ANALISIS PENGENDALIAN KUALITAS PRODUK MESIN *LAUNDRY* MENGGUNAKAN METODE *SIX SIGMA* DAN *FMEA-AHP* (Studi Kasus: PT. Industry Mesin Laundry Indonesia)

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Abstrak

Pengendalian kualitas produk merupakan faktor penting dalam menjamin kepuasan pelanggan dan menjaga daya saing di industri manufaktur. PT. Industry Mesin Laundry Indonesia (IMELDA), perusahaan yang memproduksi mesin laundry berkapasitas besar, menghadapi permasalahan terkait cacat produk yang menyebabkan gangguan jadwal produksi dan menurunkan kepercayaan pelanggan. Penelitian ini bertujuan untuk menganalisis proses pengendalian kualitas menggunakan metode *Six Sigma* melalui tahapan DMAI (*Define, Measure, Analyze, Improve*) yang terintegrasi dengan metode *Failure Mode and Effect Analysis* (FMEA) dan *Analytical Hierarchy Process* (AHP). Pada tahap *Define*, diidentifikasi jenis cacat yang paling sering terjadi, yaitu dudukan mesin patah, cacat pengelasan, dan kerusakan *bearing*. Tahap *Measure* mengevaluasi performa kualitas melalui perhitungan DPMO dan level sigma. Nilai rata-rata DPMO yang diperoleh adalah 71.187, yang menunjukkan bahwa terdapat rata-rata 71.187 kecacatan dalam satu juta peluang. Adapun nilai level *sigma* sebesar 3,02 mengindikasikan bahwa kualitas proses produksi masih berada pada tingkat rata-rata, dengan jumlah cacat yang cukup tinggi. Tahap *Analyze* menggunakan diagram *fishbone* dan FMEA untuk mengidentifikasi akar penyebab cacat, sementara AHP digunakan untuk menentukan prioritas risiko berdasarkan tingkat keparahan, kemungkinan terjadi, dan kemampuan deteksi. Risiko tertinggi ditemukan pada kesalahan operator dan kurangnya pengawasan. Pada tahap *Improve*, disusun usulan perbaikan menggunakan metode 5W+1H, seperti penyesuaian jadwal kerja, pelatihan operator, perekrutan tenaga ahli, perbaikan sistem penyimpanan material, dan evaluasi pemasok. Pendekatan ini diharapkan membantu perusahaan dalam meningkatkan kualitas produk secara menyeluruh dan berkelanjutan.

Kata kunci: Six Sigma, FMEA, AHP, Pengendalian Kualitas, Mesin Laundry, DMAI.

ANALYSIS OF PRODUCT QUALITY CONTROL OF LAUNDRY MACHINE USING SIX SIGMA AND FMEA-AHP METHODS

(A Case Study: PT. Industry Mesin Laundry Indonesia)

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Abstract

Product quality control is a crucial factor in ensuring customer satisfaction and maintaining competitiveness in the manufacturing industry. PT. Industry Mesin Laundry Indonesia (IMELDA), a company that produces large-capacity laundry machines, faced problems related to product defects that disrupted production schedules and reduced customer confidence. This study aims to analyse the quality control process using the Six Sigma method through the DMAI (Define, Measure, Analyse, Improve) stages integrated with the Failure Mode and Effect Analysis (FMEA) and Analytical Hierarchy Process (AHP) methods. In the Define stage, the most frequent types of defects were identified, namely broken machine mounts, welding defects, and bearing damage. The Measure stage evaluated quality performance through DPMO calculations and sigma levels. The average DPMO value obtained was 71,187, which indicated that there were averages of 71,187 defects in one million opportunities. A sigma level value of 3.02 indicated that the production process quality was still at an average level, with a relatively high number of defects. The Analyse phase used a fishbone diagram and FMEA to identify the root causes of defects, while AHP was used to prioritize risks based on severity, likelihood of occurrence, and detectability. The highest risks were identified as operator error and lack of supervision. In the Improve phase, improvement proposals were developed using the 5W+1H method, such as adjusting work schedules, training operators, recruiting experts, improving material storage systems, and evaluating suppliers. This approach is expected to help the company improve product quality comprehensively and sustainably.

Keywords: Six Sigma, FMEA, AHP, Quality Control, Laundry Machines, DMAI.

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