

**FEATURED PROJECT**

# Composite Pipe Repair

## COMPOSITE REINFORCEMENT OF DENT AND LEAK IN WATER PIPE

**CUSTOMER**

American Crystal Sugar

**DATE OF APPLICATION**

Sept 2023

**SYSTEM**

FRP 120 HT Adhesive, FRP 210 HT, FRP 211 HT Saturant, FRP Repair Putty, CF-500 BD

**LOCATION**

Florida

**SUBSTRATE**

Carbon Steel

PROBLEM

A critical cooling water pipe was repeatedly failing at a sugar processing facility. To address the problem in the past, the facility used a large clamp repair. Clamp repairs may be effective for spot wall thinning, but in this case, a large portion of the pipe wall was extremely thin and had signs of wall loss. The clamp repair couldn't provide a long term for widespread wall thinning, leading to repeating failures. After each failure, the clamp would be tightened, which ultimately dented the pipe. The combination of a dent and throughwall failure made this repair especially challenging.



Figure 1 Severe degradation in critical cooling water pipe

Advanced FRP Systems recommended a repair using a structurally independent, carbon fiber reinforcement system that could be applied to the external surface of the pipe.

**INSTALLATION STEPS:**

1. The surface was grit blasted to prepare the repair area for the composite wrap.
2. FRP Repair Putty was used to fill in the through-wall failure and the dent.
3. A galvanic barrier was applied to prevent galvanic corrosion. The FRP 120 HT Adhesive was used as a hold primer to protect the blast area, since the repair couldn't be performed the same day as the surface preparation.
4. The carbon fiber bi-directional fabric, CF-500 BD, was saturated with FRP 211 HT Saturant and applied in 5 layers around the pipe exterior.



Figure 2 Repair putty was used to repair and seal leaks

The alternative to the composite repair would have been draining the pipe and applying repair materials to the inside. Using the carbon fiber solution, the facility avoided draining while still addressing the causes of concern.



Figure 3 The composite repair reinforced the water line

SOLUTION

BENEFITS

- The system is validated to withstand more than 1,000 psi of internal pressure.
- The reinforcement solution extended the asset life by 50 years, providing a long-term, maintenance-free solution where clamp repairs had failed in the past.
- The system was easy and quick to install and avoided a costly, full pipe replacement.