

# Sologic Root Cause Analysis Investigation Pinpoints Reasons for Leaks in Newly Installed Pipeline

## problem

After over three miles of high-density polymer pipeline was installed with over 800 split-couplings, the initial 25 PSI hydro test resulted in 50-60 percent of the couplings leaking.

The actual impact included:

- Loss of revenue while projects were delayed during repair
- Repair and replacement costs
- Frustration with the coupling vendor
- A dissatisfied customer

Potential impacts included:

- Greater risk of injury due to increased hazard exposure during additional work and repair
- Being passed over for future projects
- Additional repair costs
- Continued project delays

## action

The pipeline owner called in an impartial third-party investigator from Sologic to facilitate the root cause analysis investigation and team. Overall, the investigation revealed that the leaks were the result of installation-induced failures in the coupling gaskets, as well as in the organization's quality control methods for detecting leaks in a timely manner.

The investigation team found that the gaskets had been pinched and/or rolled during installation. The hydro test exposed the damaged mechanical couplings.

The primary cause paths identified during the analysis were:

- Improper installation of the mechanical couplings, including not correcting surface imperfections, incomplete joint preparation, improper gasket installation, and improper bolt torquing.
- Missing opportunities to hydro test smaller sections of the entire pipeline. If that had occurred, the percentage of leaking joints would have flagged the installation problems and would likely have corrected the deficiencies in the remainder of the installation.
- A change in project manager without proper transfer of institutional knowledge at handoff.

## solution

There was an immediate need to effectively repair or replace all gaskets. The longer-term goal was to reduce the risk of recurrence. The investigation team identified 20 possible solutions that passed all selection criteria and were subsequently recommended for implementation. These included:

- Change the type of lubricant used during installation of coupling gaskets.
- Implement formal coupling installation tightening/torquing requirements based on the manufacturer's recommendations.
- Develop a task package to determine the scope, procedures, and quality control steps to be performed for the pipeline installation.
- Develop and implement standard operating procedures for installation, including formal training, auditing, and employee record tracking.
- Incorporate manufacturer's documentation – including recommended installation instructions – into formal training process.
- Implement formal quality control/quality assurance assessment – performed by someone other than installation personnel.

## case study

### benefits

After proper installation and repairs were performed, hydro testing revealed a fail rate of less than two percent. The company gleaned valuable insights into their processes, and have effectively prevented recurrence of the problem.

### about the pipeline company

Spanning nearly a dozen countries, and employing several thousand people, this is one of the world's leading niche engineering companies.

### about Sologic

Formerly Apollo Associated Services, Sologic provides root cause analysis (RCA) training, software and services to help companies achieve business goals by solving challenging problems and preventing them from recurring. With offices on five continents staffed with experienced trainers, facilitators and investigators able to deliver in multiple languages,

our RCA solutions are built on over 20 years of field experience with clients worldwide -- particularly to disciplines such as quality, safety, IT, reliability and maintenance, operations and logistics, and legal.

For more information, visit [www.sologic.com](http://www.sologic.com).



2501 Washington Street  
Midland, MI 48642, USA  
[info@sologic.com](mailto:info@sologic.com)