Print

Practice: Conducting a Capability Analysis with a Phase Variable

Open the file **MetalPartsAfter.jmp**.

Your team has been working on improving the dimensional conformance of a small metal part. You're focusing on bringing the thickness to target and reducing variability. The target is 40 +/- 5 hundredths of an inch.

You use problem-solving tools, data, and statistical methods to identify critical input variables and develop an understanding of cause and effect. You identify and test process improvements, and you implement these changes. You will conduct a Before and After capability study to see whether the capability has improved.

1. Use the Control Chart Builder to create an X-bar and R chart for **Thickness**, with **Hour** as the subgroup variable. To construct separate control charts for the Before and After data, select **Before/After Change** and then click the **By** button.

    a. Is the process stable, both before and after the change?

    a. Yes, the process, both before and after the change, is stable.

2. Now conduct a capability analysis for the process before and after the change. To do this, right-click on the X-bar chart and select **Limits** and then **Add Spec Limits**. Then remove the spec limits from the control chart by clearing **Spec Limits** under **Limits[1]**. Select **Show Capability** from the top red triangle. Repeat this analysis for both the before and after data.

    a. What were C_p and C_{pk} before the change?

    b. What are C_p and C_{pk} after the change?

    c. Using the before and after capability indices, describe how the process has changed in terms of variability and centering.

    a. $C_p = 0.944$ and $C_{pk} = 0.693$

    b. $C_p = 1.089$ and $C_{pk} = 1.073$

    c. C_p is slightly higher, so the variability has been reduced. The big change is that C_{pk} is much higher, and C_{pk} is close to C_p. So the process is very close to the target.

Hide Solution

Statistical Thinking for Industrial Problem Solving

Close