

How does six sigma helps in reducing defects?

What is variation?

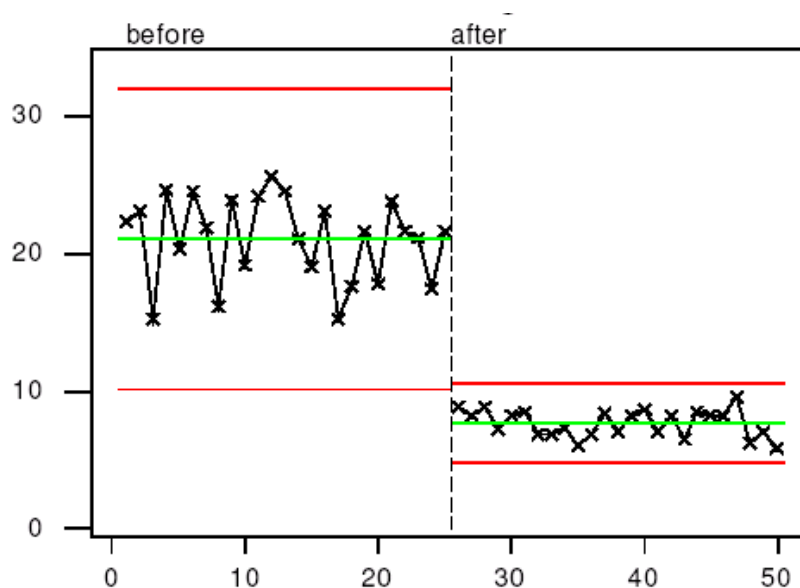
Variation is simply a deviation from the expectations/targets or standards. We are aware that Variability in a process is inevitable. Be it a manufacturing process or a service related process or a software related process or a natural process- we can always see variations.

In our own processes, we find that some days they are running in their best conditions and we get the best results in terms of productivity / quality / defect rate. On some other days we find that without any visible reasons, the results are bad. Variations in the outputs are the major concern for all of us.

We should realize that the variations in the output are caused by the variations in the inputs and the process conditions. Sometimes the variation is too large that the processes start producing defective products or services, not acceptable to customers. Though variation in the process can be never fully eliminated, it can be reduced.

Six sigma and Variations:

Six sigma methodology focuses on reducing the variation in the outputs by reducing the variations in the inputs and the process conditions so that we always get consistent quality of products and services



In the graph, we can see the variation in the process before and after doing a Six sigma project. The project was done to reduce the % rejections in a process. Before doing the six sigma project, the average rejection was around 21% and the variation in the rejection was very high – from 15% to 25%. After doing the six sigma project, we see a drastic reduction in the average rejection – from 21% to around 8%. Also the variation is also reduced significantly to vary from 6% to 10%. That is the beauty of Six sigma methodology.

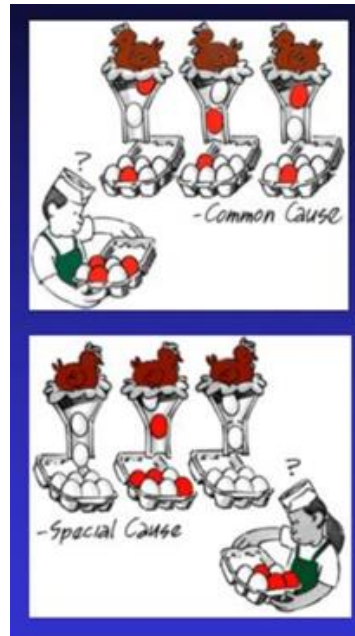
Six Sigma helps in improving the metrics taken up for improvement by identifying the critical inputs and process condition contributing to variability in outputs and reducing it to a very narrow range.

What are different types of variations in processes?

Now we will explain the types of variations and which type of variation is addressed in Six sigma methodology with an example. Assume that a person commutes around 30 kilometres every day from home to office and on an average he takes around 50 minutes to cover the distance. But he is not going to cover the distance in exactly 50 minutes every day, the time may vary between 30 minutes to 70 minutes.

There are various reasons contributing to this variation. The number of traffic signals, the waiting time at the traffic signals, the road conditions etc are some of the reasons which are always present and contribute to the variation significantly. Such variations caused by causes which are always present and chronic in nature are called Common cause variations.

Sometimes the variations are caused by reasons like major accident on the way, political procession on the route, flooding due to sudden rainfall etc. which also have a major impact, but are quite infrequent and we will be able to assign the exact reason for the variation. Such variations are called as Special cause variation or Assignable cause variation.



In the picture at the top we are unable to find out the reasons for the defective eggs like which hen, which tray etc, and hence the variation is due to common causes. In the picture at the bottom, we are able to find out the exact hen causing the problem and hence the variation is due to special causes.

Six sigma methodology helps us to tackle variation due to the common causes and hence help in solving chronic process problems nagging us for a longer period of time. Special cause (Assignable) variation should be arrested before trying to reduce common cause variation.