



# Methodological Evaluation of South African Industrial Machinery Fleets Systems in Randomized Field Trials

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## Abstract

South African industrial machinery fleets are pivotal in various sectors but often struggle with cost management and operational efficiency. A mixed-method approach was employed, combining statistical modelling and observational data analysis. Randomized field trials were conducted across three regions to assess fleet performance metrics, including operational costs and maintenance schedules. The trial results indicated a 15% reduction in overall operational expenses when fleets adhered strictly to optimised maintenance schedules (mean \$ cost = £ 20,000 per annum, SD = £ 3,000). Randomized field trials confirmed the efficacy of tailored maintenance strategies for improving fleet cost-effectiveness. Adoption of standardised maintenance protocols and regular performance evaluations are recommended to sustain these gains.

**Keywords:** *Sub-Saharan, African, methodology, randomization, simulation, modelling, metrics, fleet management*

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