Cement Assurance Value Management

Frequently Asked Questions

How is CSI Technologies qualified to offer cement quality assurance?

CSI Technologies is an O&G cement consulting and research engineering firm. Founded in Houston in 2000, we are staffed with operation and research engineers, laboratory technicians, and field execution specialists having worked in every active field in the US and totaling more than 300 years of experience. From our more than 2,500 completed failure investigations, we have coordinated our findings into a robust failure avoidance process, ensuring that your business unit does not encounter the costly cementing failures experienced by other companies.

Can I use CSI Technologies for all of my cementing needs?

CSI is not a traditional cement service provider in that we do not sell cement or associated products and we do not have mixing or pumping equipment. Our service is designed to work with conventional cement service providers to ensure that the operator's well needs are met and that engineering, slurry design, and field execution are conducted at the highest level of quality with a specific regard to CSI's identified field-best practices.

What is CSI "Cement Assurance Value Management"?

The CSI cement assurance and value management system uses a custom 3-tier approach to ensure that industry-recognized best practices are implemented, known failure contributing factors are avoided, and costs are intelligently and efficiently controlled.

CSI Standardized 3-Tier Approach

Engineering Design/Execution – Engineering design and execution review provides both NPT and remediation avoidance by offering the following four services:

- Core Failure Avoidance Techniques – This is provided by in-house engineering support to identify key risk indicators that are developed from an analysis of more than 2,500 root-cause investigations.
- Optimized and Confirmed Slurry Performance – This allows CSI to set the slurry design criteria based on each job's specific conditions to make sure the slurry performs adequately and is not over-designed. Once these criteria are set, CSI then confirms they are met using its cement research lab.
- Senior Field Supervision – A field supervisor with more than 30 years of experience remains on location for each job to make sure the cement unit is maintained properly, the job procedure is correctly calculated/ followed, and all slurries are properly mixed to meet the CSI lab report.
- Review and Approval – This allows the operations team to have an additional approval for all cementing job procedures and an independent check for all calculated job volumes.

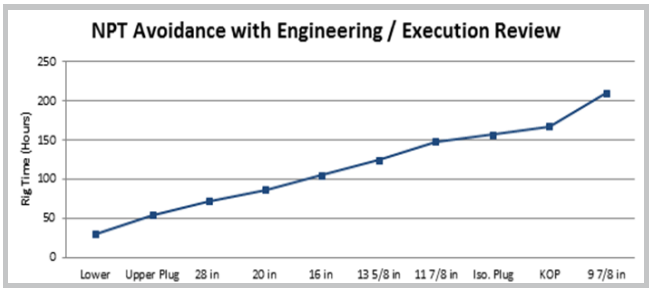
Product Selection – Product selection allows CSI to ensure the service company is using fit-for-purpose and cost-effective additives for each cement system.

Inventory/Invoicing Review – Our standardized invoice review process allows CSI to ensure all discounts are properly applied and all personnel/ equipment/inventory are not over-charged.

How does CSI "Cement Assurance Value Management" save me money?

The entire process is set up to save you money. It is easiest to explain by breaking the process into two direct cost-saving functions.

The first and most obvious is productive time recovery. The process systematically reviews the needs and risks of each cement job faced by your operation and ensures that all potential contributing failure mechanisms are eliminated. This improves your likelihood of success and inherently reduces the macro-cost of a failure as well as associated remedial cement operations. This process also ensures that micro-cost efficiencies, such as laboratory testing completion and optimized compressive strength development, are maintained and incorporated on each operation. An example pulled from a real report demonstrates how the savings are quantified over time.



This chart shows the cumulative hours of NPT avoidance for each cement job based on corrections in lab testing and risk reduction by using CSI engineering design and execution review.

NPT avoidance is based on the estimated hours recovered due to the percent risk reduction of CSI engineering and execution oversight. The percent risk reduction is applied to minimal time for remedial cement only and does not account for additional products or equipment, e.g., 25% risk reduction * 4 day remedial work = 24-hour NPT avoidance.

Specific line items captured in the plot above:

28 in Foam Job / Remedial operation, respud well head = 3 days

- 3.5 Hours – 5% risk reduction by redesigning tail slurry when instabilities were noticed during confirmation lab test
- 14.5 Hours – 20% risk reduction due to previous 1 in 5 failure record

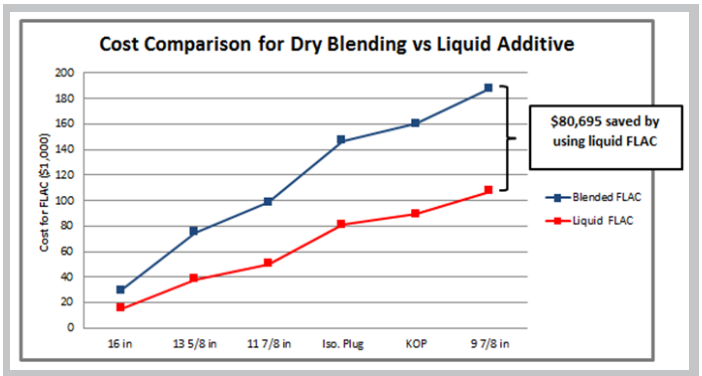
11.875 in. Liner Job / Remedial operation, shoe squeeze = 4 days

- 4 Hours – Reduced slurry thickening time by 4 hours by removing the liner hanger cement testing requirement when TOC was planned more than 2,000 ft below liner hanger
- 19.25 Hours – 20% risk reduction due to previous 1 in 5 failure record

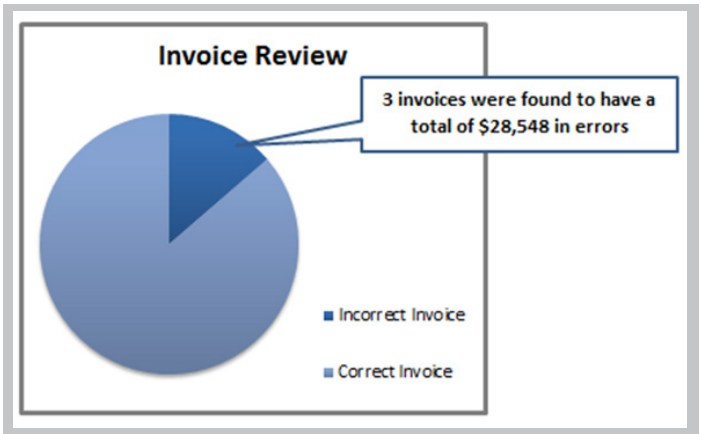
The second and less obvious cost-savings technique is CSI's consumables and invoicing management. This process focuses on four areas of potential cost savings:

- Design standardization and consolidation
- Cost-prohibitive slurry design
- Product cost-selection tool
- Invoicing review: job consumption and contract analysis

Examples pulled from a real report to demonstrate the savings.



This chart shows the cumulative cost savings by choosing to use liquid FLAC instead of dry blended FLAC after the riserless foam jobs.



This visual shows the percent of incorrect invoices reviewed during operations.

How much extra time/effort will be required from my engineers to incorporate this service?

This was a fundamental design element of the process. CSI understands that to be a valuable tool, it must be transparent, consistent, and, most importantly, user friendly. Depending on rig activity (fewer than four active rigs), a single account engineer will be assigned to your operations. This CSI engineer will establish lines of communication with your operations team and associated service companies and is capable to work wholly independent of support or supervision from your operations team. This effectively removes the burdens of engineering program review, lab results acceptance and review, field supervisor coordination, and post-job review and reporting. In addition, the service is charged by activity (hourly), so you are not paying for support when you do not require it.

Is third-party laboratory confirmation testing really necessary?

CSI has identified that more than 65% of all cementing failures can be associated with either slurry performance or slurry product quality control. Along with our state-of-the-art facility and talented laboratory staff, we incorporate a specific threshold evaluation for each testing procedure customized to your specific well needs.

Failures associated with surface mixability, surface and downhole stability, insufficient handling/pumping time, exaggerated 'wait-on-cement' (WOC) time, insufficient mechanical properties (compressive/tensile strength), polymer loading and water wetting issues, adequate or exaggerated surfactant concentrations, and efficient mud removal all can contribute to a multitude of well failures. They are often a function of improper blending/sample collection, inadequate product application ranges (temperature/pressure limitations), partially hydrated cements, and foreign contamination.

Laboratory confirmation is the only way to identify which variable of risk is present. Identifying a problem is not the end of the story. Only with an expert staff trained to identify these potential issues, along with engineers with proven track records to mitigate potential exposure with direct and clear recommendations in the event of non-ideal circumstances, can an optimized plan of attack be recovered prior to failure.

Where are these services offered?

Though based in Houston, Texas, CSI offers cementing support to all domestic O&G operating locations, including a number of international hot spots. A detailed plan of logistic coordination will be provided based on your area and level of activity regarding adequate sample collection and field personnel.