

2026 Drill Bit Forum and Exhibition




Highland Pines Golf Club

February 24, 2026

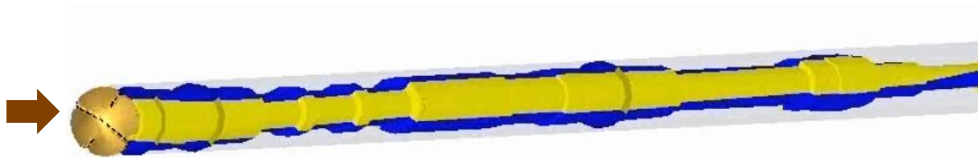
Smooth is fast: A New Simulation Based Approach to Design Stable PDCs for RSS

Armin Kueck, Franklin Valbuena, Ahmed Hanafy, John Bomidi

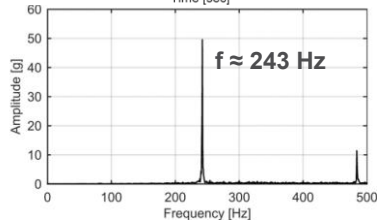
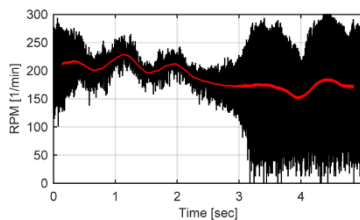
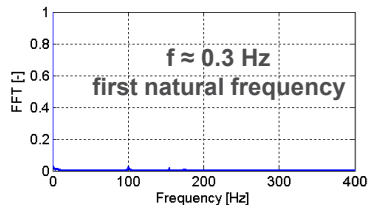
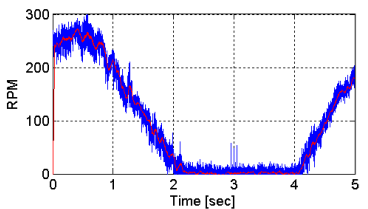
Speaker Information

- Armin Kueck
- Principal, Mechanical, R&D
- Ph.D., Mechanical Engineering, TU Braunschweig, Germany 
- Baker Hughes – 14 years
 - 10 years Drilling Services, Celle, Germany
 - 4 years Drill Bits, the Woodlands, USA

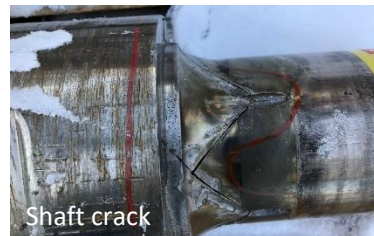
High-Frequency Torsional Oscillations



Stick/Slip: 1st Mode of Drill String

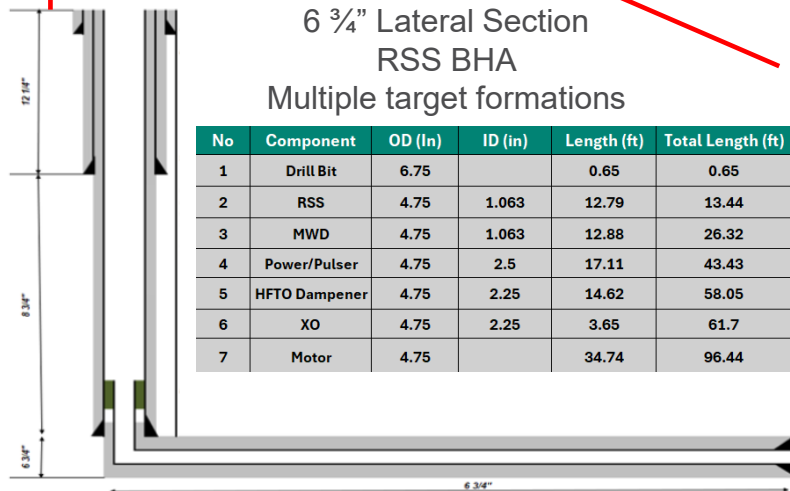


- Torsional BHA vibration between 50 Hz and 500 Hz
- Generates high dynamic torque and tangential accelerations
- Triggered by bit-rock interaction



Controlled ROP
NTP, TFF
Maintenance Costs

Evaluating drill bits in the Permian basin

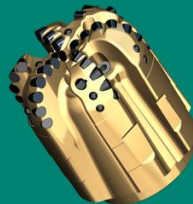


3 different PDC designs

SPE-230800-MS

Design 1

6 3/4" PDC bit with 6 blades
13mm planar cutters
Depth of cut control
Lateral stability feature
No backup cutters



Design 2

6 3/4" PDC bit with 6 blades
11mm mainly planar cutters
No depth of cut control
Lateral stability feature
Backup cutters



Design 3

6 3/4" PDC bit with 6 blades
13mm planar cutters
No depth of cut control
Lateral stability feature
No backup cutters

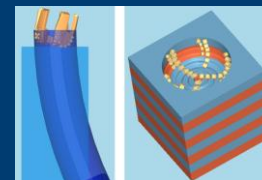


Statistical data from 33 wells:

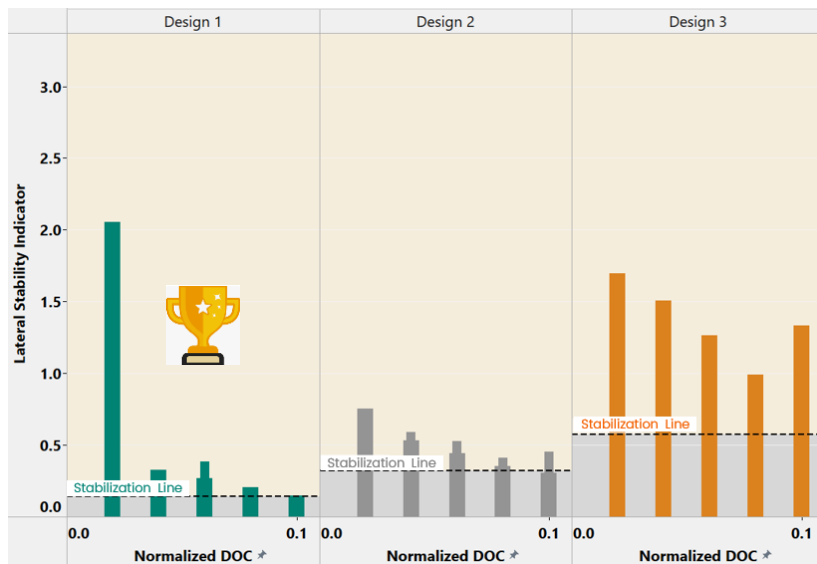
- Lateral vibrations
- Torsional vibrations
- ROP
- Tool reliability

See also: SPE-230800-MS • Beyond the Benchmark: Integrating Field Data and Simulation Models for Enhanced PDC Bit Selection in the Permian Basin • Franklin Valbuena

Simulation Indicators

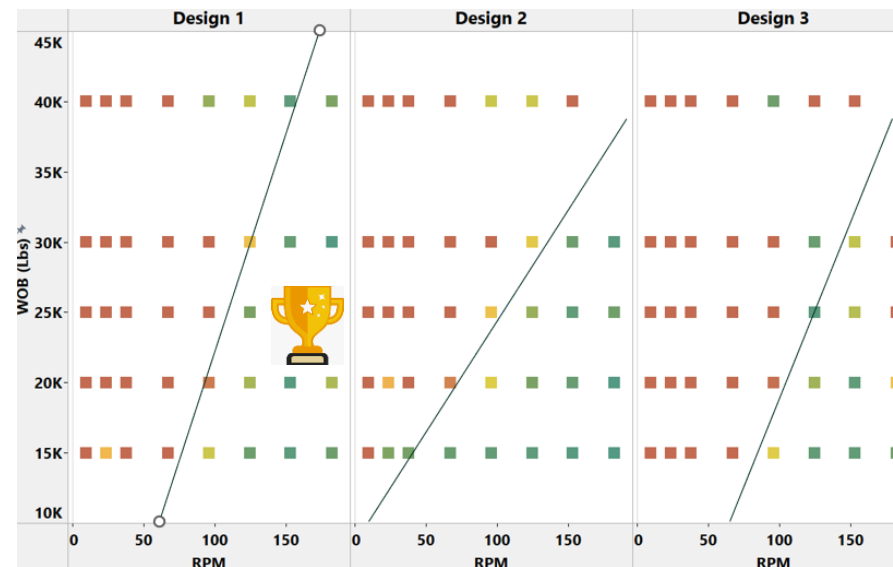


Lateral Stability



HFTO Indicator

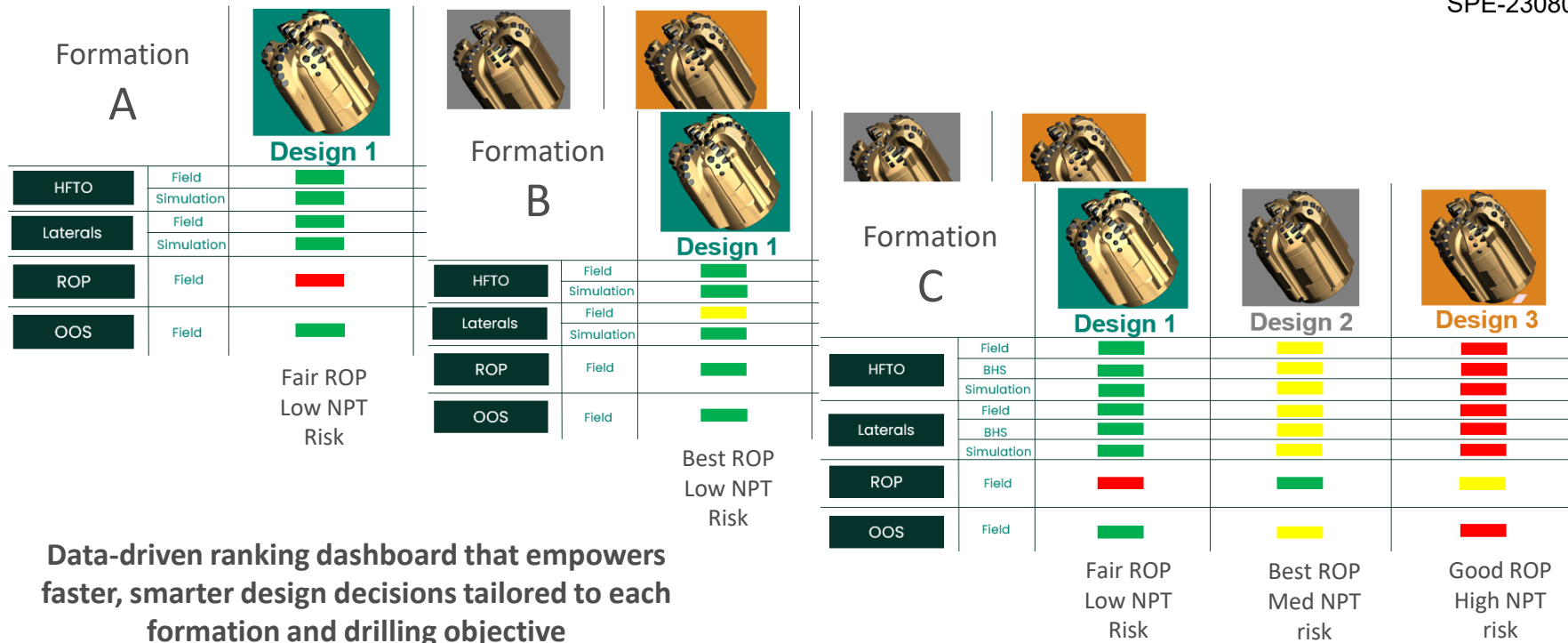
SPE-230800-MS



Simulation indicators proven to match field results, empowering a smarter, more reliable design toolbox for future innovations

Ranking Dashboard

SPE-230800-MS

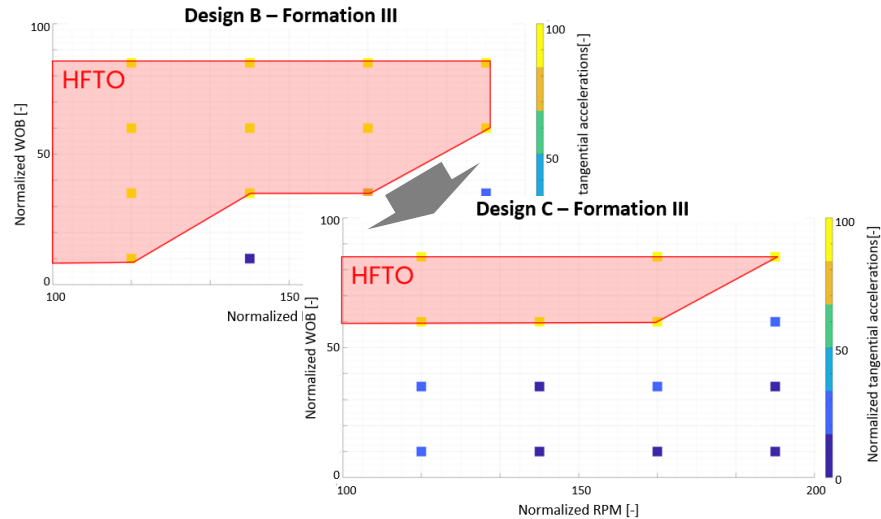


Data-driven ranking dashboard that empowers faster, smarter design decisions tailored to each formation and drilling objective

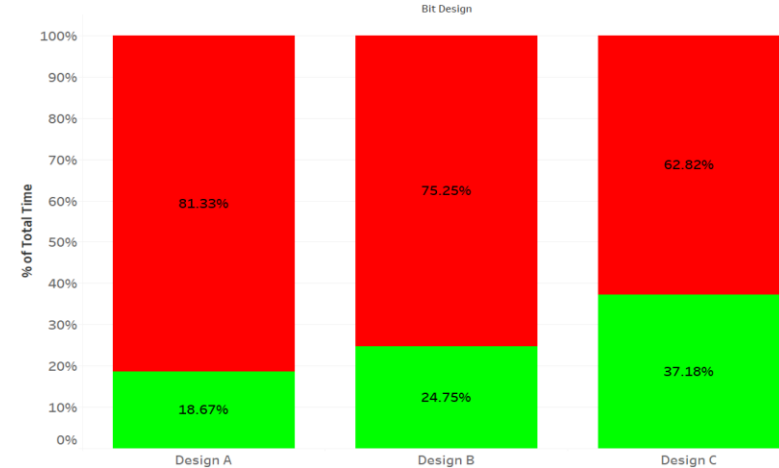
Extension to worldwide regions

Middle East

SPE-227813-MS



Total HFTO Time Formations II and III



- HFTO window increased by 30% in field operations

- HFTO free time increase by 19%

+ 8 more regions

Conclusions

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- New design methodology leads to more stable bits
- New simulation capabilities enable design optimization before production
- HFTO stability, lateral stability and ROP increased by new bit designs

Outlook

- Introducing next generation PDC technology for global RSS applications

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Thank You

