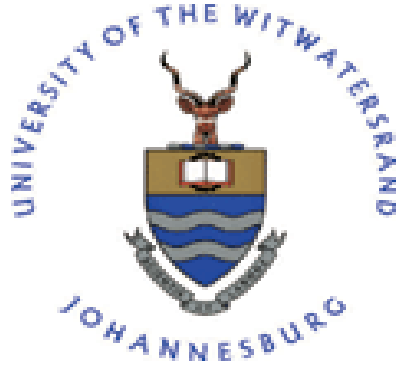




Selecting an Effective Maintenance Strategy using Analytical Hierarchical Process (AHP) algorithm on Rail Vehicles Components

by

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Abstract

To meet the needs and expectations of customer and key stakeholders, information on the condition and performance of an asset needs to be gathered consistently. This was demonstrated in a study whereby inspection data that reported on the operation and non-operation status of the components was used. This study was conducted in the rail maintenance environment with the aim to select the most appropriate maintenance strategy when faced with complex decision problems for the selected motor coach component using the Analytical Hierarchy Process (AHP) decision making algorithm. This study is important to reduce the number of systematic failures pertaining to motor coaches due to maintenance issues. The research approach adopted in this dissertation includes the application of an Analytical Hierarchy Process (AHP) mathematical decision-making model (Quantitative) and expert opinions through structured interviews (Qualitative). The approach adopted seeks to address the performance challenges in the implementation of the respective company's maintenance program by outlining the best maintenance strategies to be used for selected motor coach components. The findings from this study provide evidence that preventative maintenance is the best strategy overall. When considering the availability of spare parts factor, preventative maintenance strategy is also found to be the best strategy to be implemented. When considering the impact of failure on rail vehicle factor, corrective maintenance strategy is best the best strategy to be deployed. Whilst the reliability of maintenance data factor has shown equal importance for all strategies under investigations. And finally, the frequency of failure of the component factor, corrective maintenance strategy is best the best strategy to be implemented. The dissertation recommends that AHP methodology be used in determining the best maintenance strategy to deploy for rail vehicle components and in determining the component criticality or ranking. The limitations of the study are limited to preventative maintenance, corrective maintenance and No maintenance strategy implementation.