Obsolescence Tool Add-in

User Guide

Version 0.3.01

Developed at Iowa State University

By Connor Jennings, Pratek Pingle, and Janis Terpenny

2/10/15

NOT FOR DISTRIPUTION

Life-Time Buy Quantity Calculator

Summary:

The Life-Time Buy Quantity Calculator uses a Monte Carlo simulation technique that pull from many probability distributions and creates numerous scenarios. These scenarios are then analyzed to predict the optimal order quality when placing a life-time buy order.

Variables:

Monte Carlo Samples - The number of times the scenarios the simulation runs.

Confidence Level - 90% of the simulations you will have enough parts.

Number of Standard Deviation - How wide is the range on the output graph.

Number of Time Periods - How many time periods you want to input demands.

Percent of Buffer - Addition buffer added after the 90% confidence is calculated.

Percent of Parts Loss in Manufacturing – Allows user to account for manufacturing scrape rate of part that are unsalvageable.

Length of Buy - Distribution of how long the product will be in production

Length of Redesign - Distribution of how long it will take to Re-engineer with product without this component.

Demand Forecast – The individual demand distribution for each year.

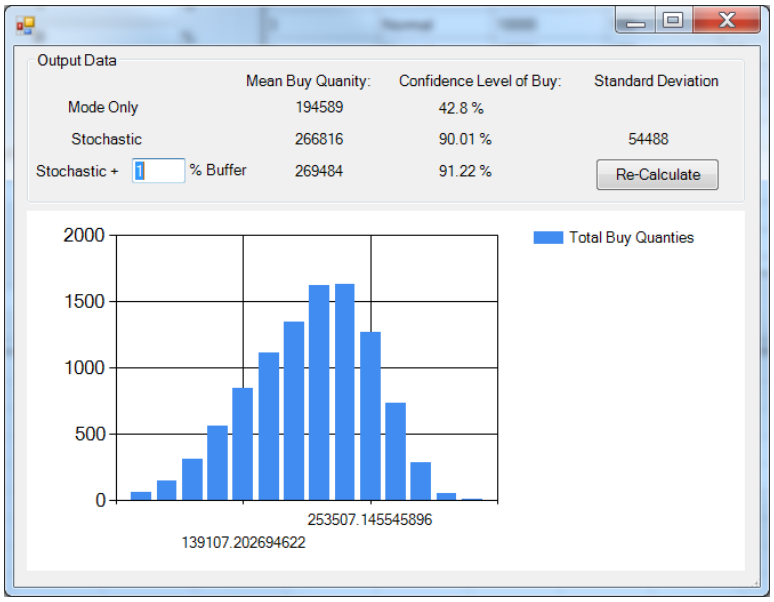
Instructions:

1. To open the Life Time Buy Calculator, hit the *Life Time Buy Calc* button under the OBSOLESCENCE tab.
2. The Life Time Buy Calculator Form will appear and be preloaded with some variables.
    a. Monte Carlo Samples = 10000 (10000 scenarios will be generated for this analysis)
    b. Confidence = 90% (In 90% of the 10,000 scenarios, the user will have enough parts)
    c. Number of Stand Deviations = 3 (+/- 3 standard deviations will be plotted on the output)
    d. Number of Time Periods = 10
    e. Percent Buffer = 1% (Increased buffer on the 90% prediction.)
    f. Percent of Parts Loss in Manufacturing = 0%
3. After resetting those variables as the user sees fit, move to the Time Distributions section.
    a. Length of Buy is how long the part will be in production and Length of Redesign is how long it will take to reengineer a new solution not including the obsolete part.
    b. Select a Distribution type from the drop down menu and input the variables that do not have “XXXX” in the text box. These variables are not needed for the distribution you have selected.

c. If you need addition help selecting a distribution, follow the *How to Choose a Distribution* Section of this User Guide.

4. Now move to the Demand Forecast section.
   a. Click on the row from the data table that you wish to change. (You must click the number directly, not just the cell)
   b. The row will populate the text boxes in the top of the form. Select distributions then make the same changes you did for the Time Distribution.
   c. If you need addition help selecting a distribution, follow the *How to Choose a Distribution* Section of this User Guide.
5. Now hit the Calculate Button in the bottom of the form and wait for results. If you miss entered data, an error message will direct you to your problem.

Analyzing Results:



1. The first line of the output is the "Mode Only" predictions. This shows how many parts to order just using average demand per year multiplied by number of years. Mode Only does not take into account anything other than those two variables. The confidence level of the Buy is the percent of scenarios that had enough parts at this order quantity.
2. Stochastic takes into account all the variables besides Percent of Buffer. Its suggested order quantity is based off the confidence level specified in the previous form. For example, a 90% confidence level will find the 90th percentile scenario by quantity and output that.
3. Stochastic + Buffer is using the Mean Buy Quantity from step 2 and added the addition buffer percent.
   a. The confidence level of the Stochastic + Buffer is not just the confidence level of the Stochastic and then adding the Buffer percent. This is because the Buy Quantity distributions are not linear.

   b. Changing the buffer size and hitting *Re-Calculate* allows users to do a sensitivity analysis of sorts. Users can see how buying addition parts effects the total confidence level. (e.g. if you add 1% more of a buffer, does it add only .2% more scenarios or covers 7% scenarios)

4. The final output is a histogram of the buy quantities for all the scenarios in this output.

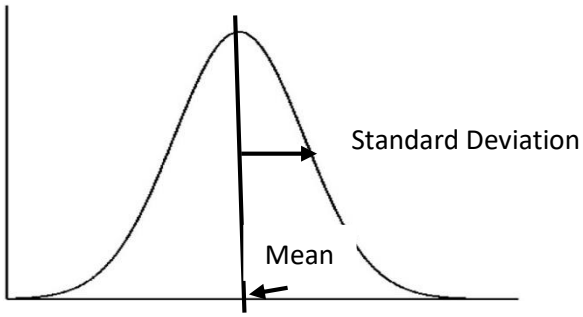
How to Choose a Distribution

Choosing the correct distribution for a simulation is important. It makes the simulation as realistic as possible and also for real business decisions to be made on its output with extreme confidence.

Normal Distributions:

Inputs: Mean and Standard Deviation

Reason for Selecting: Normal Distributions are used when a mean is known and the variance around the mean is known or can be estimated.



Uniform Distributions:

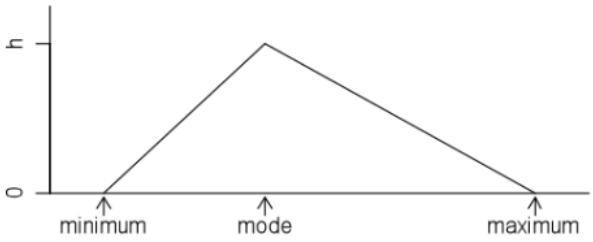
Inputs: Maximum and Minimum

Reason for Selecting: Uniform Distributions are used when a range of values has an equal probability of occurring.

Triangle Distributions:

Inputs: Maximum, Minimum, and Mode

Reason for Selecting: Uniform Distributions are used when a range of values has an equal probability of occurring.



None/No Distributions:

Inputs: Mode

Reason for Selecting: None/No Distributions are used when one exact number is known and there is no need for random sampling.