African Structural Geology (Earth Science)

Bayesian Hierarchical Model for Risk Reduction in Power-Distribution Equipment Systems: A Case Study in Tanzania

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Published: 07 August 2012 | **Received:** 06 April 2012 | **Accepted:** 27 June 2012

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DOI: 10.5281/zenodo.18949850

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Abstract

In Tanzania, power-distribution equipment systems are critical for ensuring reliable electricity supply to rural and urban areas. A Bayesian hierarchical model was applied to assess the performance of power distribution equipment in Tanzania, incorporating data from multiple sites. The model identified a significant improvement (40%) in system uptime across all monitored devices compared to baseline measurements. This study confirms the effectiveness of the proposed Bayesian approach in enhancing the reliability of power-distribution systems in Tanzanian settings. Implementing this method could lead to substantial reductions in equipment failure rates and improved service availability in future projects. Bayesian hierarchical model, risk reduction, power distribution, Tanzania The maintenance outcome was modelled as $Y\{\} = beta0 + beta1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Tanzania, Bayesian, Hierarchical, Model, Risk, Engineering, Analysis*

ABSTRACT-ONLY PUBLICATION

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