

Randomised Field Trial of Maintenance Depot System Reliability in Tanzanian Transport Networks

Aisha Juma¹

National Institute for Medical Research (NIMR)

Correspondence: ajuma@hotmail.com

Received: 30 March 2002 | Accepted: 22 May 2002 | Published: 25 June 2002 | DOI: [10.5281/zenodo.18971950](https://doi.org/10.5281/zenodo.18971950)

ABSTRACT

{ "background": "Maintenance depot systems are critical for the reliability of transport infrastructure, yet their performance in sub-Saharan contexts is under-studied. Current evaluations often rely on retrospective, non-experimental data, limiting causal inference on system efficacy.", "purpose and objectives": "This study aimed to implement and evaluate a novel randomised field trial methodology to measure the operational reliability of road maintenance depot systems, with the objective of generating robust, experimental evidence on causal factors affecting depot performance.", "methodology": "A randomised controlled trial was conducted across a network of depots. Depots were randomly assigned to an intervention group receiving enhanced logistical protocols or a control group maintaining standard practice. System reliability was measured as the time-to-failure of depot output against specified performance thresholds. The primary analysis used a Cox proportional hazards model: $h(t|X) = h_0(t) \exp(\beta_1 X_1 + \beta_2 X_2)$, where X_1 represents the intervention and X_2 a depot size covariate.", "findings": "Depots in the intervention group demonstrated a 40% lower hazard of performance failure compared to control depots (hazard ratio = 0.60, 95% CI: 0.48 to 0.75). The median time-to-failure increased from 42 days to 68 days under the enhanced protocol. Uncertainty was quantified using robust standard errors clustered at the regional level.", "conclusion": "The randomised field trial proved a viable method for rigorous, causal evaluation of engineering maintenance systems in this context. The intervention significantly enhanced depot reliability.", "recommendations": "Transport authorities should adopt principles of experimental design for system evaluations. The specific logistical protocols tested here warrant broader implementation and scaling.", "key words": "infrastructure maintenance, randomised controlled trial, system reliability, transport engineering, field experiment", "contribution statement": "This paper provides the first application of a randomised field trial to evaluate transport maintenance depot systems in sub-Saharan Africa." }

Keywords: *Randomised controlled trial, System reliability, Maintenance depots, Sub-Saharan Africa, Transport infrastructure, Engineering management, Field experiment*

Article Highlights

- First randomised field trial applied to transport maintenance depot systems in sub-Saharan Africa.
- Intervention group showed 40% lower hazard of performance failure versus control.
- Methodology provides a viable framework for causal evaluation of engineering systems.
- Quantified reliability using Cox model with robust, clustered standard errors.

Methodological Contribution

This study pioneers the application of a randomised controlled trial design to evaluate the operational reliability of road maintenance depot systems, moving beyond retrospective analysis to establish causal evidence.

This trial provides robust experimental evidence to inform infrastructure management policy.

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