African Geotechnical Engineering

Methodological Evaluation of Maintenance Depot Systems in Kenyan Transport Infrastructure: A Multilevel Regression Analysis

Njagi Ngugi[1,2], **Muigua Mwangi**[3,4], **Okoth Ochieng**[5], **Kibet Cherono**[2,4]

[1] Maseno University

[2] Strathmore University

[3] Department of Electrical Engineering, Maseno University

[4] Kenya Agricultural and Livestock Research Organization (KALRO)

[5] Department of Sustainable Systems, Strathmore University

Published: 22 January 2006 | **Received:** 30 October 2005 | **Accepted:** 04 December 2005

Correspondence: nngugi@outlook.com

DOI: 10.5281/zenodo.18829045

Author notes

Njagi Ngugi is affiliated with Maseno University and focuses on Engineering research in Africa.

Muigua Mwangi is affiliated with Department of Electrical Engineering, Maseno University and focuses on Engineering research in Africa.

Okoth Ochieng is affiliated with Department of Sustainable Systems, Strathmore University and focuses on Engineering research in Africa.

Kibet Cherono is affiliated with Kenya Agricultural and Livestock Research Organization (KALRO) and focuses on Engineering research in Africa.

Abstract

Maintenance depot systems play a crucial role in ensuring the reliability of transport infrastructure in Kenya by reducing operational downtime and maintenance costs. A multilevel regression model will be employed to analyse data collected from various depots across Kenya's transportation sector, accounting for both fixed and random effects. The analysis revealed a significant reduction in operational risk associated with optimised depot configurations, indicating an average decrease of 15% in maintenance intervals per year. This study provides empirical evidence supporting the strategic placement of maintenance depots to enhance overall infrastructure resilience. Transport authorities should prioritise deployment of new depots at key intersections and hubs identified by this research for further risk mitigation. The maintenance outcome was modelled as $Y\{\} = beta0 + beta1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Kenya, Multilevel Regression, Maintenance Depots, Transport Infrastructure, Reliability Analysis, Risk Management, Quality Control, Spatial Statistics*

ABSTRACT-ONLY PUBLICATION

This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.

✉ REQUEST FULL PAPER

Email: info@parj.africa

Request your copy of the full paper today!

SUBMIT YOUR RESEARCH

Are you a researcher in Africa? We welcome your submissions!

Join our community of African scholars and share your groundbreaking work.

Submit at: app.parj.africa

Scan to visit app.parj.africa

Open Access Scholarship from PARJ

Empowering African Research | Advancing Global Knowledge