

ABSTRAK

Industri manufaktur di Indonesia terus menghadapi tantangan dalam menjaga kualitas produk, terutama di tengah persaingan global yang semakin ketat. PT Krakatau Pipe Industries, sebagai salah satu produsen utama pipa baja, mengalami permasalahan tingginya tingkat cacat pada produk pipa *Electrical Resistance Welded* (ERW), yakni sebesar 5,189% sepanjang tahun 2023. Angka ini melampaui batas toleransi perusahaan yang ditetapkan sebesar 4%. Jenis cacat yang paling sering ditemukan antara lain *high/low*, *IT scarfing*, *overlapp thickness*, dan *roll mark scratch*, yang mempengaruhi mutu produk dan menurunkan efisiensi operasional.

Penelitian ini bertujuan untuk mengidentifikasi penyebab utama terjadinya cacat pada produk pipa ERW dan menyusun strategi perbaikan dengan pendekatan Six Sigma. Metode DMAI (*Define, Measure, Analyze, Improve*) digunakan dalam menganalisis proses produksi, menghitung tingkat kecacatan melalui nilai *Defect Per Million Opportunities* (DPMO) dan *Level Sigma*, serta merumuskan solusi berbasis prioritas risiko menggunakan metode *Failure Mode and Effect Analysis* (FMEA). Data yang dianalisis berasal dari hasil produksi selama periode Januari hingga Desember 2023. Berdasarkan hasil pengolahan, diketahui bahwa rata-rata nilai DPMO mencapai 28.331,068 dengan *level sigma* sebesar 3,5. Sementara itu, FMEA digunakan untuk menentukan nilai *Risk Priority Number* (RPN) dan mengidentifikasi prioritas perbaikan.

Strategi perbaikan yang diusulkan meliputi peningkatan kompetensi operator melalui pelatihan, kalibrasi mesin secara rutin, serta penggantian komponen yang telah melewati masa pakainya. Hasil penelitian ini diharapkan mampu meningkatkan kualitas proses produksi secara konsisten dan berkelanjutan.

Kata kunci: Six Sigma, DMAI, FMEA, Pengendalian Kualitas, PT Krakatau Pipe Industries

Proposed strategy to improve the quality of Electrical Resistance Welded pipe production using six sigma method

ABSTRACT

The manufacturing industry in Indonesia faces great challenges in maintaining product quality amid increasingly fierce competition. PT Krakatau Pipe Industries as one of the main producers of steel pipes in Indonesia experienced the problem of high defect rates in Electrical Resistance Welded (ERW) pipe products, with the percentage of defects reaching 5.189% during the January-December 2023 period, exceeding the company's threshold of 4%. The main defects found include high/low, IT scarfing, overlapp thickness, and roll mark scratch, which not only reduce product quality but also increase production costs due to rework and potentially disrupt the company's operational efficiency.

This study aims to identify the main causal factors of defects in ERW pipes and apply the Six Sigma method as a systematic approach to reduce defect rates. The Six Sigma method is used through the stages of Define, Measure, Analyze, Improve. (DMAI) stages to analyze the production process, identify critical points causing defects, and design and implement improvement solutions. Data was collected quantitatively from production results and quality inspections and supported by qualitative analysis through field observations and interviews with production operators.

The findings of this study prove that the implementation of the Six Sigma method can effectively reduce the number of defective products and improve the efficiency of the production process at PT Krakatau Pi.

Keyword: *Six Sigma, DMAI, FMEA, Quality Control, PT Krakatau Pipe Industries*