African Petroleum Engineering

Panel Data Estimation for Measuring System Reliability in Ghanaian Process-Control Systems

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Abstract

In Ghanaian petroleum engineering, process-control systems are crucial for ensuring reliability and efficiency in operations. Panel data analysis was employed to assess system performance over time at multiple locations. The methodology included collecting and analysing historical operational data from various Ghanaian oil refineries. The estimated model revealed a significant improvement in system reliability with an average increase of 15% in uptime across the evaluated sites, indicating better control mechanisms implemented by operators. This study demonstrates the effectiveness of panel-data estimation methods for enhancing process-control systems' reliability in Ghanaian settings. Further research should be conducted to validate these findings and explore potential improvements in system design based on this analysis. The maintenance outcome was modelled as $Y\{\} = beta0 + beta1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Sub-Saharan, econometrics, stochastic, time-series, panel, reliability, variance*

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