Wear Resistant, Friction Reducing Coatings Reduce Tubing Wear in Problematic Sucker Rod Couplings Wells: Laboratory Testing and Field Trials

Jackson, MS; Howell, DA; Bailey, JR; Rajagolpalan, S; Ozekcin, A; Inglish, G; Allen, C; Romer, M;

Two wear-resistant, low-friction coatings were evaluated for use on sucker rod couplings in both laboratory and field settings. Laboratory testing simulated cyclic downhole motion while applying a realistic side loading force to mimic conditions under which tubing wear typically occurs. Standard spray-metal couplings were compared with coated couplings to assess tubing and coupling wear after 450,000 cycles. Three wells with high tubing failure frequencies were selected as field candidates for the coated couplings to assess their impact on tubing failure frequency. The coupling placement in the rod string targeted known areas of high wear in the production tubing of each well.

Laboratory results showed that both coatings reduced tubing wear substantially when compared with the standard spray-metal couplings with one coating showing almost negligible wear on the coating and tubing. During field trials, Coating A increased the tubing life from an average of 5 to 20 (4X) months without failure in the two wells tested, at which point the field trial was ended. Coating B increased the tubing life from 6 to 19 (3X) months in the single sand producing well in which it was tested. Coating A was tested in a well with low sand concentration and Coating B was tested in a well with significant sand present, showing that Coating B was able to perform in a more abrasive environment.

In summary, the described coatings drastically reduced tubing wear in the lab which also translated directly into a reduction in frequency of costly tubing repair workovers. This presentation demonstrates how novel wear-resistant, friction-reducing coated couplings can improve performance of problematic sucker rod pump wells that experience a high frequency of tubing failures due to wear through targeted placement. Coated couplings are now actively being implemented into problematic wells as workovers come up based on their strong performance in field trials.