



RE-ENTRY WELL, ECUADOR

S2 SINGLE PIECE CENTRALIZERS HELP OPERATOR REACH TOTAL DEPTH DESPITE HARSH WELLBORE CONDITIONS, SAVING UP TO \$250,000 USD

Region:	South America
Well:	Mature Field

Country:	Ecuador
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THE CHALLENGE

Running casing to planned depth in mature fields wells continues to bring new challenges as deviation increases, along with the complexity of re-entry well designs. Achieving proper standoff to improve barrier integrity and cement bonds in these long branches of re-entry wells requires the use of centralizers.

Choosing the right centralizer to go through the window is crucial to minimize the risk of getting stuck due to mechanical integrity failure from centralizers or stop collars.



As part of a production increase program, an operator in Ecuador launched a drilling campaign of re-entry wells, where the lateral branch was longer than 3,000 ft, deviation was higher than 45° of inclination, and complex lithology intercalations made it hard to run the liner successfully due to combination of washouts, swelling formations, tight spots, depleted zones, and sandstone with active aquifer.

The production liner needed to be run without an additional conditioning trip after the string had been pulled out of hole (POOH). The BHA and reliable barriers were required all along the primary and secondary production zones.



S2 Award Winning Innovation

- Designed for well applications and geometries for vertical, horizontal ERD, close tolerance, or under reamed well conditions
- API Rated
- Non-welded smooth bow profile overall
- Integral bow design for increased strength and performance
- Zero weak points
- Zero start and running force with exceptional restoring force
- Low friction coefficient
- Minimum rotational torque losses
- Minimize stall out effect
- Enhanced rotation due to optimized centralization

THE SOLUTION

Halliburton collaborated with the operator recommending robust single piece S2 centralizers combined with high quality stop collars to minimize the risk of issues while running the liner through the window. In addition, the standoff was maximized to reduce the risk of differential sticking while running the liner along depleted zones.

The engineered solution to deliver reliable barriers included standoff simulations from Centek, torque and drag and iCem TMService for 2D and 3D Hydraulics modeling.

Furthermore, since rotation of the liner was identified as a key practice to achieve effective displacement efficiency and required TOC, the application of Versaflex TMLiner Hanger and Commander TM350 Cementing Head complemented the integral casing equipment solution.

“ Completing the re-entry with a single liner string allowed estimated cost savings of up to \$250,000 USD ”
Senior Engineer, Halliburton

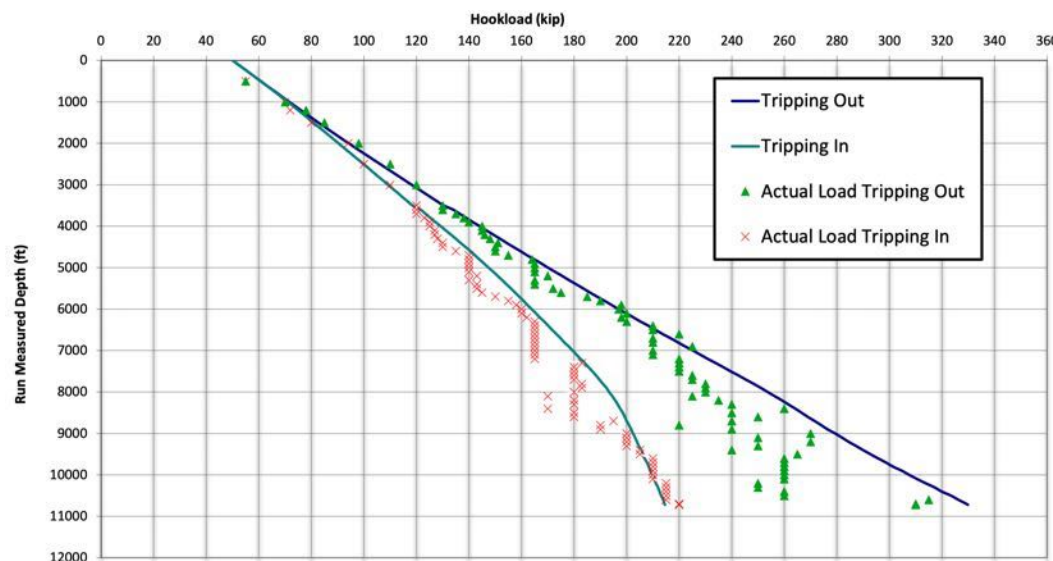
THE RESULT

The use of Centek S2 centralizers ensured casing achieved the planned depth. If planned depth had not been achieved, the change in completion plan would have caused difficulties and additional cost for the operator. The liner with 96 x Centek centralizers was able to go through out the window without any issues and was run to bottom, washing and reaming along the open hole due to the complex lithology intercalations and wellbore conditions. The heavy duty single- piece design of Centek S2 centralizers required zero running force and allowed a two centralizer per joint solution, providing adequate standoff.

The Cementing Service was executed according to design of service, rotating the liner string all along circulation and cement job.

The barrier was validated with Cement Evaluation Logs, finding the Top of Cement close to what was expected on 3D Displacement efficiency assessment. Good cement sheath was obtained even in the washouts.

The long section was completed with only one liner string and the operator has chosen to continue running two per joint single piece centralizers.



Simulated hookload and actual load during liner run

EXCELLENCE TO THE CORE