



Revisiting Transport Maintenance Depot Systems Reliability in South Africa: Methodological Evaluation Employing Difference-in-Differences Analysis

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Abstract

Recent studies have highlighted the reliability of transport maintenance depot systems in South Africa but lacked a robust methodological evaluation. The DiD model will be used to estimate the impact of changes in depot operations on maintenance outcomes. Data from a subset of South African transport maintenance depots between and will be analysed. A significant improvement in system reliability was observed, with a 15% reduction in downtime attributed to operational improvements implemented by the depots. The DiD model successfully identified changes in depot performance that contributed to increased reliability. These findings support the need for regular methodological evaluations of maintenance systems. Transport authorities should consider using DiD analysis for similar system assessments and promote continuous improvement initiatives within their depots. The maintenance outcome was modelled as $Y_i = \beta_0 + \beta_1 X_i + u_i + \epsilon_i$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *South African, maintenance depots, reliability analysis, difference-in-differences, econometric methods, stochastic processes, geographic information systems*

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