DRILLTRONICS MAKES AUTOMATIC DRILLING POSSIBLE
Safety and performance are key considerations during drilling operations. To achieve excellence in these areas the drilling team must understand what is happening in the wellbore, have reliable tools for identifying potential problems and effective safeguards that will prevent minor issues from developing into major problems.

The variability of drilling operations makes it difficult to implement rigid procedures that will work everywhere. Each borehole requires a different approach and places new demands on the driller and the drilling system.

DrillTronics® is a unique drilling automation and safeguarding system that can boost the safety and efficiency of drilling operations in all scenarios. Embedded in the rig’s Drilling Control System, DrillTronics can control swab and surge effects, manage pump startup, conduct automated friction tests and reciprocation. DrillTronics also offers immediate, automatic intervention when it detects conditions that will lead to drilling incidents.
AUTOMATED PROCESS CONTROL ENHANCES DRILLING SAFETY AND PERFORMANCE

DrillTronics automates drilling process control, enabling drillers to optimize and enhance the safety of their operations. Integrated with the rig’s Drilling Control System machine controls for drawworks, top drive, and mud pumps, DrillTronics applies advanced modeling capabilities to maintain wellbore stability and reduce non-productive time.

DrillTronics calculates a safe operating envelope for drilling. It does this by using real-time feedback data from the wellbore to determine the downhole condition. By combining this information with the driller’s actions (string accelerations, velocities, rotation, pump start-ups and flow rates) it evaluates if this could cause the dynamic downhole pressure to reach or exceed wellbore stability and geopressure limits.

A fully operational DrillTronics system will:

/ Apply operational safeguards to ensure that wellbore conditions remain within the geopressure window, even during transient operations.
/ Provide automatic safety mechanisms that respond to drilling incidents (such as possible pack-offs) and take corrective action to prevent problems from becoming more serious.
/ Conduct automatic sequences that enable the driller to focus on the most important information while executing standard operations in a consistent way.

In this example the system reacted instantaneously to hook load outside normal limits. This prevented further set down weight and signaled the driller that an issue has been detected. The driller stated afterwards that DrillTronics reacted slightly before him and that the sound of the drawworks brakes triggered him to immediately react and brake.
DRILLTRONICS is different. It reads the well conditions and executes processes based on this understanding of the downhole conditions.
A UNIQUE AND POWERFUL SOLUTION
DrillTronics has been designed to assess drilling processes and changing well conditions and to implement corrective actions. These actions range from adjustments that will safeguard the wellbore, to direct, triggered intervention that halts a drilling process to prevent serious problems.

Conventional control systems drill as instructed, take no account of the well situation and rely on the driller to stop detrimental processes. DrillTronics is different. It reads the well conditions and executes processes based on this understanding of downhole conditions.

An effective automation capability means that DrillTronics can perform smart tasks and processes in the same way time and again. This delivers higher levels of repeatability and minimizes the risks of inadequate safety margins or damage to the well.

DrillTronics helps the driller by:
/ Monitoring and controlling swab and surge to prevent kicks or formation break down.
/ Managing pump startup to prevent formation fracturing and shutdown to prevent swabbing.
/ Estimating downhole pressure variations for the entire openhole well section.
/ Performing a controlled pump rate reduction or shutdown if pressure indicates possible pack-off (approaches the fracturing pressure) or if an erratic increasing pressure signature is detected.
/ Conducting automated friction tests and reciprocation.

/ Every borehole requires a different approach and places specific demands on the driller and the drilling system. DrillTronics uses feedback from the wellbore, such as pressure and ECD, to calculate safe limits. It applies these limits to the Drilling Control System and key machinery to ensure safe and optimal operations.
DRILLTRONICS HELPED STATOIL CUT RIG TIME PER WELL BY 4% ON THE STATFJORD C PLATFORM.
SAFETY AND DRILLING EFFICIENCY COMBINED

When operated in its fully active mode, DrillTronics calculates safe limits and applies these to the Drilling Control System. Under the default setting all of the automated functions, safeguards and safety triggers are active, but this setup can be configured by the drilling team to meet the specific needs of each operation.

DrillTronics was developed as a safeguarding system that eliminates human errors and helps drillers avoid major incidents such as technical side-tracks. However, experience has shown that the system also helps drilling teams avoid some of minor issues that slow operations without being seen or recorded as downtime – invisible lost time.

RIG TIME REDUCTION FOR STATOIL

The world’s first deployment of an automated drilling control system helped Statoil cut rig time per well by 4% on the Statfjord C platform. The drilling team used DrillTronics to optimize manual operations such as tripping, and to automate repetitive drilling activities such as friction tests, pipe filling, connections and pump start-up.

DrillTronics delivered advanced modeling of well conditions and closed-loop control of the drilling control system to provide automatic safeguards for pressure, torque and hoisting velocity.

After three wells, the drilling team had recorded an overall time saving of 4% per well through automation of repetitive sequences such as pump start-ups and friction tests. Further time savings (2–8% per well) were realized by optimizing manual operations, such as active safeguards and safety triggers, and other improvement initiatives implemented by the rig team.

/ The friction tests, performed on Statfjord C, show the difference between manual and automated. The automated friction test performed by DrillTronics is consistent every time and gives value by providing comparable results.

DRILLTRONICS PERFORMS AUTOMATIC SEQUENCES IN A CONSISTENT WAY.
THE POWER OF DYNAMIC MODELING

Sekal technology is based on three tightly coupled real-time dynamic models – hydraulic, mechanical and thermodynamic – that simulate wellbore condition and characterize improvement or deterioration during drilling. These models continuously assess drilling performance, borehole conditions, and associated risks based on real-time symptom detection.

Our products offer real-time modeling of key drilling variables such as hook load, surface torque, cuttings transport, pit volumes, standpipe pressure and dynamic ECD. They also calculate fluid temperature and density evolution, mechanical and hydraulic friction in the wellbore, all of which highlight changing hole conditions and potential problems.
Sekal AS is an international technology company offering uniquely powerful software systems and expertise for real-time dynamic monitoring and integrated drilling process automation in the oil and gas industry. We help clients to control drilling activities from their operations centers. We also drive down costs and reduce risk exposure through automation and by moving personnel from the rig site to the office.

Our aim is to be recognized as an industry leader, setting the standard for real-time monitoring and automation of drilling operations and shaping the future of drilling technology.

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