

Randomised Field Trial for the Risk Reduction and Reliability Optimisation of Transport Maintenance Depots in Senegal

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ABSTRACT

Background: Transport maintenance depots are critical infrastructure for road network reliability, yet systematic evaluations of their operational risk and reliability in West Africa are scarce. Existing assessments often lack rigorous, field-based methodologies to quantify the impact of targeted interventions.

Purpose and objectives: This study aimed to develop and apply a randomised field trial methodology to empirically measure risk reduction and optimise the reliability of transport maintenance depot systems.

Keywords: *Randomised controlled trial, Infrastructure reliability, Risk reduction, Transport maintenance depots, Sub-Saharan Africa, Systems optimisation, Field experiment*

Article Highlights

- Structured, low-cost interventions substantially enhance depot system reliability.
- Randomised trial methodology provides a robust framework for evidence-based management.
- Pronounced effect observed on spare parts inventory reliability.
- First application of an RCT to evaluate engineering interventions for transport depots in the region.

Methodological Note

Treatment effect estimated using a linear mixed model with depot random effects and robust standard errors clustered at depot level.

This study presents empirical evidence for optimising critical infrastructure in West Africa.

ABSTRACT-ONLY PUBLICATION

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

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