
Achieving Customer Specifications Through Process Improvement Using Six Sigma: Case Study of NutriSoil – Portugal

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Tolerance limits are essential in production process management, as they determine consumer satisfaction. The use of statistical quality control tools allows for process improvement and the c_{pk} index enables its measurement. Above all, the adoption by businesses of lean tools has been crucial in reducing the variation of a process or a product, satisfying the consumer's specifications, eliminating defects, reducing operating costs, and, in short, increasing profitability.

The NutriSoil Company in Portugal, a small and medium-sized enterprise (SME), sells fertilizer in bags. The company has had problems with its filling process due to excess weight of the bags. Results show that by implementing Six Sigma combined with the 5S program, NutriSoil achieved an improvement in its c_{pk} index for this process, which increased consumer satisfaction and a highly significant cost savings. This resulted in increased competitiveness.

Key words: c_p and c_{pk} capability index, process capability, process improvement, Six Sigma, SME, statistical quality control

INTRODUCTION

The basic objective of this study is to explore, using a case study, the benefits of implementing the strategy of Six Sigma combined with the 5S program in NutriSoil, a Portuguese small and medium-sized enterprise (SME) struggling to retain profitability. NutriSoil had high production costs, a situation that is common to many SMEs.

The specifications or tolerance limits define the difference between acceptable and unacceptable products, and producing within these limits is critical to consumer satisfaction. The ability to consistently distribute products within specifications determines whether the supplier will continue to do business with the consumer. A company can improve a production process by efficiently coordinating the specifications and the design process. Process capability measures how the process meets specifications.

True process capability cannot be determined until \bar{x} and R control charts have reached optimum quality improvement without significant investment in new equipment. A key aspect of process improvement is to recognize that regardless of the depth of this monitoring, there is always variation. This variation is well defined when a process is statistically controlled. A modern definition of quality