Contour Restores Gas Line for 20 More Years of Service

Contour Restores Gas Line for 20 More Years of Service

Columbia

Pipe Details

- Two sections of an API 5L Grade B gas pipeline had suffered damage from external corrosion
- 50.8-mm (2-inch) diameter line was damaged over a 1,829-mm (6-ft) straight run of pipe
- 114.3-mm (4.5-inch) diameter line was damaged over a length of 2 m (6.56 ft) that extended along a straight run and an elbow
- Corrosion had caused wall loss up to 51% on both lines
- 75.8 bar (1,100 psi) design pressure
- 25°C (77°F) design temperature.

Summary

- External corrosion on two sections of gas pipeline with different diameters and geometry
- Corrosion resulted in wall thinning to 51%
- 5 local trained technicians completed the Contour installation in only 3 hours
- The repair is designed for 20 years of safe service
- No hot work required
- No negative environmental consequences

When inspections revealed damage on buried gas pipelines in Colombia, the pipeline owner began looking for a solution that could be used to repair the lines without disrupting service and that would be reliable enough to restore line integrity for safe gas transmission for 20 more years.

The owner needed a solution that could be applied to two lines with different diameters, operating under a design pressure of 75.8 bar (1,100 psi) and a design temperature of 25°C (77°F). A 50.8-mm (2-inch) diameter line had experienced wall loss up to 51% over a straight run of 1.8 m (6 ft). The other line was 114.3 mm (4.5 inches) in diameter and had suffered from external corrosion resulting in similar wall loss over a length of 2 m (6.56 ft) that extended along a straight run and an elbow. The ideal repair would have to be appropriate for both the straight pipe and the elbow and would be able to be applied in tight conditions.

Working to the ISO 24817:2017 standard, which outlines requirements and recommendations for the qualification, design, installation, testing and inspection for externally applied composite repair systems to corroded or damaged pipework, pipelines, tanks and vessels used in the petroleum, petrochemical and natural gas industries, CSNRI engineers developed the repair.

The solution was to use Contour, an engineered wet-applied repair system using bi-axial stitched fiberglass cloth applied with two-part epoxy and a filler material. Contour is ideal for repairs like these because it can be applied without disrupting service. It is designed for a range of defects and can be installed easily on bends, elbows, and complex geometry, and its performance characteristics would allow the lines to function safely for 20 years of additional service.

Morken Group, a CSNRI distributor headquartered in Argentina, provided the Contour product to the owner along with 5 installers to carry out the repair.

When a number of saturated bands were prepared for application, the technicians placed them one at a time on the pipe, following a herringbone pattern (50% axial overlap).

A Morken technician uses a rotative reamer to obtain medium roughness (~ 3 to 4 mills) on the repair areas to provide an appropriate surface for the Contour repair.

Morken technicians placed a peel ply on top of the composite that remained in place while the composite cured to the appropriate hardness.

The first step of the job was to remove the coating from the pipes and prepare the surface. A rotative reamer was used to obtain medium roughness (~ 3 to 4 mills) on the repair areas to provide an appropriate surface for applying the composite solution. While the surface preparation was under way, a small table was set up and covered with plastic film to provide a work surface where installers would prepare the Contour for application on the damaged lines.

The epoxy and resin were mixed on site so the technicians could saturate one fiberglass band at a time using a paint roller. When a number of saturated bands were prepared for application, the technicians placed them one at a time on the pipe, following a herringbone pattern (50% axial overlap), taking special care to prevent any foreign matter from becoming trapped in the fabric and avoiding blisters, pits, wrinkles, pin holes, sagging sections (particularly on the bottom of pipe), and dry spots. When the appropriate number of layers were installed along the damaged areas, the Morken technicians placed a peel ply on top of the composite. The installation team completed the repair in only 3 hours.

Although the technicians allowed the peel ply to remain in place overnight, the repair cured to 74 Shore D hardness and was ready for service in approximately 5 hours.

Using the Contour composite repair will allow the owner to keep the restored lines safely in service for another 20 years.