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Methodological Evaluation of Transport Maintenance Depots Systems in Uganda: A Randomized Field Trial on System Reliability

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Abstract

Transport maintenance depots (TMDs) play a critical role in ensuring the reliability of public transport systems in urban areas. In Uganda, TMDs are essential for maintaining and repairing buses to meet operational standards. A randomized controlled trial approach was employed to assess the effectiveness of different maintenance strategies. Data collection involved monitoring operational activities at randomly selected depots over a six-month period. The analysis revealed that depots implementing proactive maintenance schedules experienced an average reduction in downtime by 20% compared to those relying on reactive approaches, with specific patterns indicating significant improvements in system reliability. This study provides empirical evidence supporting the adoption of proactive maintenance strategies over reactive ones for enhancing TMD performance and overall transport service reliability. Based on these findings, it is recommended that Ugandan public transportation authorities consider implementing more proactive maintenance programmes to improve service quality and efficiency. The maintenance outcome was modelled as $Y\{\} = beta\,0 + beta\,1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Sub-Saharan, reliability engineering, randomized trials, maintenance logistics, geographic information systems, asset management, stochastic models*

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