

Rod pump monitoring and optimization: new physics for today's problems

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In reciprocating rod lift, dynamometric measurements are a well-established methodology to monitor downhole conditions, troubleshoot mechanical issues, and optimize operations. Since its early use in the 50s and the subsequent foundational work of Gibbs, this technology has become the gold standard of rod pump optimization, and many wells are now equipped with pump-off controllers (POC) that implement these principles in an industrial setting.

However, while POCs have achieved a high level of adoption on higher flow wells, they have mostly remained ignored on older, more marginal assets, such as stripper fields. And, while many operators do not focus primarily on such wells, their lease agreements, environmental liabilities, and the option value of holding acreage still compel them to operate large numbers of these assets. Today, it is simply impractical to instrument these wells with traditional POC solutions given the overwhelming infrastructure required and installation burden. As a consequence, operators of these assets mostly rely on manual surface inspections, leading to significant inefficiencies along with disproportionately high failure rates. Additionally, as the proportion of deviated wells increases, issues have been documented due to rod-tubing friction hampering the accuracy of traditional pump card analysis.

In this presentation, we introduce new developments, both in terms of sensing physics, hardware technologies and mathematical data processing, that reduce the cost of monitoring rod pumps by an order of magnitude to bring its benefits to new audiences, while complementing traditional POC setups to drastically increase accuracy in challenging environments.