Control Charts

Why

- To monitor process variation over time.
- To differentiate between special cause and common cause variation.
- To assess effectiveness of changes.
- To communicate process performance.

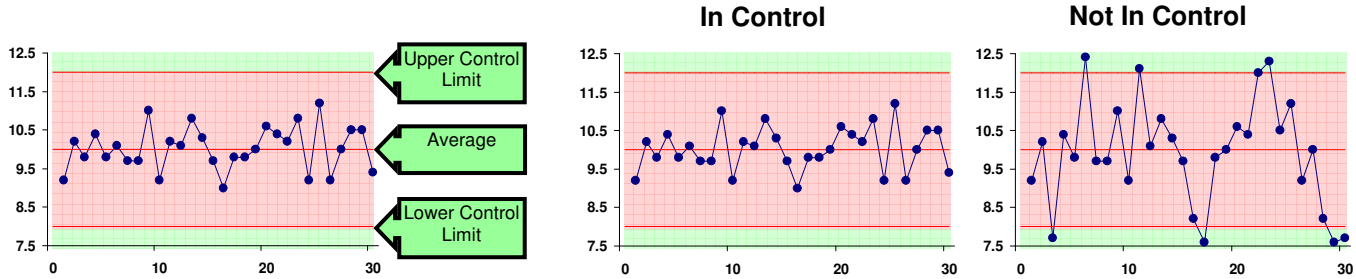
All processes have variation, which can be classified into two different types; common cause variation and special cause variation. Differentiating between the two is at the heart of control charting. Processes which are subject only to common cause variation are said to be statistically 'in control', whereas those which are subject to special cause variation are said to be 'out of control'. Keeping a process 'in control' is key as it allows you to predict future output and manage the process economically. When a process goes 'out of control' it is more likely to generate defects.

Also, the actions we need to take are quite different for common cause than for special cause; 1) Special cause variation requires prompt reaction to the differences. 2) Common cause variation requires basic changes to the process. Reacting to differences inappropriately can lead to a worsening of variation.

What

A control chart is a statistical tool used to distinguish between process variation resulting from common causes and variation resulting from special causes. It is similar to a run chart (or time series plot) with the addition of lines representing the mean and control limits.

Rules are applied to determine whether the variation observed is common cause (in control) or special cause (out of control). The simplest rule is whether the points go outside the control limits, as shown in the example below. Other rules apply to patterns in the data, for example a certain number of points in a row ascending or descending also indicate the process is out of control.



How

There are several types of control chart depending on the type of data you are dealing with. A Six Sigma Black Belt can help with selection, application and interpretation. Typical steps are:

1. Select the appropriate characteristic to control.
2. Select the data collection point.
3. Select the type of control chart.
4. Establish the basis for grouping data and determine the appropriate sample size and frequency.
5. Determine the measurement method/criteria.
6. Perform a Measurement Systems Analysis to confirm robustness of data measurement.
7. Perform an initial capability study for collecting and charting data.
8. Develop procedures for collection, charting, analyzing and acting on information.
9. Provide written instructions and train personnel.