



## Internal Lining of Man Holes with Carbon Fiber and 120 mil top coat

### Case Study – HJ3 CS200914

#### Introduction

Manholes are used extensively in Industrial and Waste Water applications. Chemicals such as Hydrogen In these applications the manholes offer access to sewer lines and excess capacity for overburden of waste water.

#### Problem

Hydrogen Sulfide from the waste that is processed through the sewer lines can attack the concrete surface of the manholes causing significant corrosion, cracking, and de-lamination of concrete. In addition, manholes experience structural failure caused by external forces such as hydrostatic pressure and soil heaving. In this particular case study, 30 manholes were repaired to mitigate the damages caused by corrosion and external soil pressure.

#### Solution

HJ3 engineers designed a repair that included one layer of CF-512 to provide internal surface tension to resist external soil pressures. The carbon fiber also served to chemically protect the manhole against hydrogen sulfide degradation. The system was installed during the presence of significant moisture and moisture tolerant grouts and primers were used to prepare the substrate. The repairs were completed in 30 days and created a 25% cost savings over standard 120 mil coating systems traditionally used for these repairs. Bond adhesion testing was performed for quality control 90 days after installation and showed a minimum of 300-psi bond strength to the substrate was achieved.



#### Conclusion

The carbon fiber repair offered by HJ3 and its certified contractor created over 25% cost savings over the traditional repairs. The system was installed under a 10-year warranty after passing the industry standard – pickle jar test.

