

Toe Tapper



Business Needs

Our customer, operating in the Eagle Ford field had wells that were predicted to reach frictional lock-up, where the coiled tubing would not be able to reach the target well depth. In addition to reach issues, the long wellbores dampened the weight on bit (WOB), resulting in longer milling times. The customer required an extended reach tool in order to achieve greater well depths and reduce milling times. With this in mind, CT Energy's Toe Tapper tool was mobilized.

Benefits

CT Energy's Toe Tapper is a unique coiled tubing friction reduction tool. The tool generates a negative pressure pulse that stimulates the coiled tubing frictional drag. By using a variable restrictor in the fluid flow, the Toe Tapper is tuned to dump a small amount of fluid to the annulus at a low frequency. This generates a periodic fluid hammer effect, due to a sharp reduction in pressure at the bottom of the coiled tubing. This pressure pulse actuates the flexible coiled tubing, reducing the friction coefficient from static to dynamic. The slower frequency of the tool gives more time for the energy of the pressure pulse to act on the coiled tubing, which also improves cuttings removal. The fluid hammer effect generates a mechanical force; while the valve cycles, the hydraulic inertial forces react axially and produce an impact energy pulse which improves weight transfer. This pressure pulse improves the helical buckling threshold, as the rigidity of the coiled tubing with the Toe Tapper is more dynamic, with higher rigidity at the pressure peaks.

The tool's unique capability of producing a low frequency pulse means that the tool provides a more effective friction reduction through a pressure pulse that has more time to act on the coiled tubing. As a result of this decreased friction, far greater well depths can be reached.

Applications

Using CT Energy's Toe Tapper technology allowed the coiled tubing to reach beyond the predicted lock-up depth and mill down to each wells target depth. The fluid hammer effect of the tool provided an observed 17% reduction in the coefficient of friction (COF). In addition to extending the reach of the coiled tubing on the 15 wells studied, the tool enabled a more effective WOB, milling 321 composite bridge plugs at an average time of 5.3 minutes per plug.



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Case Study Snapshot

Study Area: Eagle Ford

Challenges:

- Our customer required an extended reach tool in order to achieve greater well depths and reduce milling times.

CT Energy Solution:

- CT Energy's Toe Tapper, a unique coiled tubing friction reduction tool.

Results:

- Using CT Energy's Toe Tapper technology allowed the coiled tubing to reach beyond the predicted lock-up depth and mill down to each well's target depth.
- The fluid hammer effect of the tool provided an observed 17% reduction in the coefficient of friction.
- On the 15 wells studied, the tool enabled a more effective WOB, milling 321 composite bridge plugs at an average time of 5.3 minutes per plug.