

FEATURED PROJECT

Hydrocarbon Pipeline Reinforcement

CUSTOMER

A National Pipeline Operator

APPLICATION TEAM

Thortex Infrastructure Solutions

SYSTEM

Carbon Fiber Pipe Reinforcement

LOCATION

Gaithersburg, MD

DATE OF APPLICATION

August 2019

SUBSTRATE

Carbon Steel

PROBLEM

A major national pipeline operator found significant spot corrosion on one of their refined product pipelines during a routine ultrasonic thickness test. The operator had the choice of a composite carbon fiber pipe repair technology or a mechanical pipe repair clamp.

Installation time was critical to this application as the pipeline ran near a major road and in close proximity to a school, limiting the repair time to between 6 pm on Friday and 6 am on Monday due to necessary road closures.

Inspection revealed total wall loss of more than 50% in spots, well below the T_{min} threshold for this pipe to continue operation. The composite reinforcement system was chosen over the pipe clamp for several reasons:

1. The composite materials were readily available to meet the project timeline.
2. The carbon fiber repair is non-metallic and will not corrode over time.
3. The composite wrap eliminates external corrosion over the entire repair area by serving as a barrier coating.
4. No hot work was required, and the repair could be performed while the pipe was in service with a highly flammable liquid inside.

The entire repair was completed on time and under budget. The installation of the composite reinforcement took less than 3 hours. The 32-inch diameter pipe was reinforced with 3 layers of high-tensile strength, aerospace-grade carbon fiber composite technology.

In addition, the repair system meets the requirements of ASME PCC-2 (2015) Non-Metallic Composite Repair Systems: High-Risk Applications and is fully compliant with all pertinent DOT and PHMSA regulations.

SOLUTION

- This repair solution will provide the pipeline operator with a maintenance-free service life over 50 years.
- The system was fully installed, cured, and ready for service in less than 48 hours.
- Advanced FRP's composite repairs provide a seamless, fully-structural solution over any length, diameter, and geometry of pipe.

BENEFITS



Figure 1 Pipe Surface After Grit Blasting



Figure 2 Application of Adhesive



Figure 3 Final Carbon Fiber Repair