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SIX SIGMA

No doubt many of you have heard the term, "Six Sigma". Some of you have a thorough understanding of the meaning of the term. Others are scratching their heads wondering where they heard it, in what connotation or if they heard it at all.

There are many touted quality/continuous improvement programs, including TQM, SPC, ISO, CQI, Lean, and the Deming method. One of the latest is Six Sigma.

Six Sigma is a particular business-driven process that seeks continuous improvement in customer satisfaction and business profit. It places an emphasis on general business improvement by reducing and eliminating defects. Six Sigma strives to improve quality by reducing waste so that products and services are produced better, faster and cheaper. Six Sigma is also concerned with improving profitability. Six Sigma is a method for improving all business processes.

The central thought behind Six Sigma is that the number of defects produced by a process can be measured. Once understood, one can figure out how to systematically eliminate the defects and move as close to a zero defect process as possible.

The Greek letter "Sigma", σ, is a statistical term that is used to measure how far a process deviates or varies from perfection (standard deviation of a process). Standard deviation is the square root of the variance.

The statistical part of Six Sigma quantitatively describes how a process is performing. In order to reach Six Sigma a process must not produce more than 3.4 defects per million opportunities. Further, a Six Sigma defect is by definition anything outside of customer specifications.

In 1988, Motorola was a recipient of the first Malcolm Baldrige National Quality Award, a standard of excellence designed to help U.S. business achieve world-class quality. This award was conceived by the congress in 1987 as a means of recognizing businesses that are judged to have applied and are outstanding in seven criteria: leadership, strategic planning, customer and market focus, information and analysis, human resource focus, process management, and business results. The award promotes quality awareness, recognizes achievements in quality, and provides a means of ***sharing*** successful strategies. The criteria provide focus on results and continuous improvement. Award winners have achieved outstanding results in product and service quality, customer satisfaction, and overall company performance.

One of the keys to Motorola's recognition was its innovation of a quality program known as "Six Sigma". Since being publicized and shared during the 1990's, Six Sigma, has been adopted by more and more businesses as a means of not only competing better, but also of meeting the expectations of customers. Six Sigma became Motorola's response to foreign manufacturers quality programs that demonstrated the ability to produce higher quality products at a lower cost.

Looking back, the historical quality paradigm said that a process was capable if the natural spread or variation of the process, plus or minus three sigma, was less than the engineering tolerance. Refinements lead to considering the process location as well as its spread (Cpk), thereby tightening the minimum acceptable such that the process was at least four sigma from the nearest engineering tolerance. Currently average industry runs at a four sigma level. This produces 6210 defects per million opportunities.

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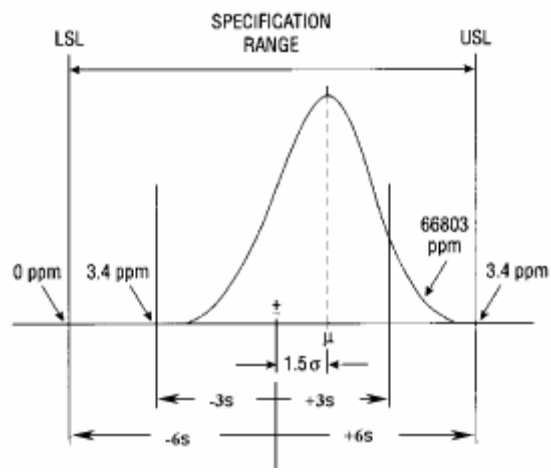

Many non-competitive companies are said to run at two sigma, producing 308,537 errors per million opportunities. Six Sigma at Motorola defined that processes operate so that the nearest engineering requirement is at least plus or minus six sigma from the process mean, reaching the previously noted 3.4 defects per million opportunities.

Most significantly, Motorola changed the face of quality to one where quality levels were measured in percentages (parts per hundred), to one where measurements are made in parts per million or even billion.

Achieving Six Sigma quality means that a given process must produce no more than *3.4 defects per million opportunities.* Opportunity is defined as a chance for nonconformance, or not meeting specifications.

Fundamentally, the objective of Six Sigma is to implement a measurement strategy with focus on process improvement and reduction in variation by selecting "Six Sigma Improvement Projects". Initiating a specific project, the following processes are used: DMAIC (Define, Measure, Analyze, Improve and Control) and/or DMADV (Define, Measure, Analyze, Design and Verify). Trained in-house technical leaders, known as Six Sigma Black Belts, apply all of the steps. Green Belts are project leaders trained to form and facilitate teams and manage projects. A Master Black Belt provides the necessary technical leadership of a firms Six Sigma program.

Six Sigma focus is one, reducing process variation, two, improving process capability.

Key to Six Sigma thinking is that:

- **Everything is a process**
- **All processes have inherent variability**
- **Data is derived and used to understand variability and drive improved process improvement**

Stated earlier, Six Sigma is focused on identifying and eliminating waste costs which provide no value to customers. If you're looking for magic in Six Sigma, don't bother. Six sigma is based on tried and true methods that have been around for decades. Six Sigma programs take these few proven methods, and trains a small group of in-house technical leaders (the above-mentioned black belts) to proficiently apply the techniques.

Six Sigma is a mature methodology based on fundamental business and statistical concepts. Currently, various software is offered to more effectively implement and extend Six Sigma programs throughout an organization bringing people, processes and technology under the umbrella.

Remember, Six Sigma is not just for manufacturing processes, nor does it require excessive training efforts. Many improvement projects may be successful using the most basic statistical and non-statistical tools. While Six Sigma does require commitment, it offers any company (manufacturing or non-manufacturing) the ability to implement Six Sigma to achieve continuous improvement in customer satisfaction, while lowering costs and improving profitability.

Customers of any business value consistent world class quality. Valued is defect free delivery of what is wanted. They value the absence of variation that they will experience, seeing and feeling for themselves.

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