

ABSTRAK

Industri daur ulang plastik memiliki peran strategis dalam mengurangi akumulasi sampah plastik sekaligus menciptakan nilai tambah ekonomi melalui pendekatan ekonomi sirkular. Namun, tantangan utama dalam industri ini terletak pada kualitas produk akhir yang masih belum konsisten akibat kompleksitas proses produksi. Penelitian ini bertujuan untuk menganalisis pengendalian kualitas produk pada perusahaan daur ulang sampah plastik, Paste Laboratory, dengan menerapkan pendekatan *Six Sigma* melalui tahapan *DMAIC* (*Define, Measure, Analyze, Improve, dan Control*). Fokus penelitian diarahkan pada produk akhir kategori aksesoris yang menunjukkan tingkat kecacatan rata-rata sebesar 4,47% selama tahun 2024.

Metode penelitian menggunakan pendekatan naratif interpretatif kualitatif yang didukung deskriptif kuantitatif. Teknik pengumpulan data mencakup observasi langsung, wawancara semi-terstruktur, kuesioner, serta analisis data historis produksi. Pada tahap *analyze*, dua jenis cacat dominan diidentifikasi melalui diagram Pareto dan *fishbone*, yaitu *bubble trap* (41%) dan tebal tidak rata (28%). Analisis *Failure Mode and Effect Analysis* (*FMEA*) menunjukkan bahwa akar penyebab utama berasal dari kelembapan material yang tinggi (*RPN* 320) dan struktur utama mesin *hot press* yang mengalami *bending* (*RPN* 360).

Sebagai rekomendasi perbaikan, penelitian ini mengusulkan penyusunan SOP pengeringan material, pengadaan alat bantu pengering, evaluasi teknis, jadwal inspeksi mesin secara berkala, serta pelatihan teknis untuk operator produksi. Tahap *control* menekankan pentingnya dokumentasi eksplisit terhadap *tacit knowledge*, penyusunan *log sheet* proses, serta pembentukan sistem monitoring internal berbasis data.

Kata kunci: *Six Sigma*, *DMAIC*, pengendalian kualitas, daur ulang plastik, *FMEA*, industri manufaktur kecil.

ABSTRACT

The plastic recycling industry plays a strategic role in reducing plastic waste accumulation while creating economic value through a circular economy approach. However, a major challenge in this industry lies in the inconsistency of product quality due to the complexity of the production process. This study aims to analyze product quality control at a plastic recycling company, Paste Laboratory, by implementing the Six Sigma approach through the DMAIC stages (Define, Measure, Analyze, Improve, and Control). The research focuses on final products in the accessories category, which recorded an average defect rate of 4.47% throughout 2024.

This study adopts a qualitative narrative-interpretive approach, supported by descriptive quantitative analysis. Data collection techniques include direct observation, semi-structured interviews, questionnaires, and analysis of historical production data. At the analyze stage, two dominant defect types were identified using Pareto and fishbone diagrams: bubble traps (41%) and uneven thickness (28%). The Failure Mode and Effect Analysis (FMEA) revealed that the main root causes of defects were high material moisture content (RPN 320) and the main structure of the hot press machine experienced bending (RPN 360).

As improvement recommendations, this study proposes the development of written SOPs for material drying, procurement of drying equipment, technical evaluation, implementation of scheduled machine inspections, and regular technical training for production operators. The control stage emphasizes the importance of converting tacit knowledge into explicit documentation, establishing process log sheets, and developing an internal monitoring system based on production data.

Keywords: Six Sigma, DMAIC, quality control, plastic recycling, FMEA, small-scale manufacturing industry.