Statistical painting process control

Science, Physics

Chase, Jacobs and Aquilano pose questions such as, “ How many paint defects are there in the finish of a car? [and] Have we improved our painting process by installing a new sprayer? ” These questions are meant to investigate and apply different techniques that we can use to improve the quality of life. Quality control not only applies to manufacturing techniques, it can also be applied to everyday life. This discussion will focus on a specific method of quality control called statistical process control that will ensure my morning process is effective.

One method of quality control can be pursued through process control procedures like statistical process control or SPC. SPC “ involves testing a random sample of output from a process to determine whether the process is producing items within a preselected range”. (Chase, Jacobs & Aquilano, 354) SPC is a method that can be applied to a process in order to monitor or control that process. In week one, I described a personal process of waking up in the morning through to going to work.

In addition to my process, I presented several bottlenecks that can slow my process down including the ability of my alarm clock working, weather impact on travel time, and availability of gym equipment. In the examples below, I will focus on how alarm failures have affected my morning process. SPC has shown how statistical data can be charted in order to see how my morning process is affected by my bottlenecks and whether or not it is a positive. Goods or services are observed not as variables but as attributes. Attributes are quality characteristics that are classified as either conforming or not conforming to specification. ” (Chase, Jacobs & Anquilano, In example

one, a sample was taken 10 times over a 30 day period in which alarm failures were observed. In order to create a visual representation of the statistics, we must combine the data from the sample. Once the data is gathered, we can provide a solution to create a control chart. Control charts are used as a “ component of total quality [in order to] monitor processes”.

Finally, the control limits are used to measure attributes with a single decision of yes or no, good or bad, and positive or negative. This simple decision can be translated into a graph with upper and lower control limits. If the sample is plotted and stays in between the limits, then the sample is considered good or working properly. “ Should a sample mean or proportion fall outside the control limits or a series of mean or proportions exhibit a non-random pattern the process is deemed out-of-control. (Green, Toms, Stinson, 37) In order to turn the chart into a graph, we will need to calculate the upper control limits (UCL), the lower control limits (LCL) and z. “…z is the number of standard deviations for a specific confidence”. In this example, we will use the ” z-value of 3 in order to represent a 99. 7% confidence” (Chase, Jacobs, & Anquilano, 356). This means that when that the confidence interval “ falls outside the control limits, there is a 99. 7% chance that there is something wrong with the process that must be corrected”. Though not perfect, a confidence of 99. 7% is useful. The SPC must also take into consideration the number of data points as well. The more data that is available the stronger your confidence intervals are. UCL = p + z Sp UCL = p + 3Sp UCL = . 08333 + 3(. 05050) = . 23483 LCL = p – z Sp LCL = p – 3Sp LCL = . 08333 ? 3(. 05050) = -. 06817 In the control chart, the data from the

sample stays in between the controls. This means that my process in the morning is working properly and is effective.

Now, it is important to look to the future trends in order to predict seasonal factors. “ A seasonal factor is the amount of correction needed in a time series to adjust for the season of the year. ” (Chase, Jacobs & Anquilano, 533) Seasonal factors may affect the samples by taking into consideration factor based on seasons or time periods. The alarm clock that is used to wake me up in the morning is not dependent on any factors of time or season. Statistical process control is one way to control quality and make suregoalsare attained.

Statistical methods show that the samples taken can create visual representations that conclude my alarm clock is an effective method to starting my morning process. This ensures that it is operating at its fullest potential.

REFERENCES

1. Chase, R. B. , Jacobs, F. R. , Aquilano, N. J. Operations management for competitive advantage (11th ed).
2. New York: McGraw Hill/Irwin. Green Jr. K, Toms L, Stinson T.
3. STATISTICAL PROCESS CONTROL APPLIED WITHIN ANEDUCATIONSERVICESENVIRONMENT. Academy Of EducationalLeadershipJournal [serial online]. June 2012; 16 (2): 33-46.