Time-Series Forecasting Model Evaluation for Transport Maintenance Depot System Reliability in Rwanda: An Engineering Perspective,

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Abstract

This study evaluates a time-series forecasting model to assess the reliability of transport maintenance depots in Rwanda. A time-series analysis was conducted using an ARIMA (AutoRegressive Integrated Moving Average) model, with robust standard errors accounting for prediction uncertainties. The ARIMA model demonstrated a predictive accuracy rate of 85% in forecasting depot maintenance intervals over the study period. The findings suggest that integrating time-series analysis can significantly enhance the reliability and efficiency of transport maintenance systems in Rwanda. Transport authorities should consider implementing this model to optimise depot operation schedules and reduce downtime. time-series forecasting, ARIMA model, transportation maintenance depots, reliability, Rwanda The maintenance outcome was modelled as $Y\{\}=beta\,0+beta\,1\,X\{\}+ui+varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Rwanda, Geographic Information Systems, Time-series Analysis, Forecasting Models, System Reliability, Maintenance Engineering, Quality Control*

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