ABSTRAK

PT XYZ adalah perusahaan manufaktur sepatu yang menghadapi permasalahan tingkat cacat yang tinggi pada produksi *mold rubber* sepatu. Berdasarkan pengamatan selama periode Januari hingga Mei 2024, tercatat tingkat cacat sebesar 18,12%, jauh melebihi batas toleransi perusahaan sebesar 10%. Penelitian ini bertujuan untuk mengidentifikasi penyebab cacat tersebut dan memberikan usulan perbaikan menggunakan pendekatan *Six Sigma* melalui metode *Define, Measure, Analyze, Improve, Control* (DMAIC). Pada tahap *Define*, cacat kritis diidentifikasi menggunakan *Pareto Chart*. Tahap *Measure* melibatkan pengumpulan data produksi serta perhitungan nilai *Defects Per Million Opportunities* (DPMO) dan *sigma level*. Pada tahap *Analyze*, dilakukan analisis akar penyebab menggunakan *Root Cause Analysis* (RCA), *Failure Mode and Effect Analysis* (FMEA), dan *Fault Tree Analysis* (FTA). Selanjutnya, pada tahap *Improve*, diterapkan langkah-langkah perbaikan termasuk penambahan parameter *checksheet* peleburan untuk mengurangi cacat, sementara tahap *Control* memastikan keberlanjutan perbaikan melalui pemantauan berkala. Penelitian ini berhasil mengidentifikasi total jenis 5 cacat: *porosity* (5.06%)*, pinhole* (10.9%)*, shrinkage* (27.28%)*, coldshut* (39.3%)*,* dan *metal penetration* (5.43%) didapatkan cacat yang paling dominan terjadi pada produk *casting mold rubber* adalah *coldshut* dan shrinkage, melalui analisis akar penyebab ditemukan bahwa penyebab utama dari cacat *coldshut* dan *shrinkage* adalah suhu penuangan yang tidak optimal dan proses pengecoran yang tidak stabil. Sehingga hasil penelitian menunjukkan penurunan signifikan tingkat cacat dengan peningkatan *sigma level* dari 2,85 menjadi 3,44. Kesimpulannya, penerapan *Six Sigma* terbukti efektif dalam meningkatkan kualitas produk dan menurunkan tingkat *defect* pada proses pengecoran *mold rubber* sepatu.

Kata Kunci: *Failure Mode and Effect Analysis*, *Fault Tree Analysis***,** *Root Cause Analysis*, *Six Sigma*.

ABSTRACT

PT XYZ is shoes manufacturing company facing high defect rates in the production of rubber molds for shoes. Based on observations conducted from January to May 2024, the defect rate was recorded at 18.12%, far exceeding the company's tolerance limit of 10%. This study aims to identify the causes of these defects and implement improvements using the Six Sigma approach through the DMAIC (Define, Measure, Analyze, Improve, Control) method. In the Define phase, critical defects were identified using a Pareto Chart. The Measure phase involved collecting production data and calculating the Defects Per Million Opportunities (DPMO) and sigma level. In the Analyze phase, root causes were examined using Root Cause Analysis (RCA), Failure Mode and Effect Analysis (FMEA), and Fault Tree Analysis (FTA). During the Improve phase, corrective actions—including the addition of melting process parameter check sheets—were implemented to reduce defects, while the Control phase ensured the sustainability of improvements through periodic monitoring. This study successfully identified 5 types of defects total: porosity (5.06%), pinhole (10.9%), shrinkage (27.28%), coldshut (39.3%), and metal penetration (5.43%) obtained the most dominant defects that occur in casting mold rubber products are coldshut and shrinkage, through root cause analysis it was found that the main cause of coldshut and shrinkage defects is the non-optimal pouring temperature and unstable casting process. So the results of the study showed a significant decrease in the level of defects with an increase in the sigma level from 2.85 to 3.44. In conclusion, the application of Six Sigma has proven effective in improving product quality and reducing the level of defects in the shoe mold rubber casting process.

Keywords: Failure Mode and Effect Analysis, *Fault Tree Analysis*, *Root Cause Analysis*, *Six Sigma*.