

Randomised Field Trial for Reliability Assessment of Industrial Machinery Fleets in Kenya

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ABSTRACT

Background: Industrial machinery fleets are critical to economic productivity, yet systematic reliability data for such assets in sub-Saharan Africa is scarce. Current maintenance strategies are often reactive or based on manufacturer schedules not calibrated to local operating conditions, leading to costly downtime.

Purpose and objectives: This study aimed to develop and apply a novel randomised field trial (RFT) methodology to empirically assess the reliability of industrial machinery fleets under typical Kenyan operational environments. The objective was to generate locally validated failure rate data to inform maintenance optimisation.

Keywords: *Randomised controlled trial, Reliability engineering, Industrial machinery fleets, Sub-Saharan Africa, Predictive maintenance, Asset management, Kenya*

Article Highlights

- Novel randomised field trial methodology applied to industrial machinery in Kenya.
- Condition-based maintenance reduced catastrophic failure hazard by 32%.
- Weibull analysis indicated wear-out failure dominance for all assets.
- Provides locally validated data to optimise maintenance strategies.

Methodological Note

The study employed a randomised controlled trial design with 120 vehicles, using a Weibull proportional hazards model for reliability analysis.

This trial provides empirical evidence for optimising maintenance in sub-Saharan African industrial contexts.



ABSTRACT-ONLY PUBLICATION

This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.



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