UNIVERSITI TEKNOLOGI MARA

IMPLEMENTATION OF SIX SIGMA USING DMAIC METHODOLOGY IN SUGAR INDUSTRY

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ABSTRACT

Six Sigma is a methodology that focuses on process improvement. It has many tools that are within the Six Sigma DMAIC toolbox (Define, Analyze, Improve, and Control). These tools help breakdown a process, analyze it, and put controls in place to improve the process from that point forward. DMAIC is a nonstop cycle that will continually improve the process. This research was conducted by using two primary objectives as a guideline. The first objective of this research is to study the implementation of Six Sigma using DMAIC Methodology in manufacturing of sugar industry. Second objective of this research is to improve the monitoring techniques by analyzing the data using Capability Six pack on Carbonation tank at melting process. The process selected was from manufacturing of sugar which focusing on carbonation tank. The parameters involved at this tank were pH of diluted liquor, retention time and temperature during settling of lime and carbon dioxide adding in the tank. However, this study was monitored the pH condition only. The technique applied was DMAIC as a solution to reduce the most common defects encountered. The analysis from employing Six Sigma and DMAIC indicated that high color is the highest defect that influenced the amount of defective sugar produced. In particular, the six pack capability of variance techniques by using Minitab 17 Software was used to statistically determine the correlation. Then, it details the application of Six Sigma with DMAIC in the XYZ Company, which obtained an increasing sigma level from 2.98 to 3.87 after the process improvement.

Keywords: *Six Sigma, DMAIC Methodology (define, measure, analyse, improve, and control), Sugar Industry, Critical to Quality (CTQ)*

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Siti Amirah Binti Alias

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CHAPTER ONE

INTRODUCTION

1.0 BACKGROUND OF RESEARCH

Six Sigma is a statistically-based and management tool for quality improvement program. It also used as a methodology that increases profits and financial by minimize costs related with quality problems (Dr. Hsiang-chin Hung, 2011). This thesis focuses on improving business processes, and especially the quality of product. It is carried out as case study of sugar industries. For the sake of simplicity, sugar industry will often be referred as Company XYZ in this research paper. It has long been acknowledgement that the benefits of Statistical Process Control (SPC) can be expended to the industrial processing industry and has obvious significant share in quality aspects of manufacturing industry especially the food industry (Sarina, 2014). Today's food manufacturing businesses are heavily challenged by consumer-oriented markets that require continuous improvement and development in food product quality. Six Sigma not only to prepare safe quality food, but also to avoid against food legislation and to gain customer trust. The quality of product is an important part that the company needs to care the most. According to (A.Coskun, 2011) Traditional Sucuk (Sausage) processing was used as a demonstrated process and some simple Statistical Process Control techniques were used as tools. This technique shows defects that may interrupt the production line and slow the process. Variations in food products have been challenging food technologist and food scientist for more than 80 years (Sarina, 2014).In this research, the process of sugar manufacturing will be elaborated and analyses on the implementation of theoretical concepts such as Six Sigma by using DMAIC Methodology.