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communications

A Monumental Rehabilitation

Emergency sewer rehabilitation project protects nation's historical buildings

With its dome reaching high into the sky, the U.S. Capitol building radiates power, patriotism and everlasting strength. It's clear from one look at this most symbolically important building that it receives ongoing maintenance and restoration. Unfortunately, the same care is not given beneath the Capitol's surface where old sewer pipes made of brick and wood are showing significant signs of history, aging with decay from the ongoing flow of rainwater and raw sewage.

Sewer pipes into the Capitol run from a mainline pipe that feeds to other laterals connected to several significant landmarks such as the Smithsonian museums. Many of these pipes are more than a century old which is not uncommon in densely-populated cities like Washington, DC. Lateral and main pipelines were built long before anyone could have imagined today's architecture or population growth. Additionally, infrastructure development, such as cable and gas lines, has further crowded the area we never see below, until a problem occurs.

The problem began when significant rainfall events resulted in floods in front of the Capitol. This street flooding would sometimes lead to flood damage in the basements of several museums and local businesses.

That's why in the Fall of 2006 when the District of Columbia Sewer and Water Authority received a call about water leaking into the basement of one of the museums, it took immediate action by calling Anchor Construction, its on-call emergency contractor, to help fix the problem. If left unfixed, these floods could have threatened the artifacts in some of the nation's most famous museums.

Finding the Problem Pipe

The problem area was identified as a combined sewer/storm pipeline just beneath the surface of a parking lot in front of the Capitol building. Three to five million people annually come to visit the U.S. Capitol building alone – many traveling on tour buses that park in the heavily used lot. Additionally, the lot is used frequently by Capitol police and legislators.

Through Anchor Construction, DC Sewer and Water Authority (DCWASA) hired Sterling, Va.-based Am-Liner East, Inc. to reline 250 feet of pipe using the Cured-In-Place-Pipeline (CIPP)

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process. CIPP effectively relines the original pipe to create a new pipe within the existing pipe without digging. This trenchless technology is becoming the preferred solution for both residential and commercial applications because it's fast, proven effective and causes minimal disruption.

A leader in providing quality full-service sanitary sewer and manhole rehabilitation, Am-Liner East was chosen because they had performed large diameter CIPP lining projects for both Anchor Construction and DCWASA and were able to fast track service for the project.

“The CIPP process was the ideal solution for this project given the method’s proven success record, cost-effectiveness and the nature of the work area,” said Mel Willett, vice president of Am-Liner East.

Project Snapshot

The project involved cleaning and relining a 106-year-old, 42” x 250’ pipe that was more than 70% clogged with sand, silt and other debris which prevented normal flow capacity during rainfall events.

Cleaning an Old Pipe Brings New Challenges

Prior to relining the pipe, Video Pipe Services of Beltsville, MD was called to provide CCTV inspection to identify the exact location of the holes and to clean the pipe. Additionally, Video Pipe Services supplied bypass pumps for the project.

The CCTV inspection revealed that the pipe was in such bad condition that a collapse could occur at any moment. A big surcharge occurred when the manholes were popped and debris was uncovered as a major problem.

The bottom half of the pipe was made of brick and mortar and the upper half was made of concrete and wood. Where the two sections joined a gap existed that allowed infiltration of sand and water along the full length of the segment. The upper portion of the pipe was so badly deteriorated that a simple scratching of the surface with a fingernail would cause the concrete to flake off. A near-future collapse was eminent since the line was under a heavily traveled parking lot and road and approximately 18 feet deep.

“The line cleaning should have taken less than two weeks to complete, but instead took about five weeks,” said Hank Norris, general manager, Video Pipe Services.

The Video Pipe Services cleaning crew worked around the clock using two trucks to remove the debris. One truck removed 80-gallons of debris a minute and another removed 120-gallons per minute.

“A line this size typically can hold about 60 yards of debris, but we discovered 265 yards of debris because the pipe had so many holes,” said Norris.

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Those holes and missing areas of pipe made it difficult to clean, particularly during rain events, which caused debris to be washed right back into the pipeline. Another battle was water main breaks elsewhere in DC that would send rushing groundwater through the pipe, adding even more debris.

About the CIPP Process

Am-Liner East used the Premier-Pipe water inversion method for CIPP rehabilitation. The basic process begins by taking the lead end of the Applied Felts resin-saturated liner and turning it inside out for a predetermined length and clamping it to a collar over the manhole. Water is then introduced into the turned back section creating a head, which causes the lining to continue turning inside out along the defective pipe. The constant addition of water maintains the inversion head, inverting the liner and ensuring it is held firmly against the host pipe. When the installation is complete, the water in the liner is circulated through a mobile hot water boiler to gradually raise the water temperature to achieve a controlled cure of the resin. Once the cure is complete, the end of the newly formed pipe is cut and trimmed.

Overcoming Challenges

The upstream manhole had a brick chimney with a diameter of only 24” that went from street level to about 15’ below grade making it impossible to install the large diameter liner. Instead, Am-Liner East inverted the liner through the downstream manhole using a hydrostatic head and cured it out using hot water. Because the 42” diameter pipe was so deteriorated, a 45” liner was used.

Another concern was a 30” diameter lateral line coming into the side of the 42” diameter line.

“We were concerned that the liner might try to migrate into this lateral so we used sand bags to block off the lateral before the liner inversion took place,” said Willett.

The significant long radius bend in the pipe line slowed down the installation slightly.

A Complete Success

This rehabilitation project was all about dedication and timing. Everyone involved in the project played an important role in keeping the job on time and on budget. The project had to be completed while Congress was out of session for the Thanksgiving holiday. To meet the project deadline, even the felt manufacturer – Applied Felts - had its employees working overnight to make the custom liner to Am-Liner East’s exact specifications.

For More Information

Contractor:

Am-Liner East. (703)430-4120; (877)-265-4637 www.amlinereast.com

CIPP:

Premier-Pipe USA. (952)944-8093. www.premierpipeusa.com

Cleaning & CCTV Subcontractor

Video Pipe Services. (301)931-0707 . www.caryloncorp.com

Felt Liners:

Applied Felts. (203)426-5948. www.appliedfelts.com