Validation of Maintenance Schedule and Parameters for Critical Equipment in a Textile Factory through Regression Analysis of System Data and Time Between Maintenance Operations

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Abstract

Validating maintenance strategies is crucial for industrial equipment reliability. Regression analysis establishes correlations between plans and Mean Time Between Failures (MTBF). This study validates maintenance schedules and parameters for critical equipment in a textile factory using regression analysis of system data and maintenance intervals. Employing the Monte Carlo Simulation technique, it analyzes relationships between input variables (maintenance activities, equipment age, operating conditions) and MTBF. An R-squared value of over 0.70 confirms the significance of the regression model. Survey design identifies critical departments, and real-time equipment failure data supports the methodology. Regression analysis yields a significant model (R-squared = 85.56%) with 18 input variables contributing to MTBF variance. Sensitivity analysis reveals their hierarchical impact. Conclusions emphasize regression analysis's efficacy in validating maintenance strategies, showcasing the input variables' significance. Findings underscore tailored maintenance plans and suggest predictive analytics expansion. Recommendations include adaptive strategies, predictive analytics integration, optimal maintenance intervals determination, cost-benefit analyses, and spare parts inventory optimization.

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