

Case Study

Relative Bearing Tool Used to Determine Optimum Configuration



Challenge – Accurate Passive Alignment of Perforating Guns

A Customer was completing wells with oriented perforating guns using eccentric weight bars for alignment. The results from similar wells where shot orientations were determined after the wells were completed, showed that the alignment accuracy to the preferred direction was poor.

Solution – The Relative Bearing Tool

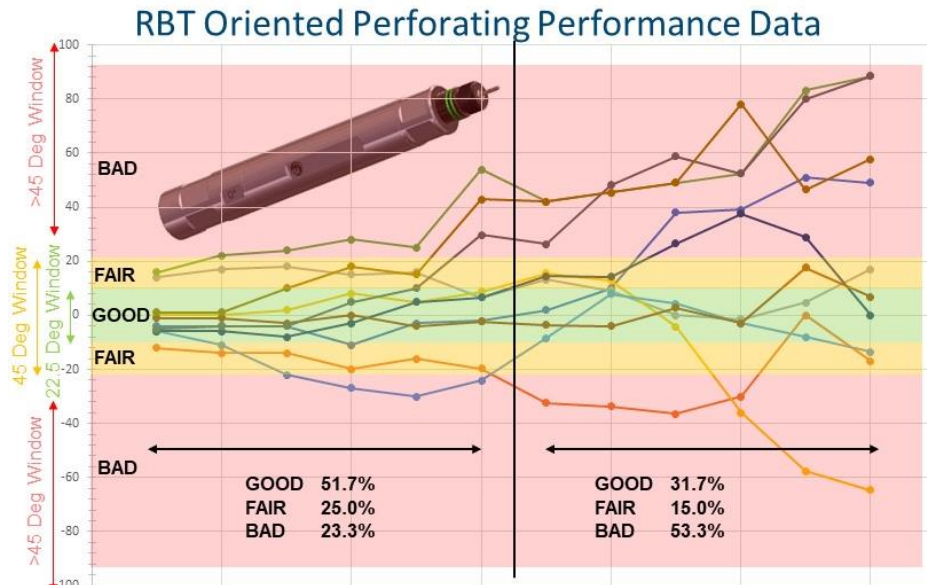
To evaluate the effectiveness of different hardware and configurations and determine the results in real-time, the customer chose the Impact Selector Relative Bearing Tool (RBT).

The RBT is a plug & play, ballistically rated, relative bearing service. It uses an arrangement of triaxial accelerometers to determine tool high side and borehole inclination. It outputs these measurements in real-time, allowing gun orientations to be plotted and changes to the gun configuration evaluated for effectiveness.

Results – Improving Oriented Perforating

Over the course of 900 gun initiations on one customer pad, cluster accuracy was found to have a dependence on initial alignment tolerance and to the order in which a gun was fired. Earlier clusters in a stage had better accuracy than later clusters and gun assemblies with better initial alignment, remained better aligned overall.

Evaluation of the data in real-time showed that the base configuration resulted in only 27% of shots being fired within a 60 Degree window to the desired direction. Changes to the configuration on location resulted in an immediate 50% improvement to the base case setup for subsequent stages.



Value to Customer – Operational Assurance

- The Impact Selector Relative Bearing Tool allowed the customer to make operational changes that quickly impacted the performance of their oriented perforating operations.
- The plug and play nature of the Relative Bearing Tool means that it can be deployed and be operationally ready in minutes with minimal training required on how to operate the service.
- Service integration within REEL-Time Data Series allows selection of additional sensors for operational assurance, including head tension/compression, pressure, and temperature.