106 Finnell Dr.
Weymouth, MA 02188
Tel: (508) 927-6915
advancedFRPsystems.com

FEATURED PROJECT

Composite Tank Repair

INTERNAL COMPOSITE REINFORCEMENT OF A RAW WATER STORAGE TANK

CUSTOMER
Black Hills Energy

LOCATION
Pueblo, CO

DATE OF APPLICATION
October 2021

SUBSTRATE
Carbon Steel

SYSTEM
HP-300 GF, CF-500 BD, FRP 210 HT Saturant, FRP 110 HT Tack

PROBLEM

Inspectors at Black Hill Energy's Pueblo Airport Generating Station discovered severe internal corrosion occurring in a 400,000 gallon, 60 ft. diameter raw water storage tank, with many areas measuring below 50% wall thickness and several through-wall failures observed. The tank had not been internally coated with an immersion-grade coating system upon installation ten years prior, allowing widespread, severe corrosion to develop. An engineering firm was commissioned by the plant to determine an economical, long-term option for the critical tank. The firm reached out to Advanced FRP to determine if an internal reinforcement with carbon fiber was a viable solution.

Figure 1 Severe Corrosion and Pitting on the Tank Wall After Grit Blasting

SOLUTION

Advanced FRP provided the engineering firm with the necessary theoretical calculations and case history to prove the long-term viability of composite reinforcement, even in badly corroded tanks. Ultimately, an internal carbon fiber composite reinforcement system with an immersion-grade coating was recommended.

INSTALLATION STEPS:

1. The tank was grit blasted to an SSPC SP-10 Near White Metal finish with a 3 mil angular profile.
2. HP 300 GF, an immersion-grade epoxy coating, was applied to protect the roof and floor of the tank and act as a galvanic barrier on the tank walls. Pitting and irregularities were smoothed with FRP Repair Putty.
3. FRP 110 HT Tack was applied to the wall via roller to aid application. The carbon fiber (CF-500 BD) was then saturated with FRP 210 HT saturant and hand-applied to the wall and floor-to-wall joint.
4. HP 300 GF was then applied over the composite via airless spray.

Despite the extremely cold nights in southern Colorado, the project was finished on time.

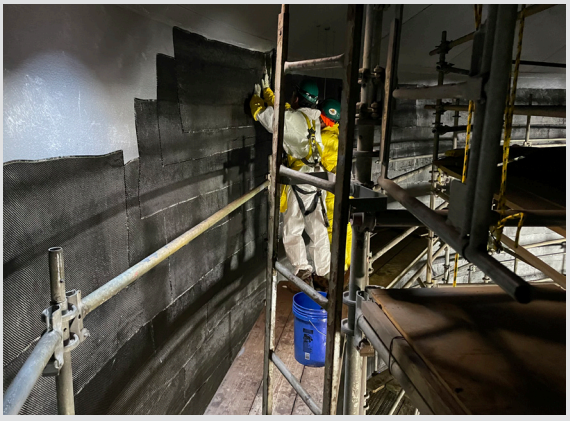

Figure 2 Application of High-Strength Carbon Fiber Tanks on Tank Walls

Figure 3 Application of HP 300 GF, an Immersion-Grade Coating System

BENEFITS

- Internal composite reinforcement prevents further corrosion even in severe conditions like Microbially Induced Corrosion.
- The fully-installed composite reinforcement system costs significantly less than purchasing a new 400,000 gallon steel tank.
- The high-strength carbon fiber composite provides structural reinforcement, and a 30-year, maintenance-free life extension for the tank.