

Soap Manufacturing Company

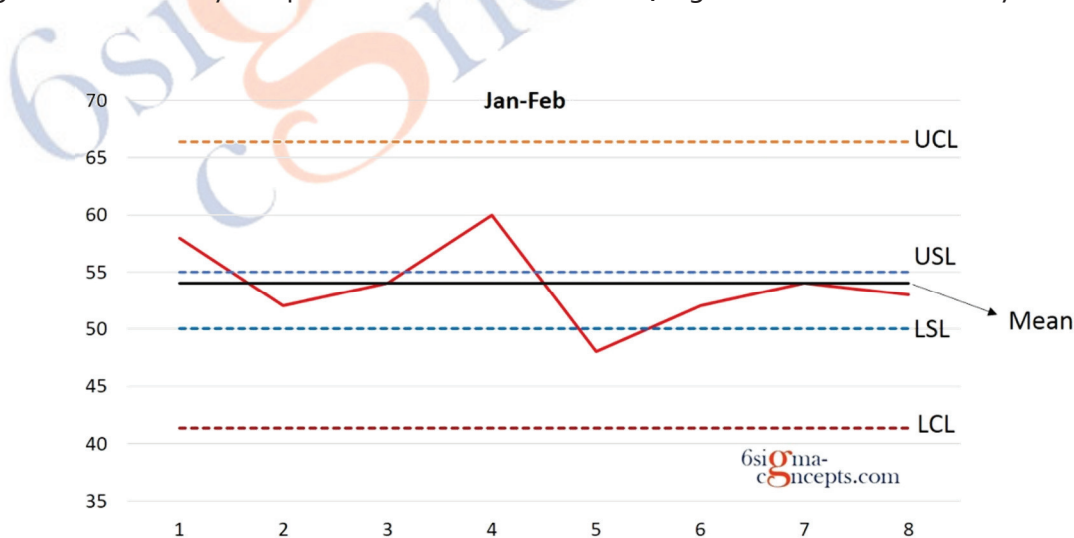
A company is in the business of making soaps with a specification of 50-55 Gms/cake. Anything less than 50 Gms may invite litigation from consumer forum and anything beyond 55 Gms would hit their bottom line. They started the manufacturing and found huge variation in the mean weight of the cakes week after week (see figure-1, January-February period). They were taking one batch per week and producing 250000 soap cakes per batch. From each batch they draw a random samples of 100 soaps for weight analysis. Average weight of 100 samples drawn per batch for the month of Jan-Feb is given below in figure-1.

Month	Jan-Feb							
Week	1	2	3	4	5	6	7	8
Batch	1	2	3	4	5	6	7	8
Mean Weight	58	52	54	60	48	52	54	53

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Figure-1: Average weight of 100 sample/batch for Jan-Feb period.

In order to evaluate the performance of the process, a control chart is plotted with VOP & VOC (Figure-2). Presently it represents the case-I scenario, Figure-6 where VOP is beyond VOC.



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Figure-2: Control chart for the month of Jan-Feb⁹

They started continuous improvement program to reduce the variability in the process using DMAIC process.¹⁰ They were able to reduce the variability to some extent but still majority of the soap cakes were out of specifications (March-April period, Figure-3). They continued their endeavor and reduced the variability further and for the first time the control limits of the process was within the specification limits (May-June period, Figure-3). At this point their failure rates were reduced as 95% of the soaps would be meeting the specifications.

We can further reduce the variability to reach the 6 sigma level where the failure rates would be 3.4ppm. But now, we need do a cost benefit analysis as improvement beyond a limit would involve investment. If 5% failure rate is acceptable to the management then we would stop here.

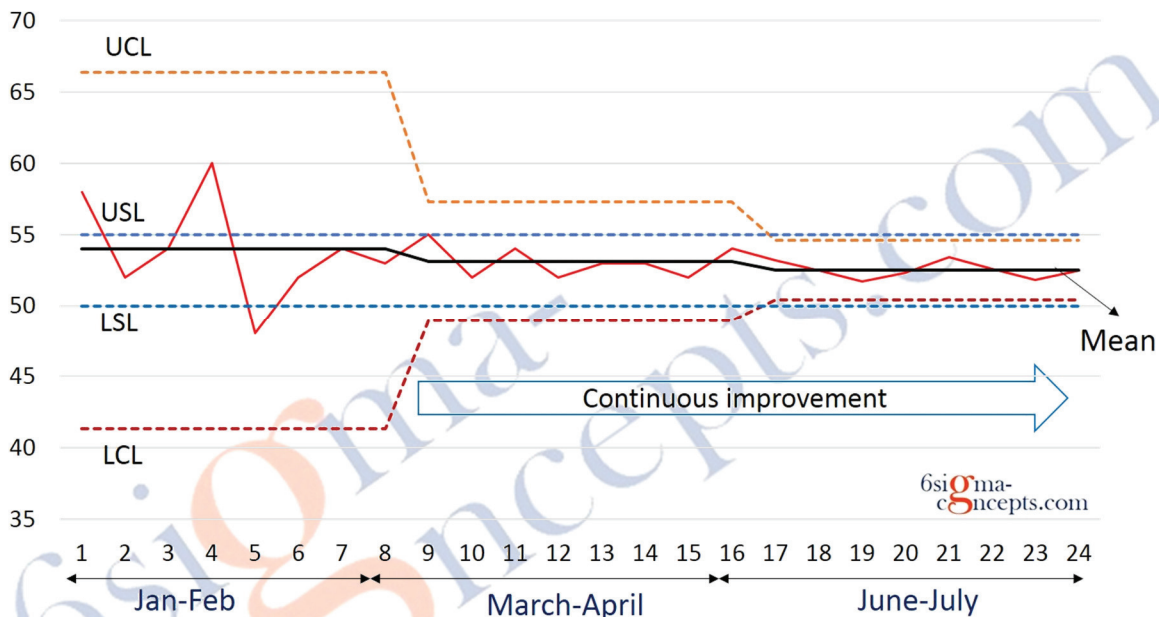


Figure-3: Continuous Process Improvement.

Comments:

It is not always desirable to achieve 6 sigma level, a 3 sigma process is good enough. But there are cases where human life is involved like passenger aircraft, automobile brakes and airbags, medical devices etc. and in these cases it worth going to 6 sigma and beyond to ensure the safety of the human life.

⁹ USL & LSL is customer's requirement. Don't bother about the calculation of LCL & UCL at this moment.

¹⁰ Once again, it uses DMAIC process which can't be discussed right now. Right now assume that they were successful in continuous improvement.