Automation for Safer and Faster Drilling

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Organizational Value: Automation and Safety

“Goal Zero” with current technology is achievable....

Serious Incidents:
- Dropped Objects
- Pressurized/Energized Equipment
- Falls from Height
- Road Transport
- Fitness to Work

Less Serious Incidents:
- Slips/Trips/Falls
- Hand Positions, etc.

...but automation will help reduce human exposure and associated risks
Business Value: Tackling Invisible Lost Time

Total Drilling Time

Technical Limit  Gap

ILT  NPT

Removable Time

Addressing ILT: drilling faster & reducing time “waste” from well delivery
Drilling Efficiency Optimization (DEO)

DEO currently achieved through human interaction, but automation would bring more consistency in finding and maintaining optimum parameters.
Drilling Automation – Soft Torque Rotary

**STRS Benefits**

- Modulates surface RPM and torque to break the pattern of downhole stick-slip vibrations
- No human (inter-)action necessary (besides calibration)

**STRS Developments**

- Top-drive modulation systems developed, trials ongoing
- Next step: automating drill-off tests to establish optimum drilling parameters
Automatic Rig Activity Detection (ARAD)

- Drilling Rotary
- Drilling Sliding
- Ream & Wash Up (backreaming)
- Ream & Wash Down (into hole)
- Wash Up (out of hole)
- Wash downwards (into hole)
- Run Into Hole
- Run Out of Hole
- Circulation On
- Make Connection
- Other / Unrecognized
Comparing Crews – Connection Time

Performance variations from rig-to-rig, well-to-well, crew-to-crew, individual-to-individual
Optimum Performance Standardization using Automation

Narrow, optimized performance distribution for a group of wells, rigs, crews

Widespread, non-optimized performance distribution for a group of wells, rigs, crews
Summary

Case for Automation:

✓ Improving safety by reducing hazardous exposures

✓ Faster drilling, achieved through automated selection and maintaining of optimum drilling parameters (e.g., breaking stick-slip with STRS)

✓ Reduction of time “waste” caused by inefficiency and natural variation in human performance