

# Drillbench Dynamic Hydraulics

Evaluate and understand the hydraulic barrier

## APPLICATIONS

- Optimize mud weight and maintain proper overbalance
- Identify and avoid drilling conditions that can exceed pressure integrity boundaries
- Evaluate the impact on mud window of new drilling methods, such as dual gradient, managed pressure, and pressurized mud cap
- Evaluate thermal effects and flow or pressure buildup caused by temperature-induced changes in mud volume
- Monitor local pressure and temperature conditions to avoid exceeding tool operating limitations
- Use for all types of wells and all fluids

## BENEFITS

- Optimize procedures to drill efficiently while maintaining pressure control for all operations
- Drill virtually to identify hazards and prepare for efficient operations
- Obtain operational decision support through “what if” analysis
- Train drilling crew

## FEATURES

- Transient flow and temperature models
- Multiple fluid options
- Accurate PVT modeling, including thermal expansion
- Pressure- and temperature-dependent rheology
- Evaluation of thermal effects and changes in mud weight in static wells
- Surge and swab modeling
- Modeling for calculation of gel-breaking pressure
- Efficient simulation workflow, including batch mode to model long operational sequences
- Flexible user interface with unique features for sensitivity studies and visualization

A module of Drillbench\* dynamic drilling simulation software, Drillbench Dynamic Hydraulics is specifically designed for planning and forecasting drilling operations to manage the hydraulic barrier. An accurate dynamic hydraulic model, including temperature transients, is used for calculating wellbore pressure for all operations.

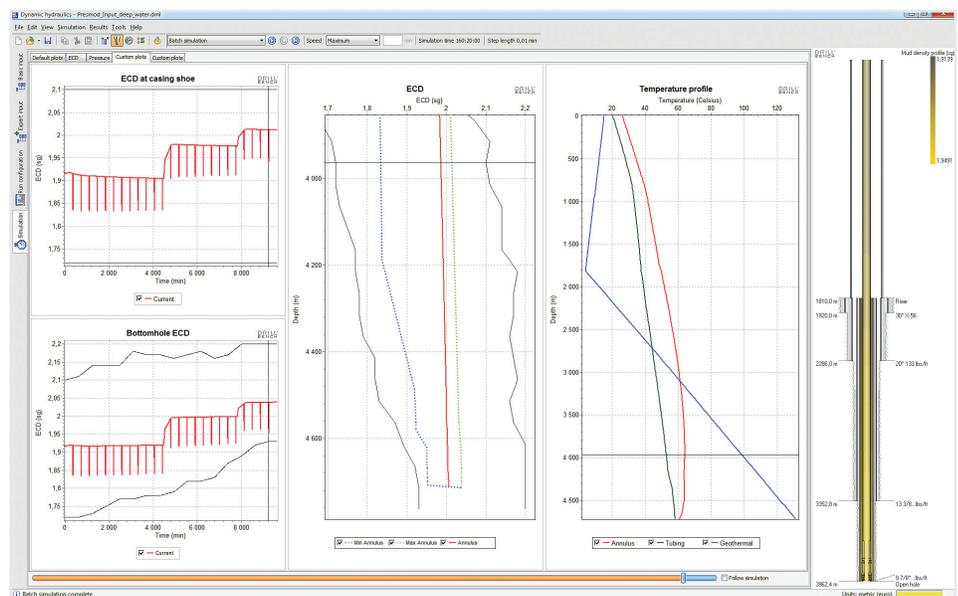
The Drillbench software is built around the well control workflow, covering pressure control, well control, and blowout control. This allows you to couple your well planning to operations workflows and provide essential input to deliver safe and efficient well construction.

The user-friendly and intuitive interface enables efficient well planning, including specification of batch jobs for simulation of an entire well section. Extensive graphics options and unique features for sensitivity studies make it easy to enhance the drilling operation.

## Optimize primary well control practices

The objective of primary well control is to make sure that the hydraulic barrier is in place for the entire drilling operation. The drilling process is highly dynamic and includes periods of drilling, circulation, static periods, and breaking of circulation after long static periods. Temperature conditions vary significantly during the different operations and have a significant impact on the hydraulic barrier. Understanding the impact of various operations is key to reaching challenging drilling targets.

When the operational window between pore and fracture pressure is decreasing, the importance of a transient model increases. Therefore, proper planning that includes transient effects clarifies the drilling challenges and helps to mitigate unnecessary loss of productive time. Narrow mud-weight windows are quite common in challenging wells, such as deepwater, extended-reach and HPHT wells, but are also typical when drilling through depleted zones.



Use Drillbench Dynamic Hydraulics to model the equivalent circulating density relative to the mud-weight window when forecasting the operational pressures to ensure that the well integrity boundaries are not exceeded.