ABSTRACT

MAINTENANCE STRATEGY SELECTION AND MAINTENANCE TIME INTERVAL OPTIMIZATION USING ANALYTICAL HIERARCHY PROCESS (AHP) METHOD AND RISK-BASED MAINTENANCE (RBM) AT PT PRIMAJASA

PT Primajasa is a company that specializes in transportation business. Today, PT Primajasa has 103 army to give service to serve five different kinds of transportation routes. Because PT Primajasa uses buses to run the operational activites, therefore the company needs to make sure its buses are in good condition. But until today, buses belong to PT Primajasa are still having problems in their trips because of damages. The unfit maintenance that doesn't consider the damage's characteristics and the components' age are possibly the main cause of the buses' damages. This not only disturb the company's performance, but also causes some maintenance fund and damage risks that can cause disadvantages to the company. Because of that, evaluation, optimal preventive maintenance activity, decisive maintenance strategy need to be done properly.

Based on system breakdown structure, Buses have 6 main systems which will be divided even more to 17 sub-systems. The machine system is divided into sub-systems Fuel and Air, Lubricants, Refrigerant. The power transfer system is divided into Clutches, Transmission, Countershaft, and Rear Axis. The chassis system is divided into sub-system Suspension, Steering Wheel, and Brake. The Electricity system is divided into sub-system Starter, Battery, and Electric Filling. The body system is divided into sub-system Body Fabrication and Interior. The Comfort system is divided into Sub-system Air Conditioner and Chairs. Those seventeen sub-systems are going to be put on research to determine its maintenance strategy internal optimization by using Risk-based maintenance (RBM) method. For determining the maintenance strategy existing in every component level from each sub-system are using the Analytical Hierarchy Process (AHP) method. The optimal maintenance activity is an effective and efficient maintenance. Effective is marked by how reliable the system's reliability is, as for efficiency, it depends on how low the maintenance fund and the possible damage risks. By combining both of these criteria, it is hoped that the maintenance activity would increase the reliability of each sub-system with both fund and risk as low as possible.

Based on the data processing, with the AHP method there are four kinds of decisions for maintenance strategy, there are Schedule Restoration, Schedule Discard, On-Condition. dan Run-to Failure, as for the interval for optimal maintenance time by using RBM method is 180 hours for Fuel and Air sub-system, 360 hours for Clutch, Electric Filling, and AC, 540 hours for Transmission, Countershaft, Steering Wheel, Brake, Starter, Body Fabrication, 720 hours for the Refrigerant, Suspension, and Battery sub-system, and 1080 hours for Rear axis and Lubricant sub-system with more than 80% sub-system reliability valued around 0.5 to 0.8. The overall cost of the activity and time interval of this proposed maintenance reaches Rp. 37.559.696, 00 which is lower compared to the existing overall cost and maintenance risk which costs Rp. 137.446.837,00.

***Keywords**: reliability, RBM, time interval optimization, AHP, maintenance strategy*