

ABSTRAK

PT. Sandang Asia Maju Abadi merupakan perusahaan garmen denim berorientasi ekspor yang pada tahun 2024 mencatat 1.493.238 defect pada divisi sewing dari 4.435.006 produk yang diperiksa. Cacat G.4 berupa benang panjang/congkolan menjadi cacat dominan dengan 166.427 kejadian atau 11,15% dari total defect dan 3,75% dari total produk. Hasil p-chart menunjukkan proses belum terkendali secara statistik dengan sebelas dari dua belas bulan berada di luar batas kendali dan proporsi tertinggi pada Juni 2024 sebesar 5,80%. Penelitian ini menggunakan Diagram Pareto, Fishbone, FMEA berbasis occurrence, FTA probabilistik, 5W+1H, p-chart, dan One-Group Pretest-Posttest Design untuk mengidentifikasi penyebab, merumuskan perbaikan, dan mengevaluasi penurunannya. Hasil FTA menunjukkan tiga intermediate event yaitu sisa benang tidak terkendali setelah sewing (I1: 47,24%), benang tertarik saat proses sewing (I2: 28,99%), dan defect visual lolos dari deteksi (I3: 23,77%). Pada I1, basic event dominan adalah operator tidak melakukan trimming sampai bersih dan pisau cutter tumpul masing-masing 12,16%, serta tidak ada quality gate setelah trimming sebesar 10,57%. Akar penyebab bersumber dari sistem reward berbasis output tanpa bobot kualitas, ketiadaan standar visual trimming di stasiun kerja, tidak ada instruksi kerja dan SOP terdokumentasi, serta lemahnya sistem inline checking. Sepuluh rekomendasi perbaikan disusun menggunakan 5W+1H dan diimplementasikan melalui penetapan PIC QC per line, penambahan operator QC, pembuatan visualisasi cacat G.4, dan pemeriksaan berkala mesin. Evaluasi One-Group Pretest-Posttest Design menunjukkan penurunan proporsi cacat G.4 dari 3,75% menjadi 3,20% dengan persentase penurunan 14,67% dan efektivitas perbaikan 17%.

Kata kunci: pengendalian kualitas, cacat G.4, Fault Tree Analysis, FMEA berbasis occurrence, p-chart, One-Group Pretest-Posttest Design, sewing, garmen denim

ABSTRACT

PT. Sandang Asia Maju Abadi is an export-oriented denim garment manufacturer that recorded 1,493,238 defects in the sewing division in 2024 from 4,435,006 inspected products. G.4 defects, defined as long thread/thread pull, were the dominant defect with 166,427 occurrences representing 11.15% of total defects and 3.75% of inspected products. The p-chart showed the process was statistically out of control, with eleven of twelve months outside control limits and the highest proportion in June 2024 at 5.80%. This study applied Pareto Diagram, Fishbone, occurrence-based FMEA, probabilistic FTA, 5W+1H, p-chart, and One-Group Pretest-Posttest Design to identify causes, formulate improvements, and evaluate defect reduction. FTA identified three intermediate events: uncontrolled thread residue after sewing (I1: 47.24%), thread disturbance during sewing (I2: 28.99%), and visual defects escaping detection (I3: 23.77%). Within I1, dominant basic events were incomplete trimming by operators and blunt cutter blade each at 12.16%, followed by absence of a quality gate after trimming at 10.57%. Root causes included an output-only reward system without quality weighting, absence of visual trimming standards at workstations, no documented work instructions or SOP, and a weak inline checking system. Ten improvement recommendations were formulated using 5W+1H and implemented through assigning QC PIC per line, adding QC operators, creating G.4 defect visualizations, and conducting periodic machine inspections. Evaluation using the One-Group Pretest-Posttest Design showed a reduction in G.4 defect proportion from 3.75% to 3.20%, with a 14.67% reduction rate and 17% improvement in effectiveness.

Keywords: quality control, G.4 defect, Fault Tree Analysis, occurrence-based FMEA, p-chart, One-Group Pretest-Posttest Design, sewing, denim garment