



ELECTROPROJECT SOFT TORQUE

First documented Operational Soft Torque system for AC RIG's worldwide

ELECTROPROJECT SOFT TORQUE (EPST)

First documented Operational Soft Torque system for AC RIG's worldwide

'Stick-slip' is a common occurrence in drilling operations that can result in torsional drilling vibrations, which cause detrimental effects for drilling performance and equipment. Following a long period of inferior performance with existing commercial systems, ElectroProject Soft Torque has been successfully deployed on several RIG's worldwide with impressive results.

DOCUMENTED RESULTS

- Elimination of Stick Slip
- Improved well bore
- Lower torque vibrations
- Less wear and tear on down hole tools
- Up to 70% ROP improvement
- Improved steerable system performance
- Reduced bit damage, longer bit runs
- Savings from thousands to millions

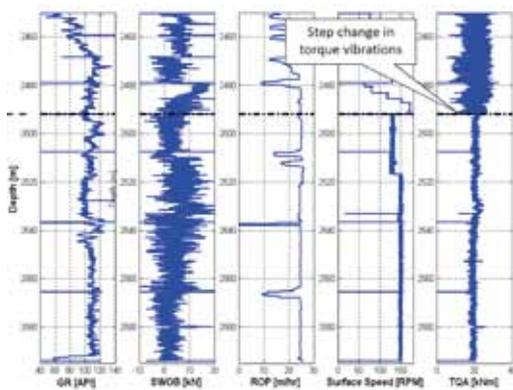
COMPARISON OF BIT WEAR



NO EPST



WITH EPST

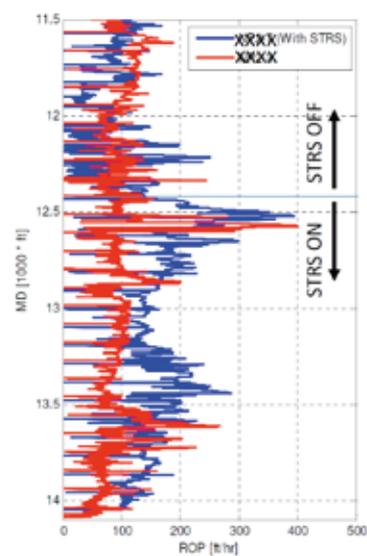


Source: Shell E&P

EPST NORTH SEA

North Sea Jack-up RIG AC

6% inclination
 12¼" section; PDC
 5½" DP to surface
 2450-5550 metres
 Salts & hard abrasive sands



Source: Shell E&P

EPST QATAR

Comparison batch drilled 8½" with and without EPST 'ON'

EPST PROVEN TECHNOLOGY

Experience shows that a relatively constant speed of the drill is optimal for effective penetration, low drill wear and good steering conditions.

EPST, dedicated 'Stick-Slip' mitigation improves drill performance

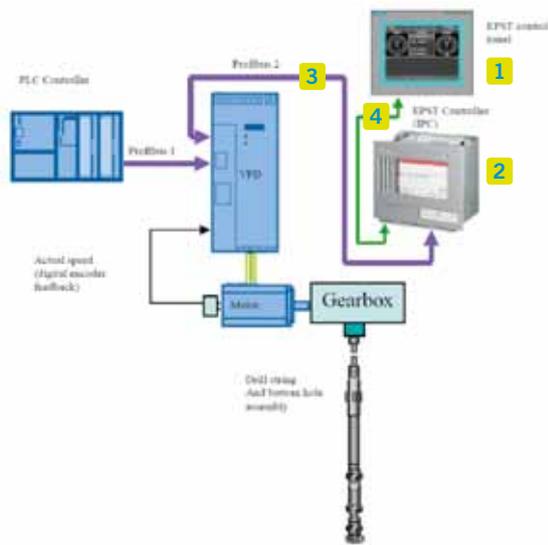
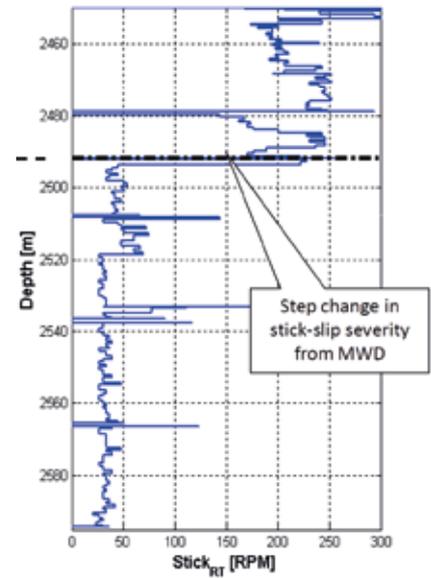
At certain depths and depending on drill conditions, including friction on bit, drill speed and weight on bit, the drill bit can 'stick' down hole while the drill string keeps rotating. The drill pipe acts as a torsional spring. At a certain torque value, the 'stick' friction is overcome and the drill bit suddenly increases in speed while the drill pipe 'unwinds' itself. This sudden increase in speed

can damage the bit. Also, steering rotary drilling operation is very difficult under 'stick-slip' conditions.

The EPST system is especially designed to mitigate 'Stick-Slip' behaviour to improve drill performance. The results are impressive.

THE AVERAGE RETURN ON INVESTMENT IS ONE DAY OF STICK SLIP MITIGATION.

DOWNHOLE STICK SLIP



EPST includes the following components:

- 1 A touch panel to operate the system.
- 2 An industrial PC (IPC). The Soft Torque controller.
- 3 An additional communication interface with variable frequency drive (VFD) or SCR
- 4 Ethernet communication between touch panel and IPC

SYSTEM ADVANTAGES

1. The EPST system is designed to be easily implemented in modern drive systems.
2. The EPST controller is a stand-alone and a RIG specific μ -processor-based controller.
3. It can operate without any interface with the RIG controls.
4. No changes are needed in the existing RIG controls.
5. Implementation can be completed within hours. Down time is reduced to an absolute minimum. The average down time while commissioning is one hour.
6. EPST can be switched 'ON' or 'OFF' on demand by using the high resolution touch screen without limiting TD control abilities.
7. EPST includes a high resolution touch screen. Independent of the RIG control capabilities, the state-of-the-art visualisation equipment presents real time data to identify down hole drill behaviour.
8. EPST includes WITS communication.
9. EPST includes state-of-the-art data logging.



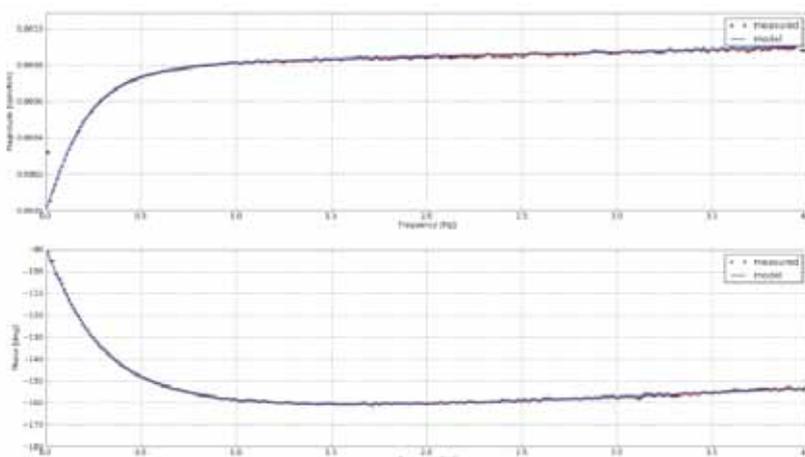
THE AVERAGE RETURN ON INVESTMENT IS ONE DAY OF STICK SLIP MITIGATION

THE POWER OF SIMULATION

The performance of Soft Torque systems depends strongly on the VFD's or SCR's configuration that is implemented.

Electroproject has 75 years of experience with VFD and SCR controls. This knowledge, combined with a great understanding of drill string behaviour, is used to create an EPST simulation tool. While engineering ElectroProject can determine the expected performance of EPST and guarantee successful implementation.

PERFORMANCE GUARANTY MODEL

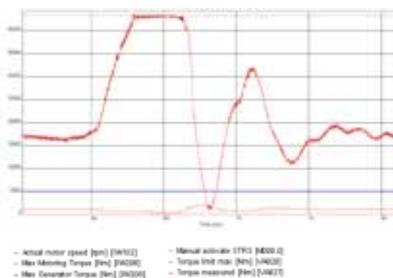


THE POWER OF HIGH RESOLUTION DATA

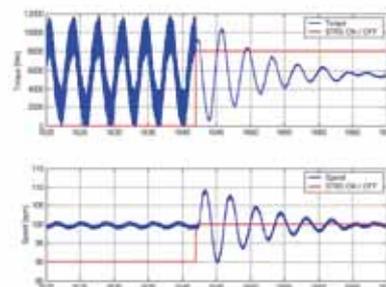
EPST includes state-of-the-art data logging technology. The EPST system stores high resolution 400 Hz data from 250 parameters. This data is organised and stored for later use.

This tool is used to verify the performance of the TD and can even be used as an event recorder to determine the cause of problems while drilling.

SUDDEN STICK SITUATIONS RESEARCHED



EPST VERIFICATION



Electroproject Aandrijftechniek

Computerweg 21, 1033 RH Amsterdam
Postbus 34, 1000 AA Amsterdam

T +31 88 484 92 50

F +31 88 484 93 04

sales@electroproject.nl

softtorque@electroproject.nl

www.electroproject.nl