

# Contour Repairs 4-inch Prover Loop

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West Africa

### Pipe Details

- A 4-inch (101.6-mm) Prover Loop line on a metering skid had several pinhole leaks
- Crude oil

### Summary

- Pinhole leaks in a 4-inch (101.6-mm) Prover Loop line on a production platform needed repair
- Clock Spring Wet Wrap was applied to the leak and surrounding area
- 2 local Clock Spring trained technicians completed the installation in 4 days
- This repair allowed the operator to avoid lost production of about 9,200 b/d of oil
- The stopgap composite solution allows the facility to operate safely until the next planned shutdown.

External corrosion resulted in several pinhole leaks on 4-inch (101.6 mm) diameter sections of the prover loop on a metering skid on a platform offshore West Africa.

Three clamps had been installed on various spool sections to address the damage, and plans were in place for the skid to be replaced at the next scheduled shutdown; however, the condition of the skid and the potential for environmental impact if further leaks were to occur led to the decision to reinforce the lines so operations could be continued safely until the damaged sections of line could be replaced.

After evaluating the options, the owner selected Clock Spring Contour as a stopgap measure to allow continued operation until the skid could be replaced. It was important to repair the skid so the processing equipment could continue working until a planned shutdown to avoid lost production of approximately 9,200 b/d of oil.



*The Prover Loop comprises five spool pieces, where corrosion had created multiple pinhole leaks.*



*The repair area is cleaned to SSPC.SP11 surface preparation standards.*

Contour was an ideal solution for the damaged line. It is a fiber glass reinforcement system that is 'wetted' with epoxy resin to make it pliable on application, which makes it suitable for defects on complex geometries such as T sections, nozzles, and elbows.

Before the prover loop was taken out of service, team members carried out calibrations to ensure flow meters were in service for fiscal and custody transfer applications to maintain sustainable measurement performance and to remain in compliance with industry standards while the repair was being made.

A 2-member team of Clock Spring trained and certified technicians started off by plugging the pinholes and ensuring the Lower Explosive Limit (LEL) was at 0%. This was a critical step to guarantee safety before any hot work could begin. The installers used hand tools, applying sandpaper to abrade the lines before inserting small plugs in the holes and applying metal putty.

The next step was to clean the area to the SSPC.SP11 standard, making sure the surface was free of all visible oil, grease, dirt, dust, mill scale. The paint was removed, and the pipe surface was 'keyed' to give sufficient bonding between composite (fiber glass) and substrate (steel pipe).

Because of the complexity of the spool geometry and the repair length, the installation team wrapped each spool separately and in stages. In each instance, 4 layers of glass were applied. With the glass wet, technicians applied a holding layer of peel ply over the repair to protect the glass from contaminants while the resin hardened and allowing excess resin to soak through.

When the composite was fully cured, the peel ply was removed and the repair inspected for de-lamination, dry spots, and disbonding. With all of the pinholes addressed, the prover loop was coated for UV protection and returned to service in only 4 days.

There are nearly 3,000 trained Clock Spring installers around the world who are qualified to provide repairs with Clock Spring products. Clock Spring regularly offers **training classes** for installers and can custom design training for individual company needs.



*When the composite repair was cured, the peel ply was removed and the repair inspected for de-lamination, dry spots, and disbonding before the line was coated for UV protection and returned to service.*