African Geomatic Engineering

Methodological Assessment of Industrial Machinery Fleets in Rwanda Using Quasi-Experimental Design for System Reliability Measurement

Kizito Uwimana[1,2], **Tharcisse Habumuremyi**[3]

[1] African Leadership University (ALU), Kigali

[2] Department of Electrical Engineering, Rwanda Environment Management Authority (REMA)

[3] Rwanda Environment Management Authority (REMA)

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Correspondence: kuwimana@aol.com

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Author notes

Kizito Uwimana is affiliated with African Leadership University (ALU), Kigali and focuses on Engineering research in Africa.

Tharcisse Habumuremyi is affiliated with Rwanda Environment Management Authority (REMA) and focuses on Engineering research in Africa.

Abstract

Industrial machinery fleets play a critical role in Rwanda's economic development, particularly in sectors such as agriculture, manufacturing, and construction. A quasi-experimental design was employed, incorporating surveys and operational data from selected industrial enterprises in Rwanda. Statistical analysis included regression models to assess the impact of environmental factors on machinery reliability. The statistical model revealed a significant positive correlation (r = 0.75) between ambient temperature and machinery failure rates, indicating that higher temperatures lead to increased failures within the fleet. This study highlights the importance of monitoring environmental conditions for maintaining industrial machinery fleets' reliability in Rwanda's diverse industrial landscape. Industrial operators should implement preventive maintenance strategies based on weather patterns to optimise machinery performance and reduce downtime. Quasi-Experimental Design, Industrial Machinery Reliability, Environmental Factors, Regression Analysis

Keywords: *African economies, Methodological evaluation, System reliability, Quasi-experimental design, Industrial systems, Reliability engineering, Case study*

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