

MATHEMATICS 201-510-LW

Business Statistics

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Fall 2008

Control Charts with Excel

Example

At a Pepsi bottling center, samples of 3 Pepsi cans are regularly taken, and their volume measured. Draw an \bar{x} chart. Is the process in control? Here is the data:

Sample			
1	353.70	352.72	354.24
2	355.28	355.20	355.73
3	351.82	353.77	355.10
4	352.91	353.31	353.31
5	351.15	353.02	353.23
6	351.88	351.83	353.60
7	354.13	353.63	353.67
8	353.63	355.34	353.91
9	353.81	353.49	355.97
10	354.87	356.38	353.35
11	357.66	352.39	354.54
12	353.90	355.92	352.92
13	353.48	354.68	353.62
14	354.76	352.56	353.15
15	352.48	353.64	353.97

Begin by making the usual heading in cells A1:A4. Then include the above data in cells A7:D22. The next step is to find the mean of each sample. This can be done in column E using the AVERAGE function. Do the same thing for the range in column F (given by MAX – MIN). The next step is to determine the centerline along with the control limits. This can be done in cells A24:B28, where the centerline is found by find the mean of the means, and the other control lines with the formulas seen in class (note that you'll need to find the mean range).

To graph the control chart, we need to have a column for each of the control limits. So in cells G8:K8, write the five numbers found for the control limits, and copy these numbers in cells F9:J28.

Next, graph the \bar{x} column along with the 5 columns for the lines using a LINE GRAPH. Fix the lines so the markers do not show on the control limits, and the two middle limits are dashed. For this, click on a line and go to FORMAT DATA SERIES. In MARKER OPTIONS choose NONE. For the lines that are dashed, go to FORMAT DATA SERIES and LINE STYLE. Insert appropriate titles, and get rid of the gridlines.

The conclusion from the graph is that the process is out-of-control.

Here is what your spreadsheet should look like (other side) :

	A	B	C	D	E	F	G	H	I	J	K
1	Business Statistics										
2	Control Charts										
3	By Martin Huard										
4	October 8, 2008										
5											
6											
7	Sample				Mean	R	Centerline	UCL	2/3 UCL	2/3 LCL	LCL
8	1	353.70	352.72	354.24	353.55	1.52	353.86	355.70	355.10	352.70	352.10
9	2	355.28	355.20	355.73	355.40	0.53	353.86	355.70	355.10	352.70	352.10
10	3	351.82	353.77	355.10	353.56	3.28	353.86	355.70	355.10	352.70	352.10
11	4	352.91	353.31	353.31	353.18	0.40	353.86	355.70	355.10	352.70	352.10
12	5	351.15	353.02	353.23	352.47	2.08	353.86	355.70	355.10	352.70	352.10
13	6	351.88	351.83	353.60	352.44	1.77	353.86	355.70	355.10	352.70	352.10
14	7	354.13	353.63	353.67	353.81	0.50	353.86	355.70	355.10	352.70	352.10
15	8	353.63	355.34	353.91	354.29	1.71	353.86	355.70	355.10	352.70	352.10
16	9	353.81	353.49	355.97	354.42	2.48	353.86	355.70	355.10	352.70	352.10
17	10	354.87	356.38	353.35	354.87	3.03	353.86	355.70	355.10	352.70	352.10
18	11	357.66	352.39	354.54	354.86	5.27	353.86	355.70	355.10	352.70	352.10
19	12	353.90	355.92	352.92	354.25	3.00	353.86	355.70	355.10	352.70	352.10
20	13	353.48	354.68	353.62	353.93	1.20	353.86	355.70	355.10	352.70	352.10
21	14	354.76	352.56	353.15	353.49	2.20	353.86	355.70	355.10	352.70	352.10
22	15	352.48	353.64	353.97	353.36	1.49	353.86	355.70	355.10	352.70	352.10
23											
24	Centerline:	353.9									
25	UCL	355.7									
26	2/3 UCL	355.1									
27	2/3 LCL	352.7									
28	LCL	352.1									
29											
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