

The Application of Lean Six-Sigma for Improvement in Bread Manufacturing Process throughout Cooperative and Work Integrated Education Program (CWIE)

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Abstract

The purpose of this study was to analyze the loss and improve the quality of bread process using techniques Lean Six Sigma. . Throughout Cooperative and Work Integrated Education Program (CWIE), CWIE members that included a student, an academic supervisor and a job mentor worked together for 6 months for above matter. By analyzing current operations with Value Stream Mapping and rely on Failure Mode and Effect Analysis (FMEA) to analyze the problem in the process. On dough cutting process with low process capability (Cpk), bread weight was lost due to reserved weight. In addition, the loss of packaging material, plastic bag, on automatic form-fill- sealing process. From two above steps, the design of experiment was applied to find the suitable working conditions. On dough cutting process, dough weight and block pusher distance were found as significant main factor influencing to the unequal of bread weight ($\alpha=0.05$). On the filling and sealing process, improper labelling and sealing were found. Cause and Effect Diagram was deployed to analyze and determine potential factors. The strength of wind to open lip bag, the height of the sealer and hardness of bread were main significant factors affecting to the seal process quality. CWIE members together designed and performed experiments to find the optimal conditions on above processes. After implementing the result of study to process control, the standard deviation was decreased from 6.7 to 3.3, the average net weight was closer to target value. Process capability (Cpk) was improved, while packaging loss could be reduced from 3.45% to 1.725%.

Keywords

Lean Six-Sigma, Experimental Design, Productivity, Process Improvement, Bread Production