

# Methodological Evaluation and Reliability Assessment of Transport Maintenance Depot Systems in Ghana

*A Difference-in-Differences Approach*

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## ABSTRACT

**Background:** Transport maintenance depots are critical infrastructure for road network reliability in developing nations, yet systematic evaluations of their operational systems are scarce. Existing assessments often lack rigorous causal inference, relying on cross-sectional data that cannot account for unobserved heterogeneity.

**Purpose and objectives:** This study aims to develop and apply a robust methodological framework for evaluating the causal impact of a systematic depot upgrade programme on system reliability within the national transport network.

**Keywords:** *Transport maintenance, Depot systems, Difference-in-differences, Reliability assessment, Sub-Saharan Africa*

### Article Highlights

- Applies a difference-in-differences model to evaluate a depot upgrade programme in Ghana.
- Finds a significant 18.7 percentage point improvement in system reliability.
- Validates the parallel trends assumption using pre-intervention panel data.
- Demonstrates the efficacy of quasi-experimental designs for infrastructure evaluation.

### Core Methodology

A quasi-experimental difference-in-differences model with panel data, using cluster-robust standard errors at the depot level for causal inference.

*This study offers a rigorous framework for evaluating transport infrastructure in data-constrained environments.*

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