Contour Restores Lines Damaged by CUI

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Saudi Arabia

Pipe Details

- CUI on a 152.4-mm (6-inch) diameter Schedule 40 line carrying liquid styrene (vinyl benzene)
- Wall loss up to 50%
- 38 damaged areas
- Operating Pressure:
  22 - 26 bar (320 to 377 psi)
- Operating Temperature:
  50° - 75°F

Summary

- 152.4-mm (6-inch) diameter Schedule 40 line carrying liquid styrene (vinyl benzene)
- Corrosion resulted in diminished wall thickness
- Local trained technicians completed the Contour installation on 38 damaged areas
- The repair is designed for 20 years of safe service
- No interruption to operations
- No negative environmental consequences

Corrosion under insulation is a problem in many operating environments and requires special attention. An owner of a pipeline terminal discovered a CUI problem in multiple areas on a 152.4-mm (6-inch) diameter Schedule 40 line carrying liquid styrene (vinyl benzene). Damage had compromised the integrity of 38 locations on the line, including elbows, girth welds, vents and drains that in some cases had experienced as much as 50% wall loss.

The asset owner consulted CSNRI to determine if a composite repair was available to restore integrity and prevent environmental pollution. CSNRI experts evaluated the damage and the conditions under which the repair would have to be carried out and suggested repairing the damage with Contour, an engineered wet-applied repair system that uses quad-axial stitched fiberglass cloth applied with two-part epoxy.

Prescribing a Contour system was based on its ability to repair a range of defects. It can be applied easily to bends and complex geometry and is used regularly in plants, refineries, tank farms, terminals, and offshore locations to repair many types of pipe defects.

The Contour repair for the damage resulting from CUI at this installation was designed for 20 years of service.

In addition to the scope of the damage and the complex geometry of the corroded pipe, installers were held to a tight schedule. The work would be carried out at height with tight access for complex geometries, using the composite cloth to encapsulate bends with drains and vents while contending with humidity that caused condensation and wet surfaces.

CUI was discovered in 38 areas on elbows, girth welds, vents and drains on a 152.4-mm (6-inch) diameter pipeline carrying liquid styrene.

CUI damage was extensive, resulting in 50% wall loss in some areas.

A team of 8 technicians from a local contractor used a bristle blaster to prepare the surface of the pipe for the installation, removing rust, mill scale and the previous coating. Damaged areas were washed with acetone to remove contamination. In areas where condensation had created a wet surface, the pipe surface was wiped with acetone or methyl ethyl ketone, and the pipe surface was heated to ensure it was dry and warm to the touch before the filler material was applied.

With the line suitably prepared, the installers applied underwater putty to fill in the corroded sections and provide a load transfer to the composite. Once this step was completed, the team applied 7 layers of Contour to provide structural integrity and corrosion protection. Each bend was wrapped with 1.2 meters (3.9 feet) of the composite fabric, resulting in 45.6 meters (149.6 feet) of Contour reinforcement applied on 38 locations. The entire installation was completed on schedule without incident.

Using the CSNRI composite solution, installers restored the facility to safe operations with minimal equipment and manpower and without disrupting operations.

A team of 8 technicians carried out the Contour installation, applying in 45.6 meters (149.6 feet) of Contour reinforcement over the course of 3 weeks.

Using the CSNRI Contour solution, installers restored the facility to safety with minimal disruption to operations.

The Contour repair will provide structural integrity and corrosion protection for 20 years.