Lecture #27

Prof. John W. Sutherland

Nov. 1, 2002
[plus notes from previous classes]
An Example

Three identical parts

Manufacturing process -- $C_p = 1.5$ (at least)
What will the individual process $\sigma_x$ be, if tolerances are obtained by simple division?
Find (i) standard deviation for the processes (ii) tolerances for individual parts
Another Example

For now, let’s assume hole & pin producing processes are centered at the nominal values and that processes have Cp values of 1.0.

What does clearance dist. look like??
Clearance Distribution

\[ C = H - P \]

\[ \mu_C = \mu_H - \mu_P = 0.035 \]

\[ \sigma_C^2 = \sigma_H^2 + \sigma_P^2 \quad \text{----} \quad \sigma_c = 0.007 \]
What can go Wrong?

- We have already seen that if our individual processes (in this case pin and hole) do not remain centered - the results can be disastrous.

- What if our processes are not maintained in a state of statistical control?
Histogram - Hole Dimension

The histogram shows the frequency distribution of hole diameters. The x-axis represents the hole diameter in inches, ranging from 0.9865 to 1.0135 inches, while the y-axis represents the frequency of occurrence.
Histogram - Pin Dimension

Pin Diameter

Frequency

0.9515 0.9545 0.9575 0.9605 0.9635 0.9665 0.9695 0.9725 0.9755 0.9785
Histogram - Clearance Dimension

About 91.4% Capable