

Enhancing Product Quality of Local Rolling Stock Spare Parts Towards Reliability, Availability, Maintainability and Safety (RAMS) Methodology

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Abstract

The dissertation, "Enhancing Product Quality of Local Rolling Stock Spare Parts Towards RAMS Methodology," explored the essential RAMS characteristics of rolling stock vertical dampers in the Thai railway industry. The main goal was to improve the performance and reliability of components by thoroughly analyzing various influencing factors. The study used a mixed-methods approach. A survey of 150 participants, including rolling stock engineers, maintenance technicians, and industry experts, was backed by in-depth interviews and focus groups involving 50 participants to understand maintenance challenges and operational practices. Statistical analyses like reliability analysis, correlation analysis, and regression models were employed to evaluate the data. The findings indicated significant relationships between vibration mitigation, passenger comfort, structural integrity, noise reduction, and technological advances with the reliability and maintainability of vertical dampers. Technological advances, especially, had a substantial impact, highlighting the importance of integrating innovative materials and digital monitoring systems. The research also identified critical challenges in implementing RAMS principles, such as the availability of high-quality materials and technical expertise. The study concluded that targeted strategies for enhancing RAMS characteristics could significantly improve the performance and lifespan of rolling stock components. Recommendations included investing in advanced technologies, optimizing maintenance practices, and nurturing a skilled workforce. These insights were valuable for manufacturers, railway operators, and policymakers, contributing to the efficiency and safety of railway systems. This dissertation highlighted the essential role of RAMS in the railway industry. It offered practical solutions for enhancing certain local rolling stock components' reliability and maintainability, specifically focusing on the only vertical damper. The future research, several areas can be explored further to enhance the impact of RAMS in the railway industry to expand component focus: Investigating the reliability and maintainability of additional critical rolling stock components beyond vertical dampers, such as braking systems, and suspension systems, to create a more comprehensive framework for spare parts management.

Keywords: Reliability, Availability, Maintainability, Safety, Rolling Stock, Local Spare parts,