AlphaApps™ CASE STUDY #03

CHALLENGES

Mitigate high stick slip in the lateral section to reduce lost time incidents, manage smooth trajectories, improve casing running times, and reduce well construction costs

SOLUTION

Utilize Z-Torque app to mitigate stickslip, reduce downhole failures, and associated challenges

RESULTS

- Z-Torque reduced the stick-slip levels by >50% in the two wells drilled
- No tool failures or damages were encountered, allowing for AFE cost reduction
- Production casing running rates were 22% faster than offsets in the area

Z-Torque Application Significantly Improves Well Performance in Austin Chalk wells

Z-TORQUE CASE STUDY

HOW Z-TORQUE WORKS

The Z-Torque system mitigates stick-slip vibrations including highly fluctuating rotational speed and torque, at multiple drill string points from bit to top drive. This is done by controlling the RPM at the top drive using advanced algorithms, designed by Shell. These algorithms expand the stick slip — free operating envelope to simplify downhole dysfunction and destructive vibrations. Drill string vibrations can cause equipment failures, broken drill bit cutters, drill pipe fatigue, and potential twist off. The use of Z-torque also allows for increased rates of penetration with less potential for trips to replace failed down hole equipment.

OVERVIEW OF CASE STUDY

One of our operator's drilling program consisted of wells in the Austin Chalk and Eagle Ford formations. Their top priority was to drill the laterals in-zone and with low variations in directional trajectory (low DLS). This was to ensure success in running the production casing and maximizing producing life of the well.

The Austin Chalk has historically had more challenging wells than those in the Eagleford. This is due to the difficult trajectory control coupled with mud losses and downhole stick-slip. Offset wells in the project had a higher rate of downhole motor/MWD failures, downhole tool wear, and excessive damages including a downhole twist-off incident.

Precision drilling proposed running Z-Torque to mitigate the stick-slip and improve lateral trajectory control. Results after the 2 wells proved very positive. Z-Torque significantly reduced downhole stick-slip to well below downhole tool specifications, notably eradicating tool damages and assisting with trajectory control. Comparisons to other offset wells drilled in the area showed that stick-slip levels matched those seen in Eagle Ford formations where a costly Oil-Based Mud solution was used.

Finally, running of production casing improved by 22%. This was made possible with a less tortuous and smoother wellbore. The last well drilled with Z-Torque allowed the operator to set a record for their longest lateral company wide in the Austin Chalk.

CONCLUSION

Z-Torque significantly reduced stick-slip by an average of 58% in the two Austin Chalk wells, eliminating downhole tool wear, reducing downhole failures, and allowing production casing to be run 22% faster than offsets in the field.

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WELL NO. 1 RESULTS

62%

Overall reduction in downhole stick-slip

WELL NO. 2 RESULTS

56%

Overall reduction in downhole stick-slip for the lateral section

WELL NO.1

As can be seen from the chart below (Fig 1), there is a marked improvement in the RPM fluctuations as measured by downhole RPM once the Z torque system is turned on. The resulting improvement in stable rotating parameters contributed to better mud motor performance leading to smoother trajectories with reduced BHA and drill string vibration through the section.

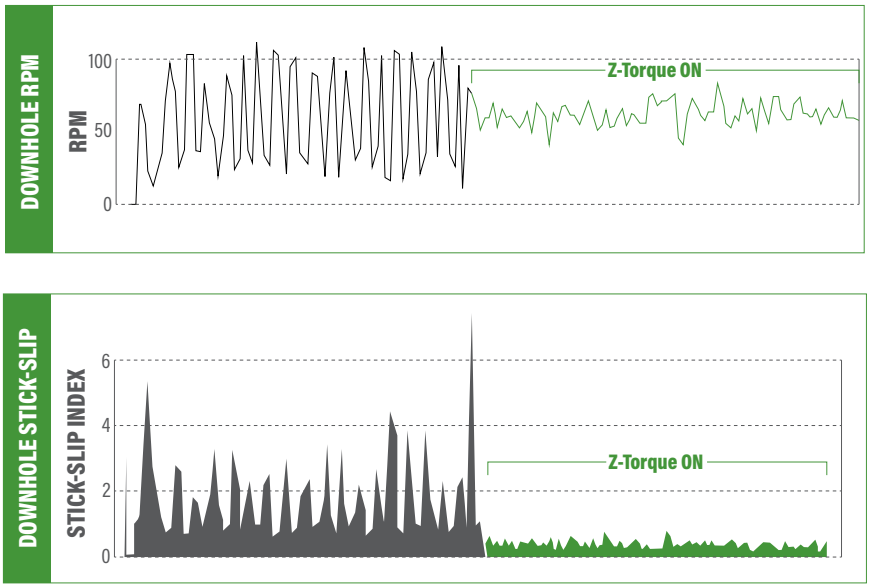

Figure 1

WELL NO.2

As can be seen from the chart below (Fig 2), drilling of the section exhibited very high stick slip measurements. The BHA's were comparable to that of other BHA's used in the field. Our analytics allowed us to better understand the behavior of drill string dynamics. This led us to using Z Torque. It can be noticed from the chart below that stick-slip reduces as soon as Z-torque is turned on. Reduction of this dysfunction led to improved rates of penetration and longer bit life.

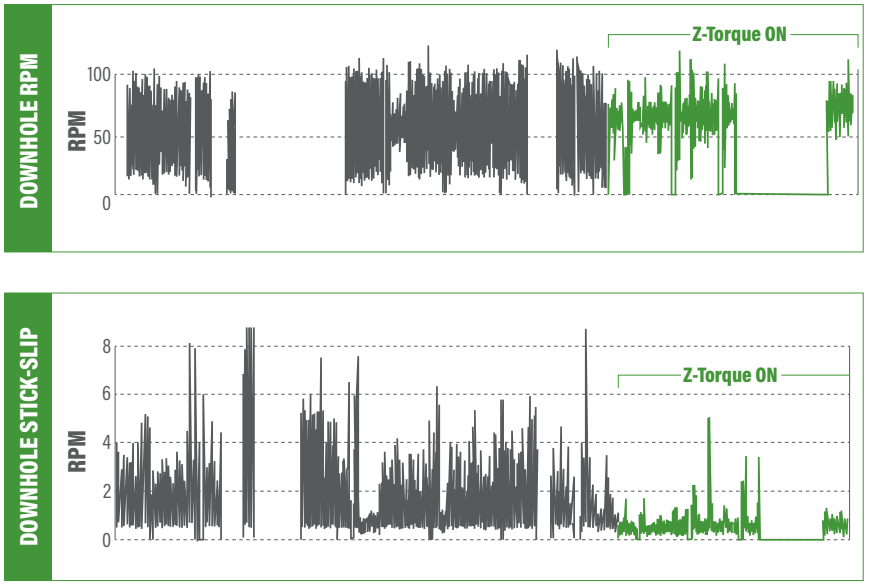

Figure 2

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