

ASSIGNMENT 2: USING DISTRIBUTIONS FOR PROCESS IMPROVEMENT DECISIONS

Using Excel, generate 20 data points from a normal distribution with a mean of 200 and a standard deviation of 5.2, using the random number seed 1024. Assume that this is the sample output from a manufacturing process with specifications 202 ± 2.5 .

A.) Do the following:

1. Check your data to see if it is reasonably normally distributed (you can use the Normal Probability Plot template from the course website). Why (or why not) does it pass the “Fat Pencil” test?
2. Estimate the yield (% within specifications) for the process as it currently operates.
3. Assume that the initial processing costs \$5.20 per part, and that the parts that are over-sized can be reworked (trimmed) to obtain a within specification part at an additional cost of \$2.45 per part (assume 100% success in reworking). Estimate the cost per good part for the process as it currently operates.

B.) Assume that we can reduce the spread of our process by 50%, without changing either the location of our process distribution or the engineering specifications of the product. Estimate the following:

1. the yield for the improved process, using the existing specifications.
2. the cost per cost per good part for the improved process.
3. the annual savings, based on a production volume of 150 000 parts.

C.) Alternatively, assume that we can center the process (move the location of the distribution to the mid-point of the specifications) without changing the spread. Do the following:

1. Estimate the yield for the improved process, using the existing specifications.
2. Estimate the cost per good part for the improved process.
3. Estimate the annual savings, based on a production volume of 150 000 parts.
4. Estimate the percentage reduction in process spread that would result in a 90% yield if we could center the process within specifications.

D.) Assume that the plant could either reduce the process variation as in (B.) or center the process, as in (C.), but not both at the same time.

1. Advise the firm as to which action should be taken first?