African Mining Engineering

Methodological Evaluation of Municipal Infrastructure Assets Systems in Senegal Using Panel Data for Reliability Measurement

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Abstract

Municipal infrastructure in Senegal is crucial for urban development but often faces challenges related to asset management and system reliability. The study employs a mixed-methods approach combining quantitative (panel data) and qualitative insights. Panel data are analysed using a fixed effects regression model to estimate system reliability coefficients. Panel data analysis revealed that infrastructure investment in Senegal has shown an average growth rate of 5% over the past five years, indicating steady improvement in asset management practices. The study underscores the importance of consistent monitoring and regular maintenance for ensuring reliable municipal infrastructure systems in Senegal. Policy recommendations include increased investment in preventive maintenance programmes to enhance system reliability and reduce failure rates. Municipal Infrastructure, Panel Data Analysis, System Reliability, Fixed Effects Regression The maintenance outcome was modelled as $Y\{\} = beta0 + beta1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Sub-Saharan, econometrics, panel-data, reliability, vulnerability, sustainability, stochastic*

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