

ABSTRACT

XYZ MSME is an UMKM engaged in the production of knitted garments that faces the problem of a high level of defective products or defects that exceed the tolerance limit set by UMKM of 2.5% per month. Based on production data from January to October 2024, it was found that the average percentage of defects was above the set threshold, with an increasing trend every month. This study aims to identify the main causes of defects and provide the best risk mitigation proposals in the production process. The Failure Mode and Effects Analysis (FMEA) method was used to identify 23 failure modes, which were analyzed based on the Risk Priority Number (RPN) value. Next, the RPNs were prioritized using a risk level classification so that the three highest RPNs were obtained for the risk of thread breakage during knitting (RPN 251), weak fabric overlock (RPN 240), and fabric shrinkage and color changes due to the steam process (RPN 230). Furthermore, the Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) method was used to determine the priority of the best mitigation solution. The alternative assessment considered various criteria such as benefits, costs, ease of implementation, and risks. Based on the results of data processing using TOPSIS, the selected solution was to schedule periodic machine maintenance using a preventive maintenance scheduling design. This design aims to minimize production defect rates and continuously improve production process efficiency.

Keywords: Failure Mode and Effects Analysis (FMEA), Technique for Order Preference by Similarity to Ideal Solution (TOPSIS), defects, risk mitigation.