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The Voice of the Customer

In the previous lesson, you learned about using control charts for problem solving. Control charts are said to define the voice of the process. That is, control charts help you understand what the process is telling you.

You learned that a process is stable and in control when only common causes of variation are present, and that control limits define the range of variation we can expect for the plotted statistic, if the process is stable.

For example, the thickness of small metal parts is measured, and subgroup means are plotted using an X-bar and R chart. This process is stable. The grand mean is 41.33 hundredths of an inch. The control limits tell us that the subgroup means will fall between approximately 38.96 and 43.7 hundredths of an inch.

In this example, the plotted statistic is subgroup means. So the control limits are based on means.

If you plot individual values on an I and MR chart, the control limits are based on individual values.

In this lesson you learn about methods for understanding the ability of a process to meet customer expectations, or specifications. Because specification limits (or spec limits) are often defined by the customer, they are sometimes called the voice of the customer.

We use the term process capability to refer to the spread of a stable process relative to the spec limits.

The spread of the distribution of this process characteristic is as wide as the spec limits.

This process is not as capable of meeting customer specifications as this process.

Process capability indices are measures, calculated from data, that compare the spread of the process to the spec limits.

In the next video, you learn about the most commonly used capability indices: C_p, C_{pl}, C_{pu}, and C_{pk}. Capability indices are computed as part of a process capability study.

In a process capability study, you determine whether the process is stable, bring the process to stability (if it is unstable), and compute a capability index to quantify the ability of the process to meet customer specifications.

Why do we care about process stability?

Earlier you learned how to use control charts to determine whether a process is stable, or in control. A stable process is predictable, enabling you to make statements about future performance. If a process is not stable, it is not predictable.

A capability index is a measure of the ability of a process to meet customer expectations. If the process is not stable, you do not know what the future performance will be, so the process capability cannot be estimated.

In the next videos, you learn how to compute and interpret the most common capability indices.

Statistical Thinking for Industrial Problem Solving

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