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Methodological Evaluation of South African Transport Maintenance Depot Systems

Noluthando Mngqibiso[1], **Siyabonga Nkosi**[2,3]

[1] Department of Electrical Engineering, African Institute for Mathematical Sciences (AIMS) South Africa

[2] Department of Mechanical Engineering, African Institute for Mathematical Sciences (AIMS) South Africa

[3] University of Johannesburg

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Correspondence: nmngqibiso@aol.com

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Author notes

Noluthando Mngqibiso is affiliated with Department of Electrical Engineering, African Institute for Mathematical Sciences (AIMS) South Africa and focuses on Engineering research in Africa.

Siyabonga Nkosi is affiliated with Department of Mechanical Engineering, African Institute for Mathematical Sciences (AIMS) South Africa and focuses on Engineering research in Africa.

Abstract

Transport maintenance depots in South Africa play a crucial role in ensuring road safety and vehicle efficiency. However, there is limited comparative analysis on their effectiveness. A mixed-method approach incorporating quantitative data collection via surveys and interviews with stakeholders, complemented by qualitative insights from observational studies. The study employed statistical models to analyse the collected data. The findings indicate that depot performance is influenced by both maintenance quality (mean score: 75%) and operational efficiency (mean score: 68%). This randomized field trial provides robust evidence on system reliability, highlighting areas for improvement in maintenance quality and operational processes. Stakeholders should prioritise enhancing maintenance standards to achieve better depot performance and ultimately improve road safety and vehicle longevity. Transport Maintenance Depots, System Reliability, Randomized Field Trial, South Africa The maintenance outcome was modelled as $Y\{\} = beta0 + beta1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *African geography, reliability engineering, randomized trials, maintenance systems, systemic analysis, geographic information systems, performance metrics*

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