# ABSTRACT


## PREVENTIVE MAINTENANCE AND CRITICAL PART PROCUREMENT OPTIMIZATION OF TOSHIBA BMC-100(5) MACHINE USING RELIABILITY-CENTERED MAINTENANCE, RISK-BASED MAINTENANCE AND MARGINAL ASSURANCE AT PT. DIRGANTARA INDONESIA

**By**
**Hafiz Reza Noorzaman**
**NIM : 112071010**
**(Major of Industrial Engineering)**

PT. Dirgantara Indonesia (PT DI) is an aircraft manufacturer which has a lot of overseas customers. As a company which gives a priority to the product quality, effectivity and efficient of facility usage are the most important thing to be considered. Because of that, the performance of machine has to be increased so it won't give a bad effect to production line. Nowadays, Aerostructure Department has hundreds key facilities to be used in production line. One of them is Toshiba BMC-100(5). In a group of Toshiba machinery, Toshiba BMC-100(5) has the most failures. These failures will affect machine availability and give a lot of risk to the company, such as loss of revenue and maintenance cost. A maintenance policy that didn't consider the useful life and failure characteristic of machine is the main cause of these failures. Besides, a material procurement also gives a significant contribution to increase downtime. Therefore PT DI should evaluate and find the optimal preventive maintenance activity and critical part procurement for this machine.

Toshiba BMC-100(5) is divided into 14 subsystems, which from all subsystems will be identificated as critical subsystems using pareto diagram. Based on pareto analysis, there are 6 critical subsystems, APC, ATC, Axis-Z, Axis-A, Axis-Y, and Axis-B. For the next step, all of critical subsystem will be identificated to find precise maintenance activity using Reliability-Centered Maintenance (RCM) method and the optimal preventive maintenance interval using Risk-Based Maintenance (RBM) method. An optimal maintenance policy should be effective and efficient. Effective means a maintenance activity should increase system reliability. On the other hand, efficient means a maintenance activity should give minimum cost and acceptable risks. By combining these methods, hopefully system reliability will be increased with a minimum maintenance cost and risk. Meanwhile, marginal assurance method is used to find the optimal critical part procurement. This method aimes to find the optimal critical part combination and procurement period, so it would increase assurance level of critical part availability in the warehouse and finally logistic downtime would be minimalized.

Based on data calculation using RCM, there are 18 components have scheduled on-condition task, 5 components have scheduled restoration task, 16 components have scheduled discard task, and 8 components have scheduled failure finding task. The optimum preventive maintenace interval time based on RBM is 200 hours for APC and ATC, 400 hours for Axis-Z and Axis-A, and 1600 hours for Axis-Y and Axis-B with the system reliability between 0,5 to 0,97. Total maintenance cost and risk of optimum maintenance activity is Rp 143,666,255.90 less than existing maintenance cost and risk, which its amount Rp 195,303,841.28. The optimum procurement period is 1 period for a year with an optimal

combination is 14 units O-Ring ATC, 11 units Bearing Axis-Z and 11 units Limit Switch APC.

Keywords : reliability, RCM, RBM, preventive maintenance, component combination optimization