

FEATURED PROJECT

Composite Pipe Repair

ACTIVE LEAK REPAIR AT WATER TREATMENT PLANT

CUSTOMER

DEP

LOCATION

New York, NY

DATE OF APPLICATION

November 2023

SUBSTRATE

Carbon Steel

SYSTEM

GF-300 BD, CF-500 BD, FRP 120 HT

Adhesive, FRP Repair Putty, HP 300 Epoxy,
 FRP 210 HT Saturant

PROBLEM

A severe pipe through-wall failure caused by internal corrosion at a wastewater treatment plant was a major cause of concern. The 24" pipe in question transported rainwater in the basement. It ran along the ceiling between two walls and was held in place by pipe supports. The challenge was finding a repair solution to avoid full replacement of the pipe segment and accommodate the concrete walls and pipe supports. The damage was so extensive that when it rained, "it was like a waterfall was coming down from the basement," according to a plant employee.

SOLUTION

The plant used a six-layer carbon fiber composite system that would not require tearing down the concrete walls. This repair solution used heavyweight, bidirectional, high-tensile strength composite material appropriate for steel pipe repairs. None of the steps in the repair process required internal repair or maintenance. All repair steps were performed externally.

INSTALLATION STEPS:

1. The surface was cleaned and grit blasted to SSPC SP 10 standards for optimal adhesion of the composite repair system.
2. The through-wall failures were filled in with FRP Repair Putty before applying the composite system.
3. A layer of glass fiber composite wrap was applied to serve as a barrier between the carbon steel substrate and the carbon fiber composite wrap.
4. Six layers of carbon fiber and glass fiber composite wrap (CF-500 BD) were applied to the repair area. The layers were saturated with FRP 210 HT Saturant prior to wrapping.

Because composite systems are adaptable to complex geometries and provide proven structural reinforcement without replacement, this solution was a perfect fit for the wastewater treatment plant. Six months later, the system was performing optimally, and no further incidents were recorded.

BENEFITS

- Validated to withstand more than 1,000 psi of internal pressure
- Extended asset life by 50 years while providing a long-term, maintenance-free solution
- Overcame internal pipe weaknesses by strengthening the external pipe structure
- Avoided costly full pipe replacement, concrete wall demolition & reconstruction



Figure 1 External pipe supports and surrounding concrete walls posed challenges to this pipe repair



Figure 2 Carbon fiber patches addressed through-wall failures



Figure 3 The composite repair system successfully stopped the leaks and reinforced the pipe