

FEATURED PROJECT

Composite Pipe Repair

INTERNAL COMPOSITE REINFORCEMENT

CUSTOMER
Momentive

DATE OF APPLICATION
December 2021

LOCATION
New York

SUBSTRATE
Steel

SYSTEM

FRP 120 HT Adhesive, FRP 110 HT Tack, FRP 211 HT Saturant, CF-500 BD, HP-300 AR, Ceramic Repair Putty

PROBLEM

During an inspection of tanks used to process wastewater, a large chemical manufacturing facility found that the piping systems used to transport water from the plant to the water treatment area were badly degraded; primarily from internal corrosion. Several through-wall failures had formed, creating an environmental hazard due to the chemicals contained in the wastewater. In search of a solution that would rebuild the pipes, fix existing through-wall failures, and prevent further corrosion from occurring, the plant considered two options: completely replacing the 36-inch carbon steel pipes or installing a carbon fiber composite reinforcement system.

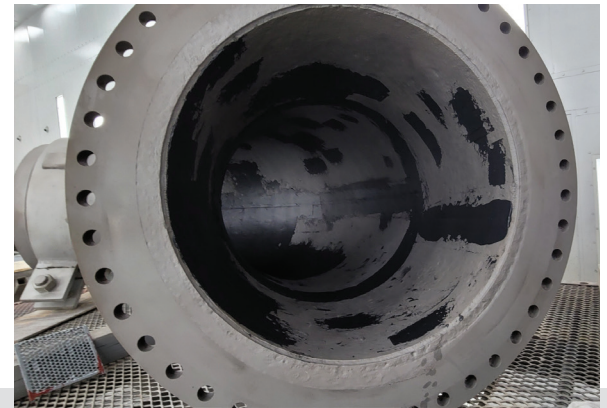


Figure 1 Internal Pipe Surface After Ceramic Repair Putty Application

After working with the plant reliability and engineering teams, Advanced FRP Systems recommended a four layer internal carbon fiber composite reinforcement system, designed to provide a permanent repair compatible with ASME PCC-2 (2018) standards and long-term corrosion resistance.

INSTALLATION STEPS:

1. The pipes were grit blasted to an SSPC SP-10 Near White Metal finish. Ceramic Repair Putty was applied to fill in any existing pitting and cover weld seams. FRP 120 HT was applied as a hold primer.
2. FRP 110 HT Tack was applied to the pipe surface immediately prior to the installation of the four layers of CF-500 BD saturated with FRP 211 HT Saturant, a corrosion-resistant, high-temperature epoxy.
3. HP 300 AR, a ceramic-filled epoxy, was applied via roller at 20 - 30 mils in two coats and allowed to cure for 36 hours.



Figure 2 Installation of Carbon Fiber Composite Internal Wrap

The pipe sections were repaired sequentially so only two tanks were taken offline at a time. All repair activities were completed on time and within the proposed budget.

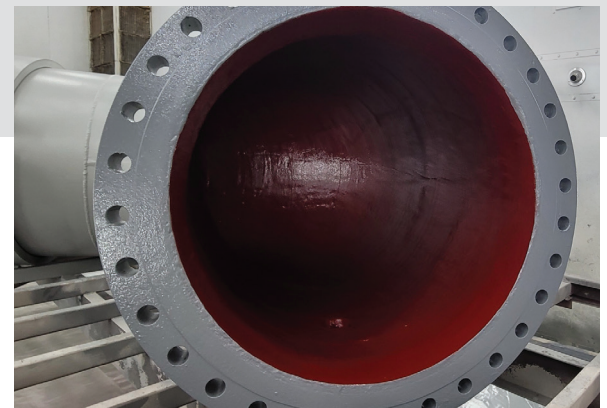


Figure 3 Internal Pipe Surface After Application of HP 300 AR

SOLUTION

- The internal reinforcement system provides structural reinforcement and a barrier to prevent additional internal corrosion.
- HP 300 AR provides outstanding resistance to water immersion, Microbially-Induced Corrosion (MIC) and wear from suspended solids in the wastewater.
- Materials for composite reinforcement were readily available, the project cost was 30% less than pipe replacement and provided a similar 20-year life extension.

BENEFITS