

ABSTRAK

Aluminium fluorida (AlF₃) merupakan salah satu produk unggulan PT.Petrokimia Gresik yang dihasilkan dari proses pemanfaatan limbah hasil samping produksi bahan pembuatan pupuk berbasis Fosfat. Produk AlF₃ dalam kurun tiga tahun terakhir sejak 2015 telah memberi kontribusi pendapatan yang cukup tinggi bagi perusahaan. Namun demikian, dalam proses produksi AlF₃ masih terdapat sejumlah defect/cacat yang merupakan kerugian bagi perusahaan.

Penelitian ini bertujuan untuk mengetahui faktor apa saja yang menyebabkan cacat pada produk Aluminium fluorida, serta bagaimana merancang aktivitas perbaikan kualitas produk Aluminium fluorida dengan Metode Six Sigma. Penelitian ini menggunakan konsep Six Sigma DMAIC (*Define, Measure, Analyze, Improve, Control*). Pada langkah *Define* dilakukan identifikasi masalah dan menentukan target sesuai Key Performance Indicators (KPI) perusahaan. Pada langkah *Measure*, dilakukan pengukuran *baseline* kinerja, penentuan akar permasalahan menggunakan diagram sebab-akibat, pengelompokan jenis kegagalan menggunakan Failure Classifier (FC), serta FMEA untuk menganalisis moda kegagalan dengan menghitung nilai Risk Priority Number (RPN). Selanjutnya langkah *Analyze* merupakan tahapan menganalisa penyebab masing-masing kegagalan berikut rekomendasi perbaikan yang semestinya dilakukan. Langkah berikutnya yaitu langkah *Improve* mengenai bagaimana melakukan usulan perbaikan, serta tahap terakhir yaitu tahap *Control* adalah melakukan monitoring konsistensi penerapan six sigma.

Penelitian ini menyimpulkan baseline kinerja produksi Aluminium fluorida pada tahun 2017 didapatkan Risk Priority Number (RPN) sebesar 5504, Proses Yield 84.8 %, dan Sigma Performance Level sebesar 2.58 σ . Terdapat 36 *failure cause* penyebab defect pada Produk Aluminium fluorida. Usulan perbaikan dengan menggunakan metoda Six Sigma DMAIC dan FMEA melalui langkah *Improve* dapat meningkatkan kinerja proses produksi Aluminium fluoride sehingga Risk Priority Number (RPN) dapat diturunkan menjadi 1632, Proses Yield sebesar 95.5% (target KPI 95%) naik dari sebelumnya 84.8% dan Sigma Performance Level naik menjadi 3.2 σ . Artinya terdapat penurunan peluang terjadinya defect sebesar 107.400 dalam 1 juta kali kesempatan (DPMO), serta potensi penghematan finansial sebesar 23,2 Milyar dalam 1 tahun.

Kata kunci : aluminium fluorida, six sigma (DMAIC), *failure classifier* (FC), *failure mode and effect analysis* (FMEA).

ABSTRACT

The problem that often occurs in a manufacturing company is defect on its product. The policy to control product defect will affect the company's performance in meeting customer demand. PT. Petrokimia Gresik (PG) is one of the State-Owned Enterprises (BUMN) and subsidiaries of PT. Pupuk Indonesia (Persero) which is engaged in fertilizer and chemicals production. PG is required to be able to meet the continuity of quality and quantity of production in meeting customer demand so that it can make cost savings through the used of more economical and efficient facilities including the management operations and maintenance systems. One of the strategic management and maintenance operations in PG is the management of Aluminum fluoride (AlF₃) plant operations.

Aluminum fluoride (AlF₃) is one of the superior products of PT. Petrokimia Gresik that produced from the process of utilizing by-products of Phosphate-based fertilizer production. AlF₃ products in the last three years since 2015 have contributed to the company's income. However, in the production process there are still a number of defects, which are losses for the company.

This study aims to determine what factors cause defects in Aluminum fluoride products, and how to design activities to improve the quality of Aluminum fluoride products with the Six Sigma Method. This study uses the concept of Six Sigma DMAIC (Define, Measure, Analyze, Improve, and Control). In Define step, the problems are identified and the targets are determined according to the company's Key Performance Indicators (KPI). In Measure step, performance baseline measurements performed, root causes are determined using fish bone diagrams, failure type groupings performed using Failure Classifier (FC), and FMEA to analyze failure modes by calculating the Risk Priority Number (RPN) value. Furthermore, the Analyze step is the stage of analyzing the causes on each failure and recommendations for improvements that should be made. The next step is how to make improvements, and the last step is the Control stage to monitor the consistency of applying six sigma.

This study concluded that the baseline performance of Aluminum fluoride production in 2017 give Risk Priority Number (RPN) of 5504, Process Yield 84.8%, and Sigma Performance Level of 2.58 σ . There are 36 failure causes of defects in Aluminum fluoride products. Proposed improvements using the Six Sigma DMAIC and FMEA methods through step Improve can increase Aluminum fluoride production process performance so that the Risk Priority Number (RPN) can be reduced to 1632, Yield Process 95.5 % (95% KPI target) climb from 84.8% and Sigma Performance Level is 3.2 σ increase from the previous 2.58 σ .

Keywords: aluminium fluoride, six sigma (DMAIC), failure classifier (FC), failure mode and effect analysis (FMEA).