



PROJECT OVERVIEW

In May 2016, a massive sinkhole formed underneath Tireman Avenue in Detroit, Michigan. The root of the problem was a fractured sewer line. A damaged pipe leading to a major concrete interceptor caused heavy infiltration, which in turn resulted in soil loss around the interceptor at the fractured location of the pipe. The soil loss eventually worked its way to the surface to create a 12-foot wide sinkhole, forcing the closure of Tireman Avenue and major public disruption. The pipe was directly below multiple utilities, including a 16-inch high-pressure gas main. If the interceptor totally failed, then the utilities were at risk of catastrophic damage.

SOLUTION

The 1930's design had the flow from the connection emptying near the crown of the interceptor, and this vertical drop created turbulence and ultimately the formation of H₂S gas, which ate away at the secondary liner. This corrosion was discovered when the sinkhole appeared, but had been corroding for decades.

The straight section of the interceptor was repaired with a 78-inch HOBAS pipe. The curved portion of the interceptor, however, made it unsuitable for this type of rehabilitation. IWPC proposed and designed an alternative repair, which included the installation of conventional "I" section ribs with tie rods for reinforcement followed by the application of GeoSpray® geopolymer mortar as a preferred structural repair solution for this section of the project. When the area had been cleaned, relined and grouted, GeoSpray® mortar was sprayed onto the new ribs and lagging. Grade nails were installed to verify the specified 1.75-inch thickness required for the curved portion.

RESULTS

The entire repair took six months from beginning to end, with final pavement replacement and the reopening of Tireman Avenue in November 2016, but a five-man crew took only five days to install the GeoSpray® portion of the repair. "Unlike traditional cement mortars, GeoSpray® is capable of bonding and building to great thicknesses," said Joseph Fattore, IWPC Senior Project Manager. DWSD inspected and approved the entire repair, which included a drop manhole that eliminated any future H₂S issues within the sewer, by directing flow to the invert of the interceptor, versus the original installation, near the interceptor's crown.

PROJECT DETAILS

Application: Non-reinforced concrete sewer

Location: Detroit, MI

Client: Detroit Water and Sewerage Department (DWSD)

Installation: May 2016

Contractor: IPR/IWPC



Sinkhole on Tireman Avenue caused by damaged interceptor.



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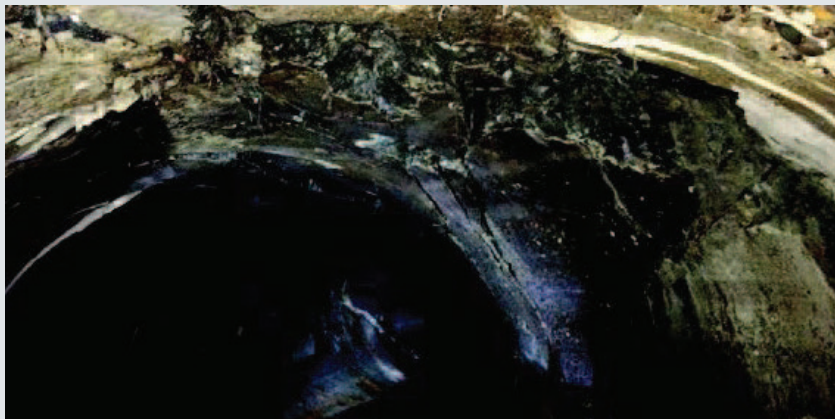
Geopolymer Mortar



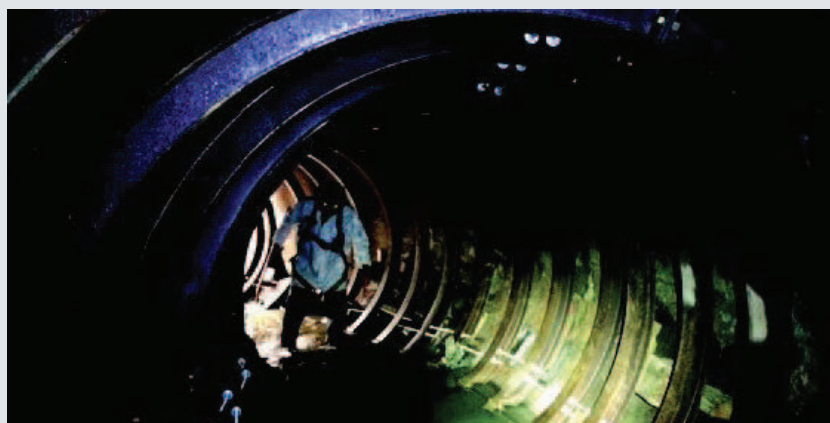
WATER/WASTEWATER

CASE STUDY:

Tireman Avenue Detroit, MI



Damaged and corroded sewer interceptor under Tireman Avenue.



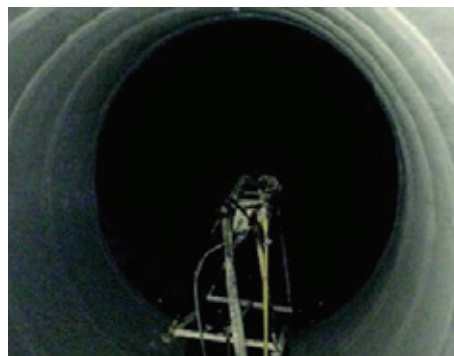
Conventional "W" section ribs with tie rods installed to shore up collapsed structure.



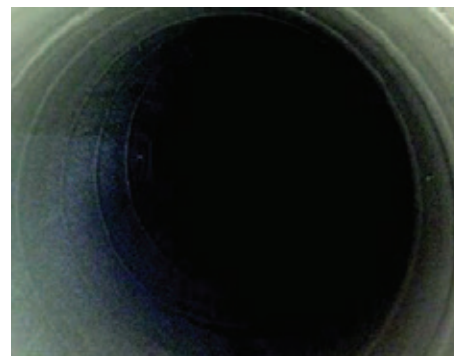
Installation of lagging around and behind ribs.



Completed installation of the ribs and lagging.



GeoSpray coating for strength and corrosion resistance over steel.



Completed rehab of curved section of interceptor.



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