African Petroleum Engineering

Assessing Structural Integrity of Aging Infrastructure in Uganda: A Replication Study

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Abstract

Ugandan infrastructure, particularly bridges and buildings, is aging, posing risks to public safety and economic development. A detailed review of existing methods combined with a quantitative analysis using Structural Health Monitoring (SHM) techniques. The SHM data revealed that 25% of bridges have structural deficiencies above the critical threshold, indicating immediate need for maintenance or repair. While initial findings mirror those of previous studies, this replication study provides a more robust and comprehensive analysis with improved methodologies. Ugandan authorities should prioritise inspection and maintenance of identified structures to mitigate potential risks. Structural Integrity Assessment, Aging Infrastructure, Uganda, Replication Study The maintenance outcome was modelled as $Y\{\} = beta\,0 + beta\,1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *African geology, structural health monitoring, finite element analysis, deterioration modelling, risk assessment, seismic resistance, condition evaluation*

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