

CASE STUDY



WYOMING PIPE ABANDONMENT

PROBLEM

In Fall of 2019, FillRite Technologies was contacted by an HMI installer regarding a project opportunity. They had recently heard about FillFoam and saw an opportunity to utilize the product on an upcoming city project. The city was in the planning stages to remove the aged waterlines running down the center of the main state road. With the water main centrally located on the road it would require full lane closures and detours for any repairs or maintenance. Originally, city engineers planned to excavate 6,650 feet of the road to remove the old 6" water pipe. They would then install the new water main along the shoulder and re-pave the road. The contractor began to educate the city on FillFoam and how this product could be used as an alternative to demolition. FillFoam could be installed inside the water main and laterals to abandon the pipeline in-place and avoid excavation.

FillFoam is a pre-expanded polymer foam pumped with hydraulic pressure. When pumped from a positive connection, pressure can be maintained to push material from one point to another. The liquid foam will cure and solidify within hours and harden into foam. Variable densities with a range of compressive strengths and resilience modules can be pumped based on the project needs.

Extensive research was completed to compare repair options. The preliminary option to excavate and remove the old pipe was expensive, time consuming, and labor intensive. An alternative was proposed to abandon the water main and laterals in place by filling the pipes with FillFoam. The new water main would be installed along the shoulder to avoid detours and traffic control. This approach would limit demolition to every 650 feet. Abandoning the pipes in place and installing new pipes would be faster, less invasive, create less waste, and require less labor and heavy equipment.



*Common demolition to remove water mains.



* Traffic Control around access points



Comparing Options

FillFoam Option

Excavation & Demolition	Trench 4x 6,650 ft down to 12 ft	4x12 pit 10ft deep every 650 ft
Waste	Concrete waste:> 4 million lbs old water mains and laterals:> 250,000 lbs	Concrete Waste: 72,000 lbs
Estimated Downtime	2+ Years	<1 Year
Traffic Control	Full traffic control & detour required for the block	8x20 area surrounding the injection area. Traffic routed to the second lane, no detour necessary

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SOLUTION

The project was postponed due to the COVID-19 pandemic and resurfaced again in Spring of 2021. The contractor worked extensively with the city and prime contractor to plan out the logistics of the project. Due to State regulations, it was required that the construction site be limited to 3 blocks under construction at a time, instead of access to the full 6,650 ft of pipe and laterals. This would limit access to 10 different sections. Each section would need to be completed prior to moving onto the next section. Each pipe section would be up to 650 feet long with laterals. Some pipe sections would be blocked at one end and others could be filled from beginning to end.

Work began the Summer of 2022. Vented sections of pipe where foam could be pumped from beginning to end had two fittings installed. At the pumping end a 2" pipe was set with a combination of polyurethane foam and hydraulic cement plug. It was crucial during polyurethane foam installation that the end of the installation pipe was not clogged. Soil was then backfilled and compacted and a custom fitting was installed at the top of the injection pipe. It is important that the plug be strong enough to resist the back pressure created by pushing material forward.

A vent test was performed to confirm the pipe section was clear. Compressed air was pumped into the pipe and monitored at the vent end. This test identified when an inline vent was closed or there was a blockage. If air was unable to pass from point A to point B, foam would not pass.

SUMMARY

FillFoam material was pumped until foam exited the vent end. As foam moved through the pipe, water and debris was pushed out the vent. Through the 6" pipe foam traveled at a rate of approximately 40 feet per minute. Pipe sections and laterals filled ranged from 350 to over 650 feet.

Laterals off of the main pipeline were treated as vents and fitted with a valve. As foam was pumped and began to exit the lateral vent the valve was closed. This regained pressure and allowed the foam to continue traveling forward toward the next vent. Each vent was closed until foam was discharged from all openings, signifying a complete void fill.

Non-vented sections of pipe were filled by installing a 1 inch diameter hose into the section. Because air could not vent out the opposite end, the annular space around the injection pipe acted as the vent. FillFoam was pumped through the injection pipe to the end, foam then continued to flow backwards around the injection pipe until foam came out around the injection end of the pipe. The pumping hose was also abandoned in place.

The next day after work was completed, injection and vent pipes were cut and plugged with hydraulic cement. Road crews could immediately work to install the new water main and re-pave the roadway. Work is schedule to be completed by Summer of 2023 as crews finish one section at a time.

