



Typical 4' glass resin UV spot repair within 8" vitrified clay sanitary sewer – Milford, Michigan

THE UV LIGHT AT THE END OF THE SEWER TUNNEL

Repairing sewer pipes is a routine form of ongoing maintenance for many communities. Recently, trenchless repairs have gained popularity and have become more widely used. However, determining the best method of repair is not so routine. Communities face many challenges as they strive to maintain an acceptable level of service for their customers:

- What types of repair methods are available?
- What are the most cost-effective options?
- How long will the repair last?
- Have other communities had successes or failures with different repair methods?
- Is there funding available for these repairs?

While the answers are likely to be different for each municipality one thing is for certain: there are many options to consider and new technologies emerge each day. Two Michigan communities have tested one of the newest options for sewer spot repairs: quick seal UV spot repair. This technology is also under contract with three other communities and is being investigated by several others. As we introduce you to this new technology we will also answer some of the questions listed previously, as we compare the traditional cured-in-place pipe (CIPP) lining method with the quick seal UV spot repair technology.

A LOOK AT CURED IN PLACE PIPE LINING

You are probably familiar with traditional CIPP lining methods, which are widely known in the field of sanitary sewer repairs. Here's how it works: a resin-impregnated flexible felt liner is

inserted into the existing sewer pipe, and steam or heated water is applied to the liner. The steam or water pushes the liner against the interior walls of the pipe, and the heat causes the liner to cure in place. While traditional CIPP lining has proven effective, the typical cure time for this method is six to eight hours. This affects the timing of final inspection by the field engineer, which means the entire process can take 1-2 days. This method of repair, however, is typically more cost-effective than sewer replacement, is non-intrusive, and can be applied to a wide range of pipe diameters.

UV QUICK SEAL SYSTEM SPECIFICS

Similar to traditional CIPP lining, the UV quick seal system can repair a variety of pipe deficiencies, including longitudinal cracks, broken pipes, offset joints, root intrusions, and leaky joints. The product is installed using a manual pull-in applicator with a camera and monitor, which allows for proper placement. The applicator is wrapped with a glass fiber composite that is cured using UV light. This applicator allows the installer to see the liner as it is being placed and make adjustments to position it accurately. Once the liner is in position, the applicator is inflated with air to push the glass fiber composite laminate against the walls of the pipe with sufficient pressure to seal off sources of infiltration. Once this is achieved, the UV light-curing system is activated. The UV curing process typically takes no more than ten minutes. As soon as it is cured, the liner can be checked and the final inspection can occur. Once cured, there is no additional shrinkage, which can be

an issue for traditional CIPP liners. The system is applied in three or four-foot sections and longer repairs can be achieved with a slight overlap of repair sections.

PRACTICAL CONSIDERATIONS OF THE QUICK SEAL UV SYSTEM

Now that we know how it works, let's examine the practicality of using this product. If you need to repair large diameter sewers, then this may not be the method for you. The UV spot repair system can only be applied to 6" through 27" diameter pipes. As with any new technology, the UV application equipment is more expensive, thus it can be more expensive per foot than traditional CIPP methods. Costs for the spot lining can range from \$1,200 to \$3,200 per 3-foot repair section, depending on the pipe size and preparatory work involved. However, as it becomes more widely used we expect the cost to decrease. This method may not be ideal for lining full pipe lengths, due to the higher cost.

Next, let us look at some of the unique advantages to using the UV spot repair system. The composite fiberglass laminate includes a UV activated resin that hardens with UV light. As a result, no mixing of materials is required on the job site. Due to the quick curing time, the field engineer is able to inspect earlier than with CIPP lining. The final application can be inspected almost immediately by the engineer, and the contractor can perform any fixes needed. Once the applicator is in place, the engineer is able to use the built-in camera system to make adjustments before starting the curing process, which helps to minimize errors. Since the application does not require the use of water, this product offers environmental benefits as well. The thickness of the spot liner is a fraction of traditional felt liners; therefore, if in the future a full lining is needed, there will be no 'bottlenecks' in the sewer. Finally, this system is temperature independent, making it possible to install this product any time of the year.

CASE STUDIES: CITY OF AUBURN HILLS AND VILLAGE OF MILFORD

Now for the big question: How well does this product work? The UV spot repair system has recently been used in the City of Auburn Hills and the Village of Milford, as well as locations outside Michigan. These communities performed repairs December 2009 through March 2010 without concern for the winter temperatures. Both projects were bid asking for general spot repairs. The general contractor, DiPonio & Morelli Construction Co., submitted the UV quick seal product for review as a substitute. Due to the advantages previously mentioned, the communities accepted it. Pipeline Management Company of Macomb Township performed the installation.

Repair recommendations for the Village of Milford were based on dated televising reports, so there was a potential change in field conditions. Using this system allowed the Village to quickly add or remove pipes to its repair schedule without delays resulting from advanced preparation required with other methods. Since the system cures within ten minutes, OHM, the Village's engineer, was able to perform same-day final inspections, which saved the community money on construction inspection and contractor remobilization.

In the City of Auburn Hills, approximately 50 areas were identified as requiring some form of spot repair to the existing pipe. Initially, the City planned to perform these spot repairs using a 3-foot stainless steel grout sleeve. The contractor offered

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to use the UV quick seal spot repair system as an alternate to the mechanical sewer spot repair. Since the repairs were only required in isolated sections of sewer and not the entire pipe length, it was more cost effective to address the repairs with the alternative. There were other advantages to using the UV quick seal spot repair system:

- fast curing time minimized disturbance to the construction area
- liner seemed to be strong enough to stand on its own in places where the existing pipe wall had completely deteriorated, and
- liner created a smooth transition with the existing sewer wall.

Long-term results are unknown because the repairs were completed recently. In the short-term, the alternative procedure has stopped infiltration at a reduced cost and with little disturbance to the residents within the construction zone.

CONTEXT DETERMINES THE SOLUTION

As with most repair methods, each product has advantages and disadvantages. If you need spot repairs on your sanitary sewer system, careful evaluation will help you decide what repair method will best meet your needs. UV lining is one of many repairs being used in this area. Full pipe UV cured lining (manhole to manhole) is currently gaining favor in the United States but is not widely used yet. While the cost is currently higher than standard felt installations, the market may well pay the premium as municipalities learn of its benefits. In recent years, the market in Europe for CIPP lining has moved to 60% UV cured glass fiber products because of the benefits it offers even though the product cost is higher. For full pipe repairs, Milford and Auburn Hills opted for traditional felt liners.

If you are interested in learning more about the UV spot repair product, application methods, or case studies, please contact:

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Have an idea for a future article? The MWEA Collection Systems Committee wants to hear your suggestions. If there is something you want to know more about, please send ideas to Michelle LaRose (michelle.larose@ohm-advisors.com). 🌊