

## Cementing Failure Analysis

Turn Your Cement Job Failures Into Cementing Successes



Each cementing job failure dramatically increases the cost of wells and can lead to complications in completion. The key to preventing these cementing and zonal isolation failures in the future is to identify why a job failed in the first place. CSI Technologies provides a comprehensive post-job analysis to thoroughly investigate the cause of the cement job failure.

Let the experts at CSI Technologies turn your cement job failure into improved cementing processes, which will ultimately lead to savings in rig time and money. After a full post-job analysis, CSI Technologies provides:

### Independent Laboratory Analysis

- > Standard API testing
- > Specialty testing and simulations

### Operational Review and Analysis

- > Review of on-site procedures and post-job reports
- > Evaluation of potential operational contributors to job failure

### Objective Engineering Analysis

- > Review of design vs. actual outcome
- > Evaluation of potential mechanical and chemical contributors to job failure

### Recommended Process for Improvement

- > Preventative methods and best practices for future jobs

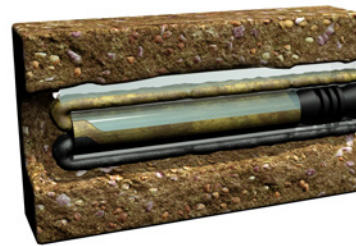
Obtaining samples and lab reports is critical so that testing of the cement system after a failure can begin. Necessary information for a thorough analysis includes:

- > Rigsite cement blend sample (10 lb)
- > Rigsite mix water or mix fluid samples (1-2 gallon)
- > Mud sample (1 gallon)
- > Spacer sample (1 gallon)
- > Liquid cement additive samples (if used)
- > Well schematic, hole caliper, and directional survey
- > Cement job proposals and original design simulations
- > Job logs, job plots, pressure charts, and any other relevant information from the job
- > Pre-job cement lab reports
- > Design BHCT, BHST, and BHP
- > Rig site BHCT, BHST, BHP, and mix water temperature
- > Bond logs
- > Schematics of equipment (e.g. liner hanger, plug/dart assemblies) that may have been involved in the job failure

In today's environment, complex well architecture, as well as new completion techniques, place higher demands on cementing performance. Horizontal shale wells, HTHP wells, and deepwater wells are a few of the more challenging operations. Learning from past job failures is key to reducing the number of issues in the future. With help from CSI Technologies, you can turn your job failures into cementing success.

A production liner was set at 20,000 ft and cemented. The cement was fully placed; however, the rig was unable to pull the drillpipe out of the hole at the end of the job. Location

water, spacer, and cement blend samples were sent to CSI for post-job testing and analysis to determine if the cement was a factor in this job failure. Post-job testing showed slurry instability that likely prevented movement of the drillpipe as cement solids settled around the pipe and set prematurely. Settling was observed at both surface and downhole temperatures. Large amounts of free fluid was also observed, which in addition to indicating instability, can result in the formation of a channel on the high side of a horizontal well. This failure highlights the need to implement slurry design specifications that include both surface and downhole stability.



*Slurry instability in a horizontal section can result in channeling or job failure.*



*Slurry instability can be detected through lab testing.*