

Automated Well Control versus Traditional Well Control: A Human Error Comparison Process

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Abstract

Traditionally, well control systems have been entirely reliant on a human reliably and accurately detecting an influx and shutting-in the well. The human condition means the driller can be distracted, or unexpectedly influenced by extraneous factors. Overreliance, then, on humans in well control can be dangerous, because of the inherent and constant exposure to human factors risk. An automated well control system has been designed to fully automate influx detection and shut-in sequences and reduce personnel exposure to rig-floor safety risks.

A comparative human factors study for the use of automated well control against traditional well control methods was performed. The analysis, completed by means of Human Reliability Assessment methodology, provides a qualitative and quantitative assessment of the human failure modes associated with the operation of the automated well control compared with the equivalent associated with traditional methods.

A Systematic Human Error Reduction and Prediction approach was used to provide the basis for subsequent quantitative assessments of human reliability. Once scenarios were subjected to the qualitative modelling process, the Success Likelihood Index methodology was applied to quantify the human error probabilities.

The outcome of the comparative analysis highlights a significant reduction in the human failure risks that automated well control brings to well control.

By examining the opportunities for human error/failure to impact upon the successful identification and shut-in of an influx, the study demonstrates that automated well control could achieve 94% reduction in the probabilities of human failures for a blowout, or 96% for a large influx.

This paper describes the automated well control technology and summarises the outcomes of the comparative analysis between automated well control and traditional well control.

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