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Methodological Framework for Evaluating Risk Reduction in Senegalese Transport Maintenance Depot Systems

A Quasi-Experimental Design

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ABSTRACT

Background: Transport maintenance depots are critical infrastructure for ensuring road safety and operational continuity in developing economies. Systematic evaluation of interventions to reduce operational risks within these systems is hindered by a lack of robust, context-specific methodological frameworks.

Purpose and objectives: This Data Descriptor presents a methodological framework designed to quantify risk reduction in transport maintenance depot systems. Its primary objective is to provide a structured, quasi-experimental approach for isolating the causal effect of specific engineering and procedural interventions on key risk metrics.

Keywords: *quasi-experimental design, risk reduction, transport maintenance, Sub-Saharan Africa, infrastructure evaluation, depot systems, road safety*

Article Highlights

- Presents a quasi-experimental design to isolate causal effects of depot interventions.
- Dataset includes pre- and post-intervention metrics for 24 Senegalese depots.
- Employs difference-in-differences with cluster-robust standard errors for inference.
- Aims to quantify risk reduction in transport maintenance systems.

Core Statistical Model

$Y_{it} = \beta 0 + \beta 1\ Treat_i + \beta 2\ Post_t + \delta\ (Treat_i \times Post_t) + \varepsilon_{it}$, where δ captures the causal treatment effect.

This paper presents a methodological framework and associated dataset, not empirical results.