ABSTRAK

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Judul Laporan Akhir	:	Pengendalian *defect welding* produk X untuk meningkatkan output produksi di line produksi

(2025: xii + 92 Halaman, 24 Gambar, 15 Tabel + 6 Lampiran)

Perkembangan industri manufaktur baterai *lithium-ion* mendorong peningkatan standar kualitas pada setiap tahapan proses produksi, salah satunya adalah proses pengelasan otomatis (*automatic welding*). PT XYZ sebagai salah satu perusahaan manufaktur baterai *lithium-ion* menghadapi permasalahan *defect welding* pada produk X yang menyebabkan meningkatnya jumlah produk *Not Good* (NG) sehingga berdampak pada tidak tercapainya target *output* produksi di *line* produksi. Penelitian ini bertujuan untuk mengidentifikasi jenis *defect welding* yang paling dominan, menganalisis faktor-faktor penyebab terjadinya *defect welding* menggunakan metode analisis *rate defect*, *Fishbone Diagram* (5M+1E), dan *Failure Mode and Effects Analysis* (FMEA), serta merumuskan rekomendasi perbaikan dan langkah pencegahan yang tepat guna meminimalkan jumlah produk NG dan meningkatkan *output* produksi. Pengumpulan data dilakukan selama periode April hingga Mei 2026 melalui observasi langsung, wawancara dengan operator, teknisi, *leader*, dan personel *Quality Control* (QC), serta dokumentasi data produksi harian. Berdasarkan hasil analisis data, ditemukan lima jenis *defect welding* pada produk X, yaitu *black hole*, *white hole*, *welding offside*, *noweld*, dan *weak welding*, dengan total 31 unit produk NG selama periode pengamatan. Jenis *defect* yang paling dominan adalah *black hole* sebanyak 12 kasus (38,71%) diikuti *white hole* sebanyak 9 kasus (29,03%). Hasil analisis *Fishbone Diagram* menunjukkan bahwa *defect welding* disebabkan oleh faktor *Man, Machine, Method, Material, Measurement*, dan *Environment*. Hasil analisis FMEA menunjukkan bahwa penyebab dengan nilai *Risk Priority Number* (RPN) tertinggi adalah kondisi lensa laser yang kotor , diikuti ketidakselarasan koordinat *pole* baterai antara mesin CCD dan mesin *welding*, serta pemeliharaan mesin yang tidak terjadwal. Berdasarkan hasil tersebut, rekomendasi perbaikan yang diajukan meliputi penyusunan jadwal pembersihan lensa berbasis siklus produksi, verifikasi koordinat *pole* baterai sebelum proses *welding*, dan penyusunan dokumen *preventive maintenance schedule* untuk seluruh komponen kritis mesin *welding*.

Kata Kunci: *Defect Welding*, *Fishbone Diagram*, FMEA, *Rate Defect*.

ABSTRACT

Control of welding defects in X products to increase production output on the production line

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The development of the lithium-ion battery manufacturing industry has driven increasingly stringent quality standards at every stage of the production process, particularly in the automatic welding process. PT XYZ as one of the lithium-ion battery manufacturers, faces welding defect problems in the X product that have led to an increase in the number of Not Good (NG) products, thereby affecting the achievement of production output targets on the production line. This study aims to identify the most dominant type of welding defect, analyze the causative factors of welding defects using defect rate analysis, Fishbone Diagram (5M+1E), and Failure Mode and Effects Analysis (FMEA) methods, as well as formulate appropriate corrective recommendations and preventive measures to minimize the number of NG products and improve production output. Data collection was carried out during the period of April to May 2026 through direct observation, interviews with operators, technicians, leaders, and Quality Control (QC) personnel, as well as daily production data documentation. Based on the results of data analysis, five types of welding defects were identified in the X product, namely black hole, white hole, welding offside, noweld, and weak welding, with a total of 31 NG units recorded during the observation period. The most dominant defect was black hole with 12 cases (38.71%), followed by white hole with 9 cases (29.03%). The results of the Fishbone Diagram analysis indicated that welding defects were caused by factors related to Man, Machine, Method, Material, Measurement, and Environment. The FMEA analysis revealed that the highest Risk Priority Number (RPN) was obtained for contaminated laser lens condition, followed by misalignment of battery pole coordinates between the CCD machine and welding machine, and unscheduled machine maintenance. Based on these findings, the corrective recommendations proposed include the establishment of a production cycle-based lens cleaning schedule, verification of battery pole coordinates prior to the welding process, and the development of a preventive maintenance schedule document for all critical components of the welding machine.
Keywords : Welding Defect, Fishbone Diagram, FMEA, Defect Rate.