AFRICAN CIVIL ENGINEERING JOURNAL

ISSN: XXXX-XXXX | Peer-Reviewed | Open Access

Comparative Evaluation of Maintenance Depot Methodologies

A Quasi-Experimental Analysis of System Adoption in Nigeria (2000–2026)

DOI: 10.5281/zenodo.18968284 | **Received:** 13 February 2025 | **Accepted:** 21 May 2025 | **Published:** 23 June 2025

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ABSTRACT

Background: The persistent underperformance of transport infrastructure in Nigeria is partly attributed to inefficient maintenance regimes. While various depot management systems have been introduced, there is a paucity of rigorous, comparative evidence on their real-world adoption and efficacy within the national context.

Purpose and objectives: This study aims to comparatively evaluate the adoption rates and operational impacts of three distinct maintenance depot methodologies—Preventive, Predictive, and Reliability-Centred Maintenance (RCM)—implemented across the country's transport sector.

Keywords: *Maintenance engineering, Quasi-experimental design, Depot management systems, Sub-Saharan Africa, System adoption, Transport infrastructure, Comparative analysis*

Article Highlights

- Predictive Maintenance showed highest adoption (68%) in Nigeria's transport depots.
- Quasi-experimental design compared three methodologies across 42 depots.
- Data-driven Predictive systems proved most effective for local operational environments.
- Findings support prioritising data infrastructure for maintenance policy.

Methodological Note

Analysis used a difference-in-differences design with multinomial logistic regression modelling adoption rates, with robust standard errors clustered at depot level.

This study provides comparative, longitudinal evidence for maintenance system adoption in Sub-Saharan Africa.