

## **CATENA Angel (ENGIE Electroproject B.V.)**

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**Van:** Reinout Storm <Reinout.Storm@taqaglobal.com>  
**Verzonden:** maandag 4 november 2019 10:57  
**Aan:** CATENA Angel (ENGIE Electroproject B.V.)  
**Onderwerp:** TAQA; SoftTorque system on Maersk Resolute  
**Bijlagen:** MWD\_Drilling\_Mech\_TIME\_03Nov19\_234330\_000.pdf

Dear Angel,

Via this email I would like to thank you and your team for all the efforts made to install the SoftTorque system on the Maersk Resolute. The system was installed in time to start using it in the challenging Chalk section of TAQA well P15-20G2. The rig performed some tests with the various torque compensation systems onboard, to try and make an objective comparison between them. Attached is the Schlumberger MWD log, which provides an indication of stick/slip at the bit in combination with the torque figures.

Please see below for parameters that were kept consistent for all systems.

Hole size = 17 ½"  
Drillpipe = 5 7/8" VX57  
Bit = Stingblade PDC  
Depth = 1901m  
RPM = 140 rpm  
WOB = 14-16T  
Flow rate = 4400 lpm  
Pressure = 131 bar  
MW out = 1.18 SG  
Formation being drilled = Ommelanden Chalk  
Mud being used = GEM / Polymer mud

Timing breakdown (all time prior to 23:00 had the ElektroProject Soft Torque "Normal" mode on)

23:00 – 23:04 - No torque compensation systems used – Torque range = 7 – 42 kftlbs

23:04 – 23:14 – Maersk Adaptive Torque – Torque range = 16 – 42 kftlbs

23:14 – 23:23 - ElectroProject Soft Torque "Mild" mode = 22 – 23 kftlbs

23:23 onwards - ElectroProject Soft Torque "Normal" mode = 22 – 23 kftlbs

As you can see, your system is providing a significant reduction in both torque range and maximum torque while increasing ROP at the same time.

Regards,

Reinout

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