

OTC-32983-MS

Unlocking Next Generation Well Construction Through Smart and Intelligent Tubular Running Process: Successful Application of Digitalization, Personnel Reduction, and Promoting Safety

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Abstract

Well Construction is one of the critical phases during which drilling is planned for tubular running, casing, and completions operation. Historically a labor-intensive and manual-operation process and the associated hazards, risks, and challenges are still faced nowadays adding complexity to meet the desired operational metrics; in addition to championing safety and maintaining full competency and operational compliance. The petroleum industry is also leaning towards a cleaner energy transition that gives rise to transforming legacy systems and solutions to improve the overall economy.

The advancements in digital solutions have helped to gain traction in various phases of the well, such as Drilling and Evaluation, Intervention, Production, and Abandonment, however, Well Construction has still yet to unlock comprehensive benefits for increased operational efficiency, flawless execution, reduced personnel – all while complying with current industry specifications and safety standards. To achieve the overall well objectives, a tiered-based digital solution is offered in Well Construction which not only incorporates digitalization and energy transition, but the true proof of industry values is also validated, providing solutions based on various rig types and setups.

With a detailed digital roadmap strategy and recognizing key features and added value, a series of field runs and deployments showed remarkable results capturing the safety metrics, operational cost reduction, and improved efficiency with the tiered approach in Well Construction. Based on various offered solutions, operational safety was improved between 41% to 70%, rig time savings, and efficiency improved between 16% to 33%, and the personnel reduction advocating digital technologies witnessed a larger range from 22% to 77% reduction in operational personnel.

Regarding energy transition utilizing remote operations and an intelligent and autonomous tubular connection technology, the solution also offered about \$1.9 million in annual cost savings with carbon emission reductions. The digital solution can be integrated based on rig requirements; hence various levels of this tiered technology can be combined to enhance the operational key performance indicators (KPIs). With advancements in digitalization, the power of data management, analytics, and visualization can improve operational metrics and highlight stronger financials with achieved targets. This paper will provide a comprehensive summary of a multiple-level award-winning offered solution, that promotes smart and intelligent Well Construction with validation of proof of value with numerous case studies witnessed in tubular running operations and beyond.
