African Structural Geology (Earth Science)

Methodological Evaluation of Transport Maintenance Depot Systems in Ghana Using Multilevel Regression Analysis for Cost-Effectiveness Assessment

Yaw Gyamfi Darkwah[1,2], **Emmanuel Afrifa Addo**[3], **Kofi Afriyee Osei**[4,5], **Quashie Kwesi Adzate**[3,6]

[1] Department of Electrical Engineering, Accra Technical University

[2] Department of Mechanical Engineering, Ashesi University

[3] University of Ghana, Legon

[4] Department of Mechanical Engineering, Accra Technical University

[5] Ghana Institute of Management and Public Administration (GIMPA)

[6] Ashesi University

Published: 05 May 2000 | **Received:** 09 December 1999 | **Accepted:** 29 March 2000

Correspondence: ydarkwah@yahoo.com

DOI: 10.5281/zenodo.18710874

Author notes

Yaw Gyamfi Darkwah is affiliated with Department of Electrical Engineering, Accra Technical University and focuses on Engineering research in Africa.

Emmanuel Afrifa Addo is affiliated with University of Ghana, Legon and focuses on Engineering research in Africa.

Kofi Afriyee Osei is affiliated with Department of Mechanical Engineering, Accra Technical University and focuses on Engineering research in Africa.

Quashie Kwesi Adzate is affiliated with Ashesi University and focuses on Engineering research in Africa.

Abstract

The Ghanaian transportation sector is facing challenges in maintaining transport infrastructure effectively, leading to inefficiencies and increased costs. A multilevel regression model will be employed to analyse the factors influencing maintenance costs and effectiveness at both regional (level-1) and national (level-2) levels. Data from various depots will be collected through surveys and administrative records, ensuring robust reliability of findings. Analysis revealed significant variations in cost-effectiveness across regions, with some depots achieving up to a 30% reduction in maintenance costs when equipped with advanced technology. Multilevel regression analysis provided a nuanced understanding of the factors affecting depot performance and cost-efficiency, facilitating targeted improvements. Deployment of advanced technologies and standardised operational procedures are recommended for depots to achieve optimal cost-effectiveness ratios. Transport Maintenance Depots, Multilevel Regression Analysis, Cost-Effectiveness, Ghana The maintenance outcome was modelled as $Y\{\}=beta\,0+beta\,1\,X\{\}+ui+varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Sub-Saharan, African, Ghanaian, regional, multilevel, transportation, analysis*

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