# DrillVibe

## Real-Time Vibration and Stick-Slip Monitoring to Improve Drilling Performance

**DrillVibe** provides real-time analysis of down hole torsional and axial vibrations without the wait of discontinuous mud pulse data. GEOLOG specialists interpret the continuous, high frequency data feed and highlight when changes to drilling parameters, such as RPM and Weight on Bit (WOB), need to be adjusted to minimize vibrations. These vibrations are responsible for pipe fatigue, bit wear and reduced rate of penetration (ROP) and therefore need to be closely monitored to prevent bottom hole assembly (BHA) failures and improve drilling performance.

## Benefits

- Optimize drilling parameters to changing vibration trends
- Optimize bit selection and BHA design
- Reduce risk of BHA damage due to severe vibrations and stick-slip
- Real-Time vibration wave characterization (location, severity, duration, and frequency)
- Automatic alert of dangerous vibration levels
- Reduce AFE and tool repair costs
- Reduce NPT

## Challenges and Solutions

The key in vibration analysis is having high frequency data available in real-time, without having to wait for mud pulse data. Without it one cannot take immediate action to prevent catastrophic failures downhole or improve drilling performance.

LWD vibration monitoring systems use downhole accelerometers which are limited to bottom hole vibration detection. Their mud pulse telemetry systems provide low frequency data which are ineffective to adequately prevent BHA and drill string damage. Drilling in underbalanced environments also poses a challenge since mud pulse systems cannot transmit data without a fluid medium.

*The solution to these challenges lies in using utilizing surface sensors for RPM, Weight on Hook, Torque, and Stand Pipe Pressure for entire drill string monitoring. DrillVibe provides a continuous monitoring solution to mitigate risks and improve drilling performance in any drilling environment.*

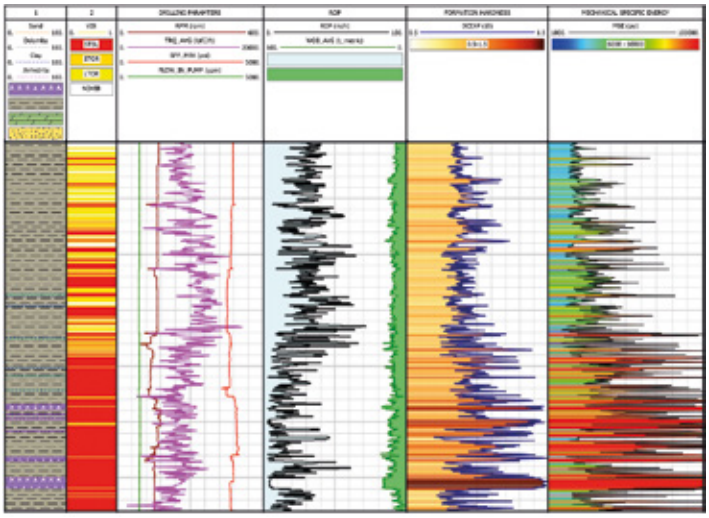
## Applications

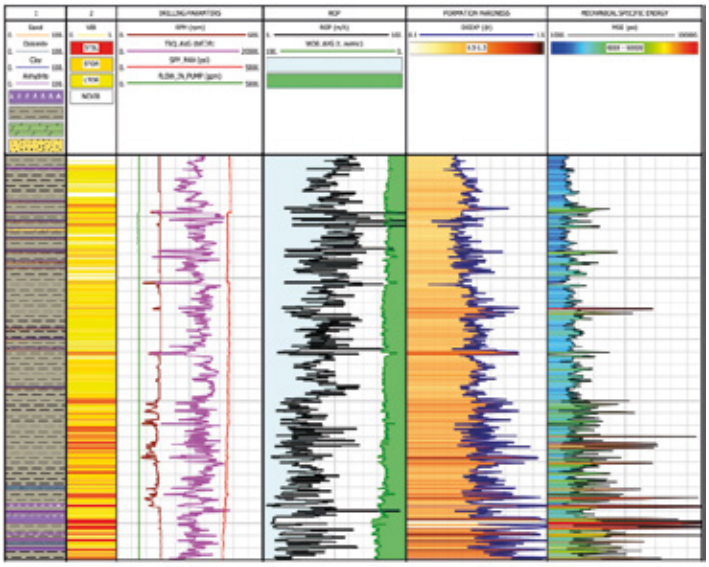
DrillVibe can be applied in both offshore and onshore environments regardless of underbalanced or overbalanced drilling conditions. This surface solution can be applied to horizontal and vertical wells as well as high pressure and temperature environments (HPHT) with no downhole tool risk.

DrillVibe

# Case History

DrillVibe Service Saves $138,000 USD





Well #1

DrillVibe service was utilized during a multi-well drilling campaign in North Africa. While drilling the first well severe stick-slip was identified and reported to company personnel. The red and yellow flags in track 2 highlight the severity of the events from stick-slip and torsional vibration (red being severe). The high MSE readings in track 6 correlate to stick-slip severity, demonstrating inefficient drilling.

Changes to drilling parameters to mitigate these effects were unsuccessful. As a result Well #2 (not shown) was not able to show significant improvement.

Well #3

DrillVibe analysis of the previous two wells demonstrated the bit used was not optimal for the lower cretaceous shale, causing severe stick and slip.

Changes to the bit and stabilizer placement were implemented based on the DrillVibe analysis from Well #1 and #2.

As a consequence of drilling with optimal parameters, Well #3 was drilled more efficiently with less torsional vibration, a decrease in mechanical specific energy (MSE) and an increase in ROP. The bit was found to be less worn than on the previous two wells. The result was a significant savings of 19 hours of on bottom time with an estimated savings of $138,000 USD.

| Well | 12 ¼" Section Length (m) | 12 ¼" Section On Bottom Hours | Average ROP m/hr |
|---|---|---|---|
| 1 | 2107 | 61 | 34.5 |
| 3 | 2136 | 42 | 50.8 |

## Specifications

| | |
|---|---|
| Analysis Channels | 10 |
| Continuous Acquisition Rate | 50 Hz |
| Frequency Analysis | Fast Fourier Transform |
| Detection Resolution | 1 second |
| Data Storage | Time and Depth |

## GEOLOG around the World

GEOLOG SURFACE LOGGING