

## Cementing software

# Cement Log Visualizer

Predictive cement bond insight

## FEATURES

- Simulates how contamination, centralization, and job execution impact the cement bond
- Visualizes the prediction in a cement map format
- Validates prediction with real-time or post-job pressure matching
- Integrated dashboard with standoff, dogleg severity, deviation, channel potential factor, and open hole size
- Exportable documentation

## BENEFITS

- Predicts cement integrity before logging
- Instant post-job integrity prediction validation
- Helps improve cement design quality
- Identifies zones at risk for bonding issues pre-job
- Enables confident reduction of cement log runs in consistently designed wells where predictions are validated

## Overview

Cement bond integrity is crucial for wellbore security. Various methods are employed, which include sonic logging that measures amplitude and travel time of acoustic signals and ultrasonic tools that provide a more detailed image to evaluate cement quality. These traditional methods all rely on post-job logging, which often reveals cement isolation issues too late when remediation is costly and operational flexibility is limited. Undetected bonding issues can lead to gas migration, sustained casing pressure, remediation, and potential well failure. Without predictive insights or a unified view of key factors, such as slurry design or standoff, operators struggle with inefficient operations, unplanned delays, and inconsistent post-job reviews.

The Halliburton Cement Log Visualizer transforms cement bond evaluation from a reactive, post-job process into a proactive, predictive workflow. It forecasts bond integrity before the operation and validates predictions with real-world data. Cement Log Visualizer presents results in a familiar cement map format.

## Pre-job simulations predict cement bond integrity

The Cement Log Visualizer provides operators a clear view of the cement bond integrity before the operation. Job parameters, such as slurry design, pump schedule, casing setup, and well geometry, are input into the visualizer. The tool simulates fluid placement and itemizes profiles to identify potential contamination zones. It then predicts cement bond integrity and channel potential factors based on contamination data, slurry design, casing hardware, wellbore geometry, centralization, openhole geometry, fluid properties, and standoff. The result is a predictive cement map response presented in an easy-to-interpret cement log style format. Operators can identify zones with potential low bond quality or channeling potential to execute decisions and reduce nonproductive time (NPT) and integrity risks.

## Real-time data improves cement log prediction accuracy

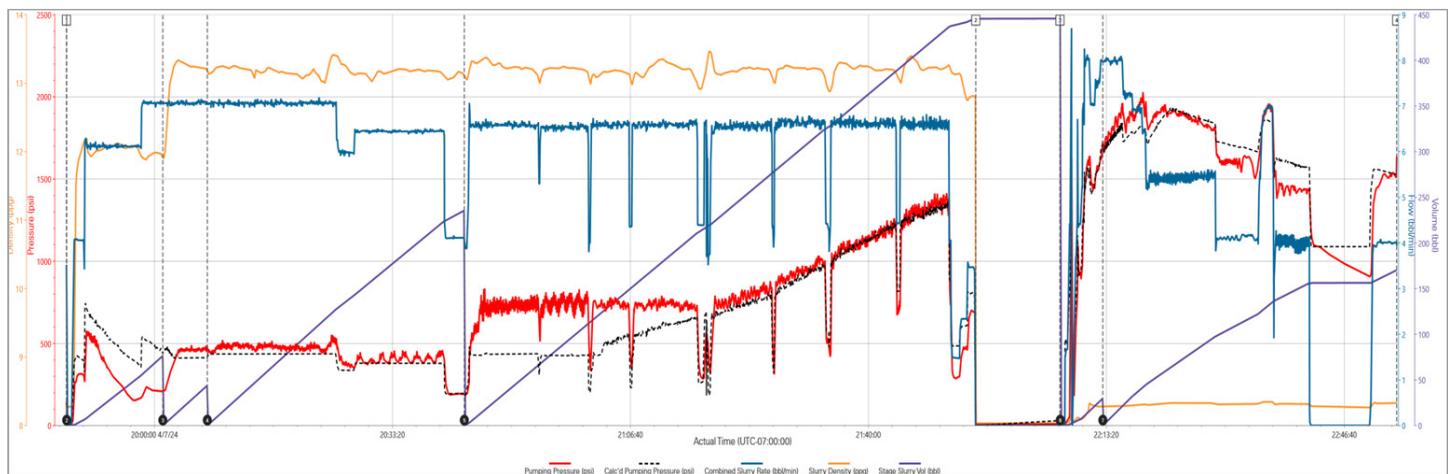
The Cement Log Visualizer model refines its output using real-time job execution data. The system incorporates actual pump rates, geometry, density,



and pressure responses to adjust the predicted bond log after the job is complete. This helps ensure the forecasted cement bond quality reflects true downhole conditions, which provides a more accurate representation of expected bond quality. As a result, operators can decide when cement evaluation logging is necessary, particularly in wells that follow best practices and where the tool has worked in the field.

## Validated cement log predictions

Validation within the Cement Log Visualizer goes beyond modeling. It provides a direct, visual comparison between predicted and actual cement logs. After job execution, the tool overlays the predicted cement map response adjusted using real-time parameters, such as pump rates, densities, and well geometry side-by-side with the actual wireline log. Both logs are displayed with standard logging color palettes. This enables immediate and intuitive interpretation by field engineers and decision-makers. This side-by-side visualization allows teams to assess the accuracy of the prediction and understand how operational variables influenced the final bond quality. In addition to the logs overlay, the dashboard includes comparative plots of critical influencing factors, such as standoff, individual fluid concentrations, dogleg severity, deviation profile, channeling potential factor, and openhole size. These insights help engineers correlate log results with job design and execution to facilitate root-cause analysis and continuous improvement.

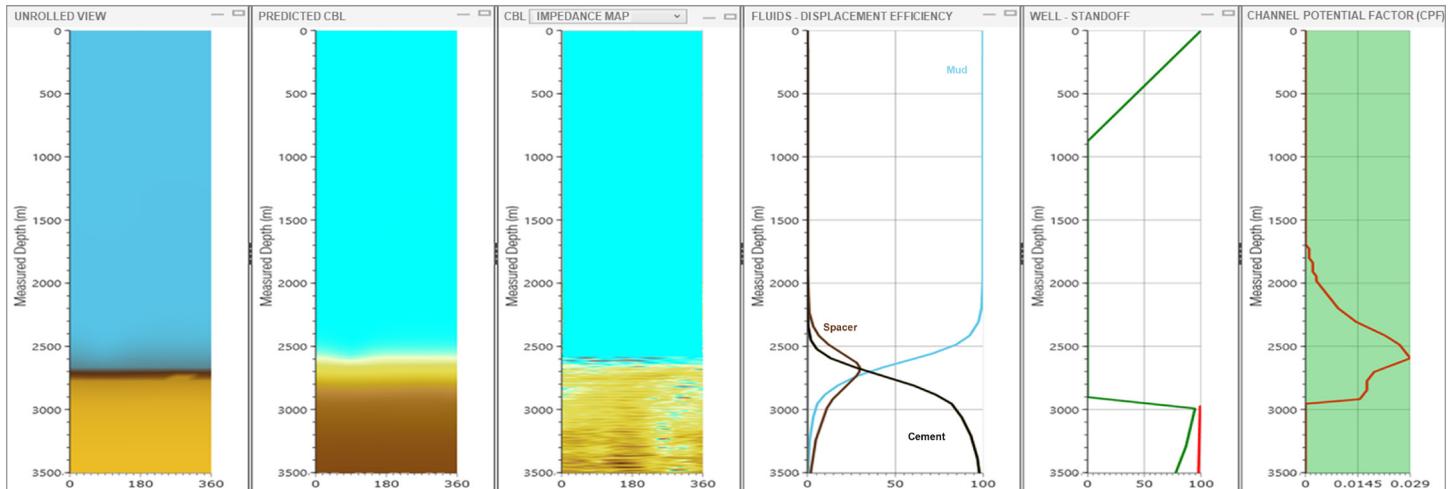


Post-job evaluation confirms model accuracy as calculated pressures closely match real-time measurements during operations. This alignment demonstrates that the well's actual response mirrors the modeled behavior. The Cement Log Visualizer improves prediction reliability through dynamic integration of real-time data, such as pump rates, geometry, fluid density, and pressure into the cement log forecast to help ensure it reflects true downhole conditions and supports confident, timely decision-making.

## Reduce cement evaluation log runs without compromising integrity

When predicted and actual cement logs align, it confirms the reliability of the model and empowers operators to make confident decisions about future wells. This proven accuracy allows operators to collaborate with regulators and use the validated prediction as a credible integrity assurance metric, especially in fields where consistent practices are followed and optimal job execution is achieved. With the capability of the Cement Log Visualizer to generate accurate, predictive outcomes, operators can justify running a single cement log for multiple wells on the same field, which significantly reduces logging frequency without compromising well integrity.

The tool's dashboard overlays predicted and actual cement logs with standard logging visuals and presents key influencing parameters, such as standoff, fluid concentration profiles, dogleg severity, channeling potential, and openhole size side-by-side. This comprehensive view provides deep insight into the factors that affect bond quality and helps validate the prediction with actual logs. When successful validation is achieved, operators can confidently reduce logging runs to unlock measurable savings in logging time, rig time, and overall operational cost while full transparency and compliance are maintained.



The Cement Log Visualizer dashboard overlays predicted and actual cement bond log with standard logging visuals and presents key influencing parameters, such as standoff, fluid concentration profiles, dogleg severity, channeling potential, and openhole size side-by-side for comprehensive evaluation. When the model's cement map predictions align with the actual log results, it validates the prediction accuracy and reduces the need for additional logging runs to execute faster, more cost-effective decisions.

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