

One-Minute Spotlight

The Crystal Ball Scatter Chart

Once you have run a simulation with Oracle's Crystal Ball, you can view several charts to help you visualize, understand, and communicate the simulation results. This Spotlight uses Crystal Ball and a simple spreadsheet (shown below) to demonstrate how you use a scatter chart. Scatter charts are a new feature as of Crystal Ball 7.3.

	A	B	C	D	E	F	G
1	Simulation with Design of Experiments						
2	Length						
3	LSL	USL	Target				
4	59.0	67.0	63.0				
5							
6	Factor	Name	Actual Value	Nominal Value	Std Dev	Dist.	
7	1	MoldTemp	155	155	10	Normal	
8	2	CycleTime	100	100	5	Normal	
9	3	HoldPres	130	130	3	Normal	
10							
11	Response:	Length	63.732				
12							
13	Transfer Function:						
14	Length = 0.05755MoldTemp + 0.09025CycleTime + 0.4565HoldPres + -0.0002825MoldTemp*CycleTime + -9.18						
15							
16	Results from Minitab						
17	Estimated Coefficients for Length using data in uncoded units						
18							
19	Term	Coef					
20	Constant	-9.18					
21	MoldTemp	0.05755					
22	CycleTime	0.09025					
23	HoldPres	0.4565					
24	MoldTemp*CycleTime	-2.83E-04					
25							

This example model demonstrates the application of combining simulation with a designed experiment. The model uses the results from a designed experiment to simulate the variability in the part length (the response, or transfer function from the designed experiment) based on variability in each of three factors.

The three factors are defined as assumptions with appropriate normal probability distributions, and simulation of the model results in a distribution of the response and the likelihood of defective parts (those with lengths that are out of spec).

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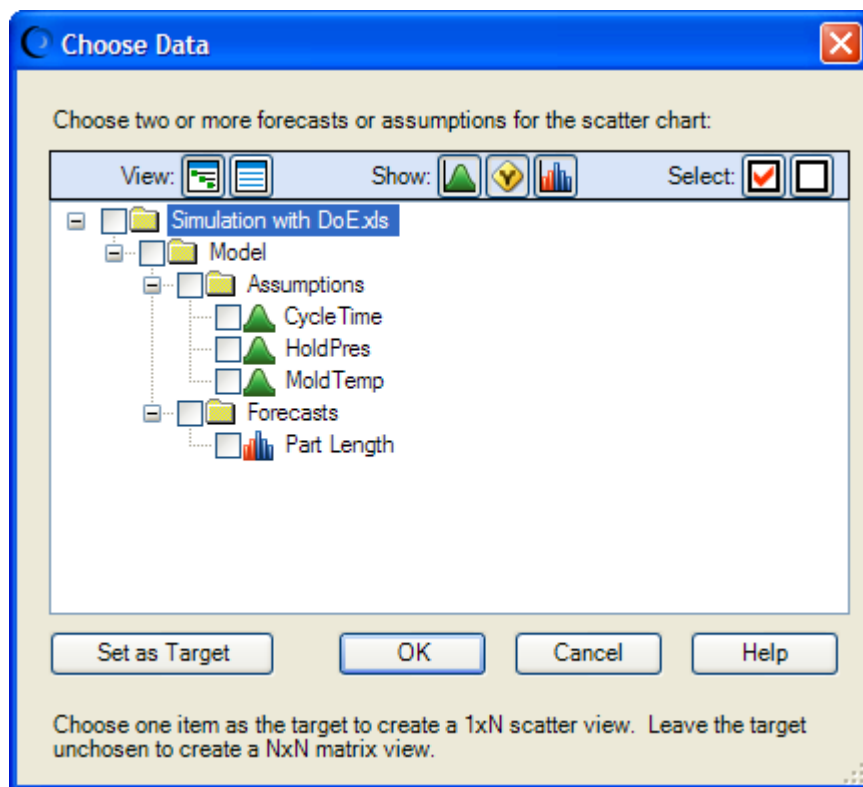
Creating the Scatter Chart

Once you have run a simulation, you can use scatter charts to help you understand any relationships among the three input factors. Scatter charts show correlations and other relationships between pairs of forecasts and assumptions plotted against each other.

To create a scatter chart, select the Scatter Charts option from the Analyze menu or select the scatter chart toolbar button (outlined in red, below):



When you first open the scatter chart, you see a blank view. Click New to create a new scatter chart.



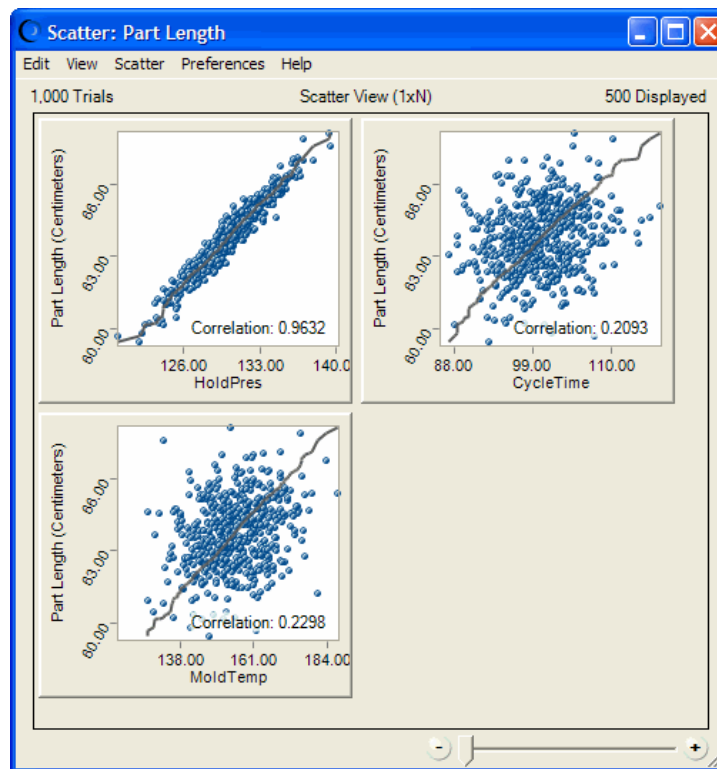
The chooser shows a tree view of all the assumptions and forecasts. Select the Part Length forecast and click on Set as Target (you have the option to select an assumption as a target as well). Then

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select the other assumptions (or you could select any other forecasts if they existed) that you wish to see in the scatter chart for Part Length. Click on OK.

Interpreting the Scatter Chart

In its basic form, a scatter chart contains one or more plots of a target variable mapped against a set of secondary variables. Each plot appears as a cloud of points or symbols aligned in a grid within the scatter chart window. In this example, you can view each of the three inputs mapped against the Part Length forecast. The HoldPres assumption has a strong positive correlation (0.9632) with Part Length, a relationship verified by the sensitivity chart.



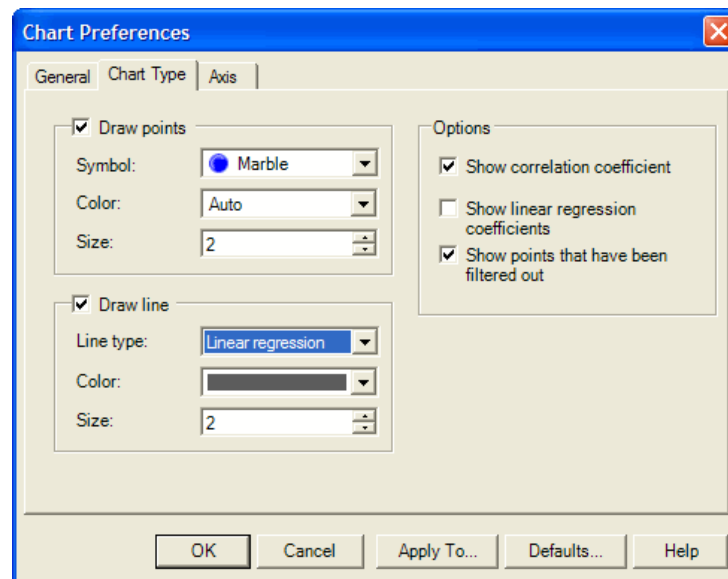
The line in each graph shows where the pairwise points would appear if they were sorted in ascending order. The closer the points conform to the line, the closer the relationship among the plotted variables. Lines sloped from the lower left to the upper right show positive relationships. If the relationship is negative, the line slopes from the upper left to the lower right.

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Formatting the Scatter Chart

You can use the Plot Sizer at the lower right to increase or decrease the size of all plots and the amount of detail shown within them. You also have several options for chart and scatter preferences.

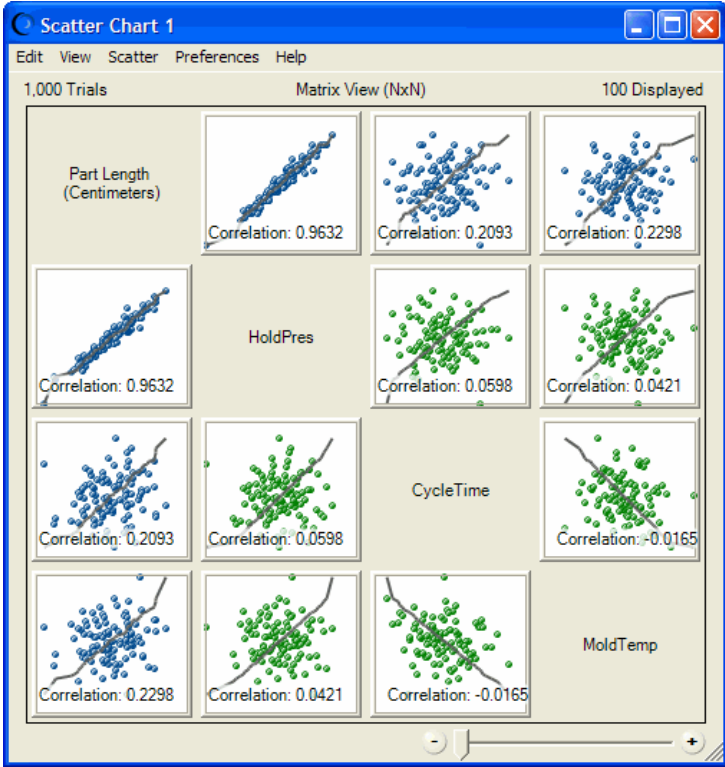
Under Preferences > Chart, you can change the appearance of the title, axes, points, line, and more. The default is the Ordered Fit line shown above, but you can change the line to change it to a Linear Regression line, which uses a least-squares technique to show the linear relationship of the points.



Selecting the Matrix View

Under Preferences > Scatter, you can also change from Scatter View to a Matrix View. In the Matrix view, each selected variable is plotted against every other selected variable to show the relationships among them, including the intercorrelations among three inputs.

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For more information or to contact us, browse to <http://www.oracle.com/crystalball>.

