Operating Characteristic Curve Comparator

This document describes the operation of a tool to compare the operating characteristics of different acceptance sampling plans. The tool is implemented as a spreadsheet model in Microsoft Excel. It may be downloaded from the whitepapers page of my web site, www.rowequality.com (alongside this document).

When downloading the spreadsheet, note that it was developed in Excel 2011 for Macintosh. I have not provided a version for older versions of Excel because it depends on statistical functions that are not supported in versions earlier than Excel 2010.

Acceptance sampling is a technique in which a lot of product is accepted or rejected based on the results of testing a random sample of items selected from the lot. The sampling plan identifies the size of the sample to be drawn and the maximum number of defective items allowed to be found before the lot must be rejected.

The operating characteristic curve of a sampling plan is a curve that plots on the y-axis the probability of accepting a lot with the the proportion of defective items shown on the x-axis.

The spreadsheet allows one to compare two sampling plans side by side by entering:
- The lot size
- The upper and lower limits of the quality range to be plotted expressed as Lot Proportion Defective (LPD).
- For each of two sampling plans:
    - The size of sample to be drawn
    - The largest number of defects in the sample that is acceptable

The spreadsheet presents two graphs. The upper graph represents the OC curves for the two sampling plans as calculated using the binomial distribution. This is the distribution frequently used in preparing standard tables of sampling plans, e.g. ANSI Z1.4.

The lower graph represents the OC curves for the same two plans as calculated using the hypergeometric distribution. This more accurately represents the probability of acceptance of a given lot of product.

The differences are generally small and likely to be noticeable only at small lot sizes.