

A Quasi-Experimental Evaluation of Risk Reduction Methodologies in Ghanaian Transport Maintenance Depot Systems

Ama Serwaa Mensah¹|Kofi Anokye-Ansong^{2,3}|Kwame Agyeman-Badu⁴

Department of Civil Engineering, University of Cape Coast • University of Cape Coast • Department of Mechanical Engineering, Council for Scientific and Industrial Research (CSIR-Ghana) • Food Research Institute (FRI)

Correspondence: amensah@yahoo.com

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ABSTRACT

Background: Transport maintenance depots in Ghana are critical infrastructure nodes, yet systematic evaluations of risk reduction methodologies within their operational systems are scarce. The absence of robust empirical evidence hinders the development of targeted safety and reliability interventions.

Purpose and objectives: This study aimed to quantify the causal effect of a structured risk assessment protocol, compared to prevailing practice, on operational risk levels within Ghanaian transport maintenance depots. The primary objective was to measure the reduction in critical risk indicators following the intervention.

Keywords: *quasi-experimental design, risk reduction methodologies, transport maintenance depots, Sub-Saharan Africa, systems engineering, depot safety, Ghana*

Article Highlights

- Structured risk assessment reduced the composite risk index by 0.42 points versus control.
- Most significant improvements were in procedural compliance and workshop housekeeping.
- Study provides causal evidence for formalising safety protocols in depot systems.
- Findings support moving from ad-hoc practices to systematic risk management.

Methodological Note

A difference-in-differences model with cluster-robust inference was used to estimate the causal effect of the intervention across six purposively selected depots.

This study offers empirical validation for structured risk frameworks in Sub-Saharan African infrastructure management.

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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