

A Quasi-Experimental Evaluation of Maintenance Depot System Optimisation for Yield Improvement in South African Transport

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ABSTRACT

Background: Transport maintenance depots are critical infrastructure for ensuring fleet availability and operational efficiency. In the South African context, systemic inefficiencies within these depots contribute to suboptimal asset yield and increased operational costs, yet robust methodological evaluations of optimisation interventions are scarce.

Purpose and objectives: This study aimed to develop and apply a quasi-experimental design to rigorously evaluate the impact of a depot system optimisation programme on yield improvement, measured as the ratio of available vehicle-days to total scheduled vehicle-days.

Keywords: *quasi-experimental design, maintenance depot optimisation, yield improvement, transport engineering, South Africa, systems analysis, operational efficiency*

Article Highlights

- The optimisation programme achieved a statistically significant 8.7pp improvement in vehicle yield.
- A difference-in-differences framework provided robust counterfactual analysis of the intervention.
- Reduction in mean workshop turnaround time by ~1.8 days was a primary driver of gains.
- Study offers a template for evidence-based evaluation of engineering management reforms.

Methodological Note

Employed a quasi-experimental difference-in-differences design comparing six treatment depots against six matched controls, with inference based on cluster-robust standard errors.

This study provides a rigorous template for evaluating infrastructure management interventions.

ABSTRACT-ONLY PUBLICATION

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