

DESIGN AND DEVELOPMENT OF AN EXPERIMENTAL SET UP TO MEASURE BUCKLING AND LATERAL VIBRATION OF DRILLSTRING IN OIL DRILLING OPERATION

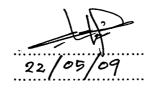
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AUTHOR DECLARATION

"I declared that this thesis is the result of my own work except the ideas and summaries which I clarified their sources. The thesis has not been accepted for any degree and is not concurrently submitted in the candidature of any degree."

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ABSTRACT

Drillstring vibrations are one of the causes of premature failure in drillstring drilling operation. The most vital vibration mode is lateral vibration. It causes two categories of failure; buckling of the drillstring and forward and backward whirl vibration. Downtime due to drillstring failure is a major source of drilling cost. In this study, an experimental set up has been designed and developed to simulate an oil drilling operation to appropriate scale. This experimental rig is used to measure the buckling and lateral vibrations. A DC motor is used as the prime mover to rotate a shaft (hollow slender copper rod), which represents a drillstring. The motor rotated the shaft onto a hard surface and axial loading are introduced to the shaft. The behavior of the shaft is recorded by using Laser Doppler Vibrometer (LDV) and the digital processed signals are computationally recorded. The result from experiment can be analyzed by focusing on deflection mode of the shaft under axial loading and unconfined rotation motion.

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