ABSTRACT

PT XYZ is a manufacturing company engaged in the manufacture of energy sources. One of the products produced is Dry Battery (Manganese). In the Production Department (Assembling) there are 6 production lines, namely UM-1, UM-2, UM-3#1, UM-3#2, UM-3#3, and UM-4 lines where these production lines produce sizes Different Dry Batteries. Based on historical data for the period April 2020 – March 2021, the UM-4 line is a line that needs to be repaired immediately because it has the highest number of defective products and the difference in the percentage of defective products with the highest percentage of tolerance for defective products. The percentage of product defects in the production of Dry Battery line UM-4 is 0.60%, while the percentage of tolerance for defect products is 0.54%. The process that produces the most products that are not in accordance with the product CTQ is the seaming process. The seaming process resulted in 54.1% of defective products from the total number of defective products. The types of defects that occur in the seaming process are Cap loose, Insulation Ring broken, Metal Jacket decking, and the results of seaming Metal Jacket are not appropriate where the type of defect is categorized in one category of defect type, namely appearance. The solution given is a preventive maintenance scheduling design for the Seaming machine spindle which can minimize defects in the seaming process at PT XYZ.

Problem solving is done using the DMAI approach (Define, Measure, Analyze, and Improve). In the define phase, identification of product CTQ, production process stages, process CTQ, and problems in the production process is carried out. In the measure phase, process stability and process capability are calculated. In the analyze phase, an analysis of the root causes of the problem is carried out where the problem is the CTQ process that is not fulfilled in the seaming process. The CTQ of the process that is not fulfilled is that the spindle pressure on the Seaming machine is 30 N/m^2. The root cause analysis is carried out using a fishbone diagram and 5 Whys. In addition, a risk assessment analysis was carried out using FMEA, especially PFMEA. In the improve phase, a preventive maintenance schedule for the Seaming machine spindle is designed which can

minimize the Dry Battery product defect in the seaming process. In doing the design, the Mean Time to Failure (MTTF) and Mean Time to Repair (MTTR) value calculation methods are used.

The design result obtained is preventive maintenance on the Seaming machine spindle within an interval of 14,239 days when the Seaming machine operates after experiencing previous damage. Then calculated the optimal preventive maintenance and obtained the results of 10.14 working days. In the design process, the specifications and design standards set by the company are also considered. The design results are then verified, validated, evaluated, and the implementation plan is analyzed.

The implementation of the design results will provide various benefits, such as minimizing spindle wear during the production process, overcoming spindle work that is hampered due to accumulated dust, and knowing maintenance time intervals. In addition, the design of preventive maintenance scheduling for the Seaming machine spindle is expected to minimize defects in the seaming process at PT XYZ with the assumption of a decrease of 80% or if calculated based on total product defects, it is expected to minimize up to 43%. The decrease in defects that occur will have an impact on changes in the sigma value where there is an increase from 4.812 ≈ 4.8 to 4.967 ≈ 5.

Keywords — ***Dry Battery, Defect, Seaming Process, DMAI, Preventive Maintenance Scheduling***