

# AcidShield Restores Original Design Strength to MIC-Damaged Pipe at Chile Refinery

## AcidShield Restores Original Design Strength to MIC-Damaged Pipe at Chile Refinery

Chile

### Summary

---

Damage to process piping at a facility in Chile was attributed to Microbiologically Influenced Corrosion (MIC). Corrosion was discovered at more than 2,000 weld locations on thousands of feet of a refinery's stainless steel cooling water lines. MIC is caused by approximately a dozen known species of bacterial microorganisms. These bacteria thrive in water or soil conditions with a pH of 4 to 9, or temperatures of 50 to 122°F (10 to 50°C). If left unchecked in piping, these microorganisms make their presence known by causing pitting, especially at vulnerable welds. The asset owners turned to CSNRI to engineer a solution to mitigate the corrosion caused by the bacterial microorganisms.

### Benefits

---

- AcidShield™ eliminates unplanned down time for high-consequence piping
- Extends the life of aging and corroding assets
- No pipe cutting or welding
- Prevents future corrosion
- Qualified and compatible with 98% sulfuric acid up to 150°F (66°C)

### Challenge

During a plant expansion, contaminated water was used to hydro-test thousands of feet of new cooling water lines. This allowed MIC to flourish, undetected, in the pipes until the facility began to operate the system. Unfortunately, the microscopic vermin had attacked the critical piping in a multitude of locations. With damage throughout the system, the repair was further complicated, as the lines would need to remain in service during the repair.

### Solution

CSNRI engineers developed a solution that included thousands of one- to two-foot (0.3m to 0.6m) repair lengths of AcidShield for application to the many points of corrosive damage throughout the process lines. AcidShield is a custom-engineered composite repair system with superior chemical compatibility. Designed for repairing corroded and damaged piping, this ASME PCC-2 401, 402 and ISO 24817-compliant system uses chemically resistant, bi-directional fabric in conjunction with a proprietary epoxy system to deliver repairs suitable for piping with harsh chemical services.

AcidShield not only restores piping to its original design strength, but also allows the plant to verify the integrity of the repair throughout its intended design life. At the customer's request, a repair was engineered with a 10-year design life. To ensure an expert installation, CSNRI sent two bilingual instructors to the plant, certifying more than 80 applicators. The CSNRI team remained onsite for 20 days in order to get the extensive project underway.

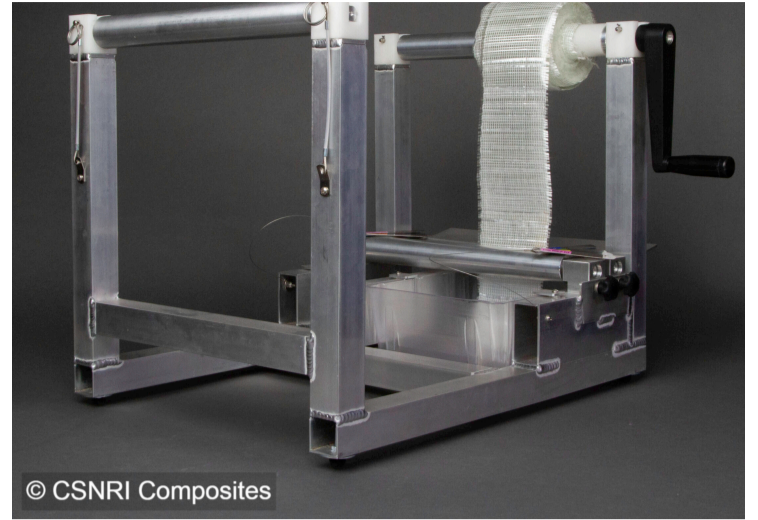


## Manage consent

First, crews used an MBX bristle blaster to achieve the required minimum 1.5 to 2.5 mil anchor profile. Then, using CSNRI's patented Resinator® field-saturation machine, the AcidShield composite fiber was wetted with epoxy and quickly wrapped around the compromised weld joints. The Resinator is a custom-engineered, saturation machine designed for use with CSNRI's field-saturated systems. Critical to proper installation of wet layup, field-saturated composite repair systems, the Resinator controls the resin-to-cloth ratio ensuring the correct strength repair is carried out. The job required minimal manpower and no heavy equipment to achieve complete restoration of the corroded areas.



*Field-saturated AcidShield was applied quickly to corroded areas throughout the system.*



*The Resinator® saves time and money, especially on large projects, allowing installation technicians to saturate at a much faster rate than via hand saturation techniques.*

## Results

The composite installation was performed without incident, while the facility maintained full operation. The repair restored the process lines to original design strength. The MIC assault was controlled, mitigating the risk of future failure. The asset owner is extremely pleased with the outcome, and looks forward to utilizing CSNRI composites and site support for future projects.



*AcidShield restored the damaged stainless steel pipe to original design strength without interruption of operation.*