VORTEX

CASE STUDY

PROJECT SNAPSHOT

PROJECT
Outagamie County CTH CE Culvert Rehabilitation

PROBLEM
Outagamie County Highway Dept. discovered a pipe located under a four-lane highway that was corroding and groundwater infiltration causing concerns over its structural integrity, and potential collapse. The Department took measures to ensure this culvert continued to perform.

CONTRACTOR
Vortex Lining Systems

DIMENSIONS
90″x75″ metal pipe arch

OVERVIEW
Implemented a trenchless spray-on application of geopolymer to rehabilitate the pipe and added more service life to the asset.

Trenchless Technology Used to Rehabilitate Debilitated Infrastructure Under Four-Lane Highway in Appleton, WI

GEOKRETE GEOPOLYMER MORTAR STRUCTURALLY RESTORES LEAKING AND CORRODED METAL ARCHED PIPE

VORTEX PRODUCTS USED

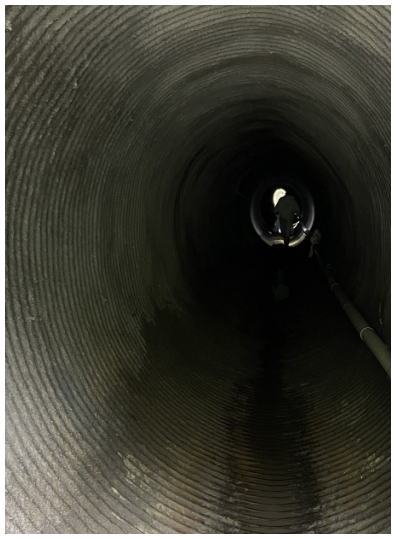
1. GeoKrete® Geopolymer
2. Quadex Lining System

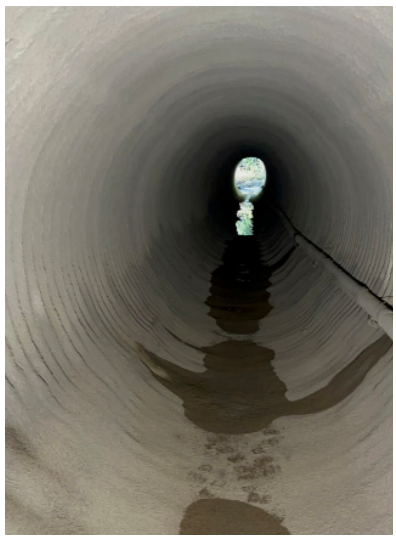
THE CHALLENGE

A 90″x75″ metal arch culvert pipe located under a four-lane highway was discovered to contain rust at the water line, which posed an issue for the Outagamie County Highway Department. Engineering firm raSmith was selected by The Department to conduct a study on the culvert pipe. The Department wanted to investigate the structure for any further signs of deterioration and estimate the remaining life of the pipe. This would give them a better understanding of the timeline needed to complete a rehabilitation project for the asset, eventually estimating that there were five years of service life left.

The firm, raSmith, wanted to determine different alternatives for restoring or replacing the culvert pipe. The alternatives to choose from came down to digging the pipe out and totally replacing it or lining the pipe innovatively and cost-effectively without disrupting the public. They determined that, if ignored, the pipe would deteriorate to the point that holes would form along the structure, leading to leaks or other detrimental structural issues for the pipe and The Department.

Ultimately, The Department was looking for cost-effective and disruption-less ways to completely rehabilitate the pipe, while keeping the total replacement option as a last resort move.





CASE STUDY

IMPACT

1 Rehabilitation over replacement. Environmentally-friendly trenchless solution was used to rehabilitate culvert pipe and avoid total replacement.

2 Avoided public disruption. Trenchless rehabilitation method allowed The Department to avoid disrupting the four-lane highway above the culvert pipe.

3 Fast and efficient installation. Successfully completed the project in 8 days versus up to six months of total pipe replacement.

THE SOLUTION

After deliberation, The Department concluded that it did not matter which materials would be used to rehabilitate the pipe, so long as the method used would be a trenchless spray-on application via the Quadex Lining System, performed by Vortex Lining Systems (VLS). The Department and raSmith would ultimately choose VLS and this method, featuring its signature GeoKrete® Geopolymer. This geopolymer is specifically designed to restore structural integrity, mitigate groundwater infiltration, and most importantly, provide corrosion protection.

VLS recommended GeoKrete be spray-applied to a thickness of 1.5″ over the entire length of the pipe.

THE RESULTS

Vortex Lining Systems lined the existing pipe with the spray-applied GeoKrete Geopolymer. The application of the Geopolymer mortar not only seemingly solved the rust and deterioration issues for the pipe but upheld the structural integrity of the asset, adding 50 years of service life.

As the existing pipe ran beneath the county's four-lane highway, there was no traffic disruption. The VLS crew was able to complete clean, prep, patch, and reline the metal arched culvert in just 8 days, with no interruption of traffic flow.

After final inspection, the county Engineer found the pipe to be fully rehabilitated and was pleased with the efficiency and professionalism of the VLS crew.

The wall of the culvert before having GeoKrete geopolymer spray applied.

The culvert pipe was fully rehabilitated due to the innovative and efficient spray-on application of GeoKrete Geopolymer.