Direction by Design™ Software
A New Approach to Bit Design for Optimal Directional Performance.
Direction By Design Bit Optimization Software

The Science Behind the Bit Solution

Halliburton leads the development of the science to design reliable, high performance bits. With the introduction of the powerful modeling capabilities of Direction by Design bit optimization software, it is now possible to define the connection between specific bit design changes and quantify their full impact on directional deliverables. Central to our strategy of overall design optimization, this advanced capability means bit design and matched drilling system performance are optimized together.

For the customer, it means these key benefits:

- The ability to quantify the impact of changing bit features and dimensions on steerability, bit walk and bit face control for any given well trajectory and BHA
- “Apples to apples” comparisons to assess which bit design will best balance all the required attributes for efficient directional performance in a specific application
- Analysis of how changing operating parameters will affect performance outputs of a particular bit design for real time optimization at the rig site

Direction by Design Software Can Be Used to Model a Variety of Systems

Accurately evaluating the impact of design on bit directional behavior requires in-depth understanding of the drive/steering mechanism utilized. Without such understanding, bit design is a “trial and error” process.

Direction by Design software is used to optimize drill bit performance for all directional drilling configurations:
- rotary steerable systems
- directional motors
- vertical automated systems

Each of these configurations differ in the way in which they direct the drill bit and influence the interaction between the cutting structure and the formation during build or drop.
**Performance Evolution**

The three Direction by Design software outputs are used to select and optimize bit features and dimensions to continuously drive enhanced performance in your unique directional application.

This continuous evolution replaces the traditional "trial and error" approach.

**Direction By Design Outputs**

Direction by Design software determines the effects of bit geometry parameters on steerability, bit walk tendency and bit face control during directional drilling to account for different bit behaviors during kick-off, build and hold drilling modes.

**Steerability (Side Force Required)**

Designers simulate a range of bit actions and quantify the affect on steerability.

**Bit Walk Tendency**

In this application, the bit is designed with a right-hand walk in order to offset a tendency toward undesired left-hand walk and remain centered on the well path.

**Bit Face Control (Torque Variation)**

Analysis of torque variance between different areas of the bit design allows maximum aggressiveness without over-engagement that can contribute to damaging vibration.

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**Performance Evolution**

- Identifying optimum cutter back rake selection
- Identifying optimum gauge length
- Identifying optimum blade profile
- Identifying hydraulics and cleaning configuration
The Best Optimization Service, The Most Advanced Selection Tools

**MEASURE, MODEL, OPTIMIZE**

Our continuous-improvement process of “model, measure, optimize” to define application-specific bit solutions. This process is driven by our global network of application evaluation specialists (ADE’s and AE’s). This means you work with our regional experts who understand local conditions.

**OUR LATEST ADDITION TO THE DRILLING OPTIMIZATION SERVICE**

Direction by Design software is the latest addition to the tool kit that is available to our ADE and AE specialists to carry out the service, complimenting our industry leading rock/drilling mechanics and design software.

Direction by Design software eliminates the lengthy and expensive trial and error approach.

**DIRECTION BY DESIGN THROUGH THE DIRECTIONAL DRILL BIT OPTIMIZATION PROCESS**

Sales of Halliburton products and services will be in accord solely with the terms and conditions contained in the contract between Halliburton and the customer that is applicable to the sale.

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