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Statistical quality control approach based on double sampling method

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This study investigated whether quality inspection practices of the SL Organisation can be enhanced by applying statistical quality control techniques, which mainly is a combination of acceptance sampling and statistical process control. The two main objectives of this study were to investigate the possibility of implementing statistical process control techniques into the current inspection process, and to examine the possibility of enhancing the currently used acceptance sampling methods.

A stepwise approach is designed in applying statistical process control to a production process where the steps include identifying the potential types of defects, identifying the production stages and the critical stages for quality, measuring the potential defects using check sheets, creation of Pareto charts to find out which defects are most common, carrying a cause and effect analysis to improve the production process and creating control charts in order to monitor the production process. Ceylon Paper Pottery factory on which SL Organization carries out quality inspection, was selected to test the success of the implementation of statistical process control techniques.

In order to improve the acceptance sampling methods, the protection level of currently used sampling tables in the industry were assessed via operating characteristic curves and average outgoing quality curves. Hence the most suitable sampling plans were identified using the general level 3, tight inspection sampling table in ANSI/ASQ Z 1.4. Also, in order to reduce the inspection cost, reduction of the number of inspections required is considered. To achieve this objective, sampling plans which have lower average total inspections and double sampling plans with average sample number lower than the sample size of single sampling plans were identified while providing the same protection level. Specifically, this study recommends SL organization to use ANSI/ASQ Z 1.4 double sampling plans at general level 3 tight sampling plan when the lot size is below 1200, and general level 2 tight sampling plan otherwise.

Keywords: Statistical quality control techniques, acceptance sampling, statistical process control

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