STATISTICAL TECHNIQUES FOR SOAP PRODUCTION PROCESS IN A LOCAL INDUSTRY

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B.G.S.A.PRADEEP

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B.G.S.A.Pradeep

Department of Mathematics

University of Ruhuna

Matara

Sri Lanka

Statistical Quality Control (SQC) techniques are very important for industry in order to minimize occurring of defectives by willful and inadvertent errors. Therefore, SQC techniques applied for soap industry because a considerable amount of soaps has been returned as various issues. Hence these issues were quantified by collecting and analyzing of data available in the database of the Harischandra Mills PLC, by resorting Pareto chart. Declining of fragrance, weight and colour intensity of the soap was identified as the major factors because which were responsible for 80% of market returns. As the production volume of the company was 25,000(N) pieces per day, an ISO sampling plan was prepared and sample size 57 (n) was drawn. In the study, color and weight were tangible while fragrance was intangible. Therefore the one tangible property- color was omitted from the study and Shewhart and cusum control charts were used to determine whether the soap processing line in statistically control for fragrance and weight variations.

To accomplish this task, five pieces of soap were drawn every half an hour intervals from the production line and weight and the strength of fragrance were measured using electronic balance and oven method respectively. The data gathered from the first-three days were used to calculate trial control limits for weight (CL=75.022 for $\overline{X}$-chart and CL=2.28 for R chart). The analysis reviews that there was not out of control signal on $\overline{X}$ or R-chart, which conclude weight

variation of soaps in Hrischandra Mills PLC was in control. Further, a cusum technique was applied for very small variations of soap, which also depicted that the above process is still in control.

The same sampling procedure was carried out to measure variation of perfume strength and found out of control point on the R-chart. After removal of (inadequate perfume strength) that point, new control limits were calculated (enhancement of strength of fragrance) as (CL=1.3520 for $\overline{X}$-chart and CL=0.982 for R chart) Day after first-three consecutive days (4^{th} day) the same sampling plan was applied to draw Shewhart control charts ($\overline{X}$ or R-chart), then found another out of control point on the $\overline{X}$-chart this point also removed (operator's fatigue) and new control limits were calculated (introducing background music with high stimulus value) as (CL=1.4020 for $\overline{X}$-chart and CL=0.816 for R chart). Since more out of control points were not found these values were used for online usage. More over to scrutinize the process, cusum control charts were used because very small amount of perfume is responsible for high impact on perfume strength. Therefore cusum control chart was plotted (1σ) and found there was a variation in perfume strength.