Drilling Software | Sophisticated Yet Simple

BHAPRO
BHA Mechanics Model

Overview

In the modern oil well drilling industry, a typical Bottom Hole Assembly (BHA) always works in a harsh downhole environment and must survive severe mechanical and thermal loads. The complex loading conditions can cause various types of failures such as bit wear, directional control failure, low ROP (rate of penetration), low quality of measurement data, and so on. Modern BHA may include expensive equipment such as mud motors, rotary steerable systems (RSS), and M/LWD tools. Extending their service lives and fully achieving their functions are the main concerns of successful oil well drilling.

With an increasing number of long horizontal and extended-reach wells, Pegasus Vertex believes that BHA performance prediction has become a critical process during the planning phase of drilling operations. Therefore, Pegasus Vertex developed BHAPRO, a software that calculates the stress and BHA components under complex downhole loading conditions. With the aid of BHAPRO, we are able to locate contact points between BHA components and wellbore wall, and also identify critical rotary speed (RPM) to avoid detrimental vibrations. Thus, users are able to optimize BHA design, improve BHA performance as well as reduce failure risks.

Benefits

Enhanced Data Quality

- Ensures high-quality measurement data by maintaining the integrity of M/LWD tools and other measurement equipment, which is crucial for accurate decision-making and efficient drilling operations

Enhanced Performance and Reliability

- By calculating stress and identifying critical RPM to avoid harmful vibrations, BHAPRO reduces the risk of bit wear, directional control failure, and low ROP, improving drilling performance and reliability.

Improved Planning and Efficiency

- Supports planning for long horizontal and extended-reach wells by predicting and mitigating potential issues, leading to cost savings and operational efficiency.
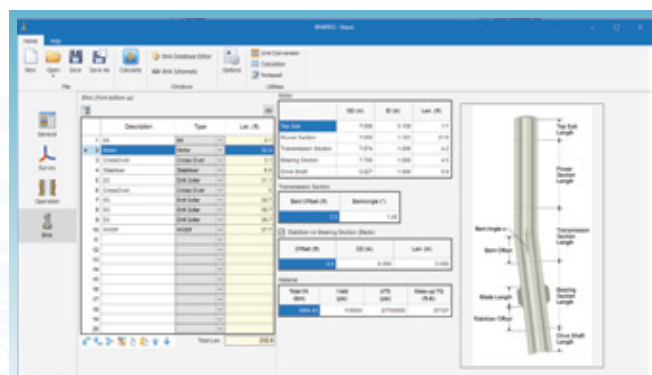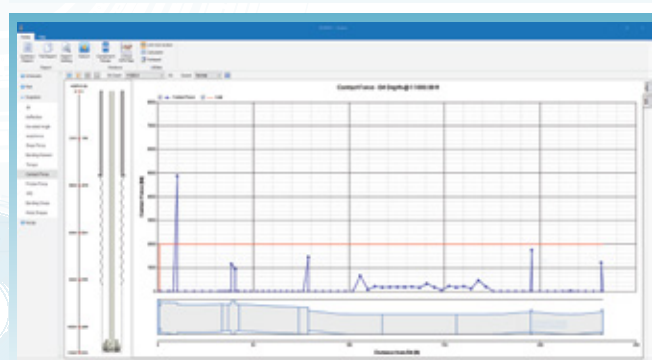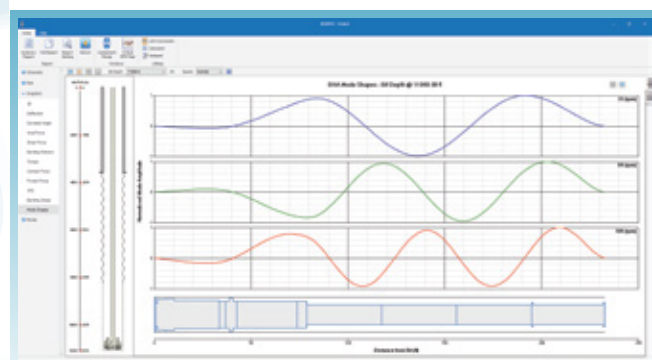
BHAPRO–BHA Mechanics Model

Features

- 9 types of BHA components
- Up to 20 BHA component selection
- BHA force, stress, and deformation calculation
- Failure risk identification and estimation
- Wellbore tortuosity simulation
- Up to 10 points of analysis in one run
- Critical rotary speed analysis
- Contact point prediction
- Contact and friction forces calculation
- Bend angle and hole over gauge effect
- Finite element model
- BHA visualization
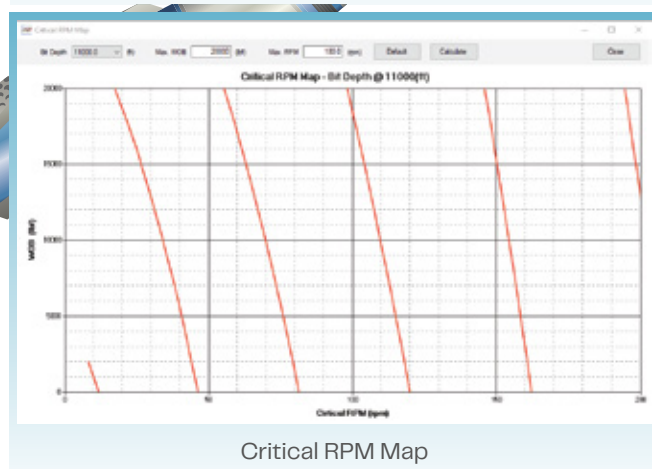- Result data snapshot and recap
- Editable and expandable BHA database

System Requirements

- Microsoft Windows® 10 or above
- Microsoft Office® 2016 or above
- Dual-core Intel or AMD processor, 1.4 GHz or higher. Quad-core CPU recommended. Not compatible with ARM processor
- 4 GB RAM (8 GB Recommended)
- 200 MB of free disk space for installation
- 1,280 x 768 display resolution

BHA Data Input

Contact Force and BHA Deflection

Mode Shape

Critical RPM Map