

Abstract

This independent study aims to study the cost of quality (COQ) for the defect reduction using six sigma methodology. The case of interest is the manufacturer of actuator component and printed circuit cable assembly (PCCA), supplier of hard disc drive's (HDD) industrial. Three main quality costs of interest include appraisal costs, prevention costs and failure Costs. The achievement of this work is evaluated from the improvement of process capability (Cpk) of component of interest as customer required.

The study followed the five steps of six sigma approaches by resuming from the problem defining step. It was found that the numbers of the defect of actuator component and PCCA were very high. Cause and effect diagram, then, was applied in order to determine the possible causes of such problem. In measure step, the failure and effect mode analyses (FEMA) technique and the pareto rule were used to rank the risk priority of the causes and to determine the most potential ones, respectively. From this step, the key factors for process variation were specified. These factors were, then, statistically hypothesis tested in the analyses step. After that, the design of experiment was performed to determine the significant effect of such factors in the improve phase. Finally, the result of the study were implemented, monitored, and controlled with statistical process control tools.

The study found that there were 2 main factors affecting to the defect of the product of interest at 95% confidence level including solder paste and stencil aperture. It was found that the solder paste of HM531 and the stencil aperture at 11.0 mm were suitably implemented. The implementation of these two factors increased the Cpk from 1.33 to 2.34. Comparing to the sale revenue of 35 million USD, the ratio of internal failure quality cost was reduced by 40% from 1.4555 to 0.8119.