



Run Charts

Run Charts can also be used to determine if a process has experienced a change. The run chart is not as sensitive to special cause variation as control charts. Run charts can be developed with fewer data points. Run charts are especially useful for data that is measured over time.

Make sure your data is normally distributed—can use a histogram to determine. Median, mode, and mean should be the same or to close if data is normally distributed.

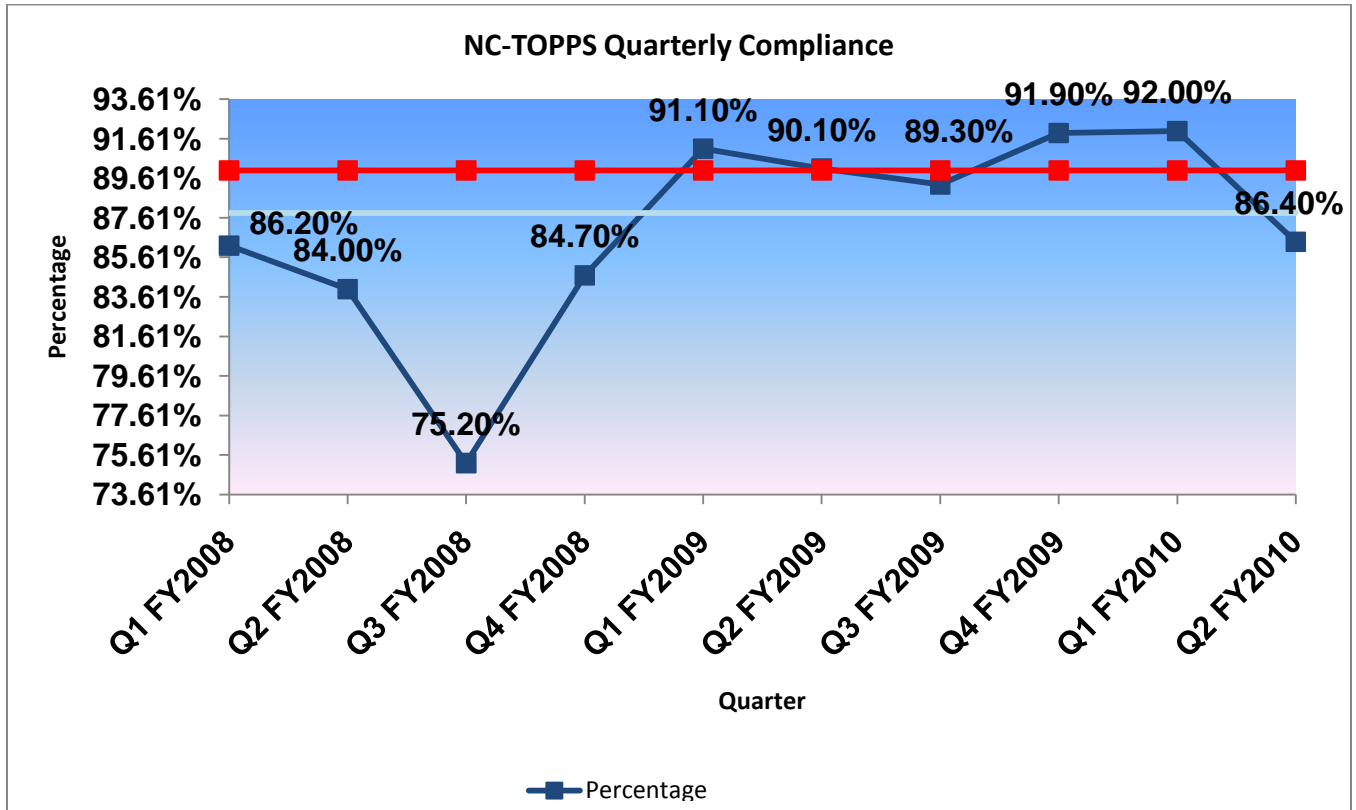
A run is defined as a series of consecutive points that are on one side of the median line—(regardless of whether they are going up and down) --use the run chart to interpret the results based on number of data points. If number of counted runs is smaller or larger than expected, there may be special cause variation. Example: 16 points not on line and there are 13 “runs”—means there is special cause variation because the expected number of runs is 6-12.

- To calculate the median: Count the number of data points. If the number is odd, the middle value is the median number. The middle value will have the same number of data points below it and above it. Example: 5, 10, 11, 20, 22, 16, 26, 10 (place the numbers in descending or ascending order: 5, 10, 10, 11, 16, 20, 22) The middle value is 11—that is the median. If the number of data points is even, then the middle two values must be added together and divided by 2 to get the median. In the above example: if another data point was added—18, then the order would be: 5, 10, 10, 11, 16, 18, 20, 22 The middle two values are 16 and 18. $16 + 18 = 34$ divided by $2 = 17$. The median is 17.

In the NC-Topps example, the median is 87.85%. There are a total of 3 runs. No points lie on the median. The total number of data points is 10 so according to the chart, 3-8 runs would be considered “normal” variation. There is no special cause variation.



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Pts not on Median		Lower limit runs		Upper limit runs		# Pts not on Median		Lower limit runs		Upper limit runs	
10	23	3	8	8	16	36	49	13	19	23	31
11	24	3	8	9	17	37	50	13	19	25	32
12	25	3	9	10	17	38	60	14	24	25	37
13	26	4	9	10	18	39	70	14	28	26	43
14	27	4	9	11	19	40	80	15	33	26	48
15	28	4	10	12	19	41	90	16	37	26	54
16	29	6	10	12	20	42	100	16	42	27	59
17	30	5	11	13	20	43	110	17	46	27	65
18	31	6	11	13	21	44	120	17	48	28	70
19	32	6	11	14	22	45		17		29	
20	33	6	11	14	22	46		17		30	
21	34	7	12	15	23	47		18		30	
22	35	7	19	16	23	48		18		31	



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