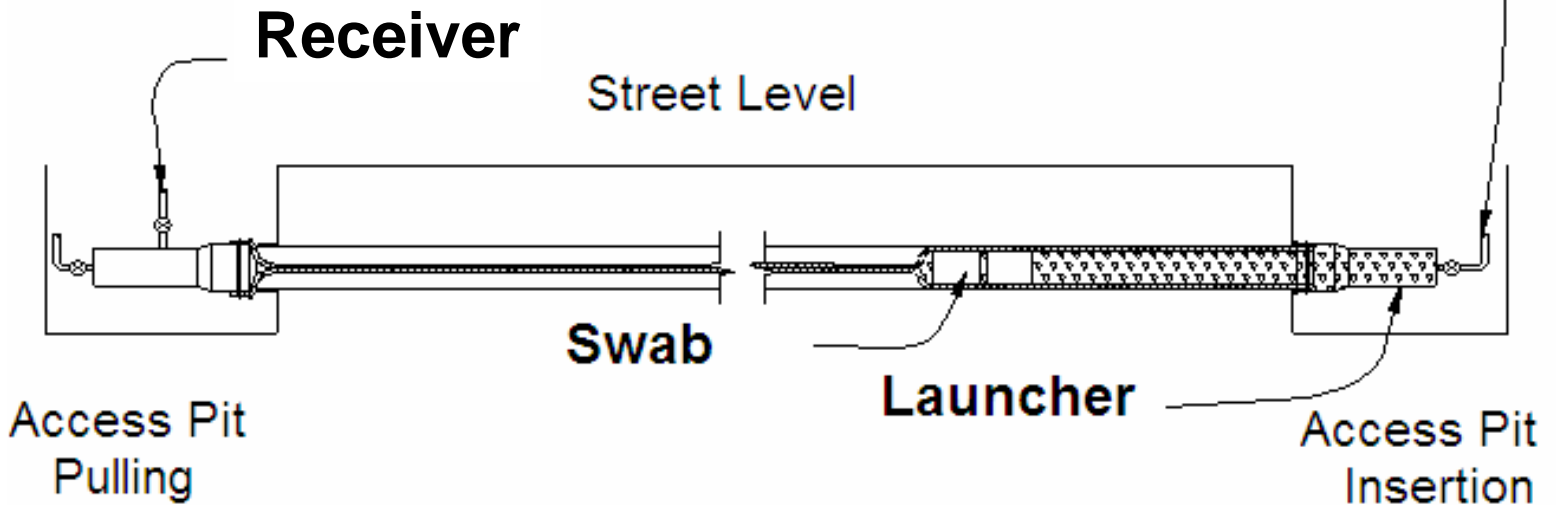
Winching the liner tube in place



Water Main Renewal

Liner installation

Water under pressure is pushed in the pipe to form the liner for future adherence



Proofing and pressurizing the line



Liner curing, pressure testing & service reinstatement



- 8 hour cure at temperature
- Pressure test liner
- Expose liner and re televise
- Robotically reinstate services





Restore services, dismantle bypass



Project Summary



- **Approximately 3000 linear feet rehabilitated**
- **Six (6) pits required**
- **Total cost approximately \$160 per lineal foot**
- **Total Time of construction 30 days**