UNIVERSITI TEKNOLOGI MARA

PREDICTIVE MODEL OF MAINTENANCE COST IN MALAYSIA ROLLING STOCK: A CASE STUDY WITHIN URBAN RAIL

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ABSTRACT

The first railway network in Malaysia commenced in 1885 which connected Taiping to Port Weld with the rail length of 13.6 km. Presently, the total length has since expanded to 2984 km. The revolution of the urban rail system occurred mostly in Klang Valley since the location is the main economic source of the country. The network covers 221 km of distance and is still expanding. The National Transport Policy 2030 mentioned that the government is committed to improve the rail system as a national agenda. Rolling stock is a major component of the rail system. Train operating companies (TOCs) are responsible to operate and maintain the systems. Maintenance work is needed to ensure the system's reliability, availability, maintainability, and safety. Comprehensive maintenance entails millions of dollars in cost. It is crucial for the TOCs to have workable and realistic predictive maintenance cost models to understand the cause and effect of the significant variables. Without maintenance cost model, the TOCs are unable to scientifically predict the cost, and this might lead to inaccurate budgeting incurring higher cost to the organisations. This research aims to evaluate the maintenance strategy practiced and to discover the independent variables involved and finally develops a maintenance cost model. Primary data was collected using a survey conducted among five TOCs. The primary data was used for ranking analysis utilizing the Importance Index. The secondary data was obtained from the ABC Company to establish empirical data for the analysis of the rolling stock maintenance cost and to develop the structural equation modelling. The research established a scientific approach to predict the rolling stock maintenance costs model. The developed approach introduces scientific and structured concept to assist the management level in producing more accurate budgetary estimates of the rolling stock maintenance that satisfy the organization's needs. The established approach integrates correlation analysis and structural equation model with regression analysis to model the maintenance cost using the SPSS and SEM AMoS software. The finding revealed that the Preventive and Corrective Maintenance were the most-practiced strategies. The Workforce and Spare Parts were discovered to be important variables influencing the maintenance cost. Eventually, six maintenance cost models were developed. The Depreciation Office, Employees Provident Fund, Salary, Consumable Spares, Repairable Spares, and Freight Charges were found to be among the significant variables affecting the maintenance cost model. The model was validated using numerical analysis. The model practicality was assessed by the subject-matter experts of the industry. As a recommendation, it would also be beneficial to develop a predictive model for the maintenance costs of the intercity, freight trains and high-speed train in future.

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