

DRIVING THE ORGANIZATION TO SIX-SIGMA QUALITY WITH MALCAM'S ON-LINE INFORMATION SYSTEMS

WHAT IS SIX-SIGMA?

Six-Sigma is a rigorous and disciplined methodology that uses data and statistical analysis to measure and improve a company's operational performance by identifying and eliminating "defects" in manufacturing and service-related processes. Commonly defined as 3.4 defects per million opportunities, at many organizations it simply means a measure of quality that strives for near perfection.

The statistical representation of Six-Sigma describes quantitatively how a process is performing. To achieve Six-Sigma, a process must not produce more than 3.4 defects per million opportunities. A Six-Sigma defect is defined as anything outside of customer specifications. A Six-Sigma opportunity is then the total quantity of chances for a defect.

The fundamental objective of the Six-Sigma methodology is the implementation of a measurement-based strategy that focuses on process improvement and variation reduction through the application of improvement projects. This is accomplished through the use of two Six-Sigma sub-methodologies: DMAIC and DMADV. The Six-Sigma DMAIC process (Define, Measure, Analyze, Improve, and Control) is an improvement system for existing processes falling below specification and looking for incremental improvement. The Six-Sigma DMADV process (define, measure, analyze, design, verify) is an improvement system used to develop new processes or products at Six-Sigma quality levels. It can also be employed if a current process requires more than just incremental improvement.

Modern industries are constantly seeking the perfect combination of product quality, optimal control of production processes and production cost savings. Hungry for on-the-fly information platforms with smart process and product tracking, manufacturers all over the world are starting to take advantage of the Six-Sigma profit strategy.

Six-Sigma organizations not only produce excellent products but also maintain highly efficient production and administration systems that work effectively with the company's entire set of processes, including support, purchasing, human resources and customer service.

DMAIC The Six-Sigma process is based on the DMAIC (define, measure, analyze, improve, control) model developed at Motorola during the 1980s. Now recognized as an integral part of the American Society for Quality's Six-Sigma Body of Knowledge, this process has repeatedly demonstrated its capacity for productivity, quality, information, and breakthrough improvements.

Essential DMAIC process flow highlights include:

- quantification of a project's value to the business—every Six-Sigma project must be related to critical quality characteristics and have a significant dollar impact
- measurement as a means of communication—Six-Sigma is largely the applied science of measurement; knowing how to measure, when to measure, what to measure, and how to record measurements for maximum value are essential Six-Sigma skills
- well-designed data collection plans, which are of primary importance in any Six-Sigma project
- recording data sequentially
- a Six-Sigma analysis, which is a statistical analysis—Six-Sigma and financial measurements are valuable when framed in a meaningful context
- properly documenting breakthrough, improvement, and quality control principles—their proven 72-year history of improving profits in industry is unsurpassed

SIX-SIGMA ADVANTAGES

Six-Sigma is a business philosophy to improve customer satisfaction, a tool for eliminating process variation and errors, and a measure of world-class companies allowing for process comparisons. A Six-Sigma philosophy generates top-box customer satisfaction and repeat sales; and it reduces the cost of doing business because the process is done right the first time.

Six-Sigma is a level of performance that reflects significantly reduced defects in products and services, and is a statistical measurement of process capabilities as well as a benchmark for comparison. It is a set of statistical tools to help companies measure, analyze, improve and control processes.

Finally, it is a commitment to all customers and consumers of products and services that a company continually works on improving its product and decreasing its errors or defects. When a company has achieved a Six-Sigma rate of improvement, it has increased yield from 99.73 percent (the traditional quality engineering requirement according to Three Sigma criteria) to 99.99966 percent.

SIX-SIGMA IMPLEMENTATION

A business process is a series of activities designed to produce a product or service. Business processes are thought of as a customer's view of the business because many of them start and/or end with customer interaction. Core business processes are initiated by a customer's request for goods or services that the company can provide. In response to the initiated event, work is performed in a series of steps that cross multiple organizational boundaries within the company. Ideally each of these activities adds value to what was produced in the previous activities, and directly contributes to the process's ultimate deliverables. These value-adding activities are those tasks for which the customer is willing to pay.

Implementing Six-Sigma manufacturing means more than delivering products without defects, it means eliminating almost all defects, rework and scrap. It includes operating the entire business processes under statistical control and controlling input variables, rather than inspecting for defects at the end of the process, and it means maximizing equipment uptime and optimizing cycle time.

As profit-based business initiatives producing financial benefits, Six-Sigma projects are designed to improve the quality of decisions affecting every process in the enterprise: finance, operations, and production. As Six-Sigma projects improve profits, grow market share, reduce production costs and enhance productivity, they create near-perfect processes, products and services.

In Six-Sigma projects, measurements are of primary importance and are rigorously analyzed. Computing power and intuitive software minimize, and in many cases eliminate, the math anxiety that used to plague companies that pioneered the use of quantitative analysis. Personal computing frees executives for their primary responsibility: to ask the tough questions that move corporate cultures into a more profitable future.

PROFIT STRATEGY

Sigma is a statistical measure of variability, or standard deviation, in a given process through characterization. This characterization involves assessing the potential of a process as compared to its capability. Consequently, Sigma is a statistical unit of measurement that reflects process capability. It is a way to determine or even predict errors or defects in any given process, whether it be in manufacturing or in delivering a service.

Six-Sigma is a proven method for improving profits by pursuing perfection. As the disciplined use of applied science that improves profits by creating and systematically replicating breakthrough improvements, Six-Sigma ensures that productivity soars.

In a Six-Sigma company, top-level executives and managers must be able to use Six-Sigma tools and language. Every person must become statistically minded.

TURNING DATA INTO INFORMATION

The science of data collection has two keys: 1) systematically observing processes and systems, by which it is possible to learn faster than through trial and error; and 2) looking and learning to facilitate improvement. Data arrays become information when they are analyzed and graphed in a disciplined way. The resultant analytic graphs are valuable, particularly as guidelines to save time and money.

Six-Sigma enables the comparison of processes that differ in scope and complexity, according to statistical evidence that is essential for professional credibility. Statistical methods deliver the highest level of evidence for making judgments, replacing decisions based on intuition, assumption and guesses.

When counts and measurements are turned into accurate statistical pictures, patterns emerge. Learning to recognize these patterns is an indispensable Six-Sigma skill. Valuing the information conveyed by these patterns is one of the most important contributions executive leaders can make to Six-Sigma projects.

THE MALCAM'S APPROACH TO SIX-SIGMA

Malcam's online, patented moisture and density deviation measurement tools provide accurate moisture and density data on any bulk material in real time speed and with no damage to the material. Malcam's MMA™ systems and software are successfully installed and operated in more than 450 locations around the world, providing the organization's management with fast, accurate and easy to use information system that enables online process control and statistical analysis of the product quality in various stages of manufacturing.

Of particular interest to Six-Sigma quality industry seekers is the Malcam's INS-20, a unique, expert statistics data sharing system solution providing managers with the ability to supervise all levels of data through networking, and thereby increase efficiency. Developed by GreenVision Systems, a sister company of Malcam, the INS-20 is designed to facilitate the move from current "testing to document quality" to a "continuous quality assurance" paradigm that improves the ability to assure built-in quality by design. Based on Six-Sigma project principles, the INS-20 improves efficiency and enables enterprises to maintain an organization leadership role.

The INS-20 implements process analytical technology (PAT), connecting production and environment parameters to provide a clearer view of actual overall plant/organization efficiency—i.e., to provide a larger picture of what is actually occurring throughout production processes.

Serving as a watchdog, data is filtered in real time to managers in the organization, according to their defined level of access. And in addition to this real-time routing of relevant data to personnel in the management chain, the INS-20 is also a powerful data processing tool, enabling the reprocessing of data.

The main features of the INS-20 real-time, multi-volumetric, image-based information networking statistical interpretation platform include:

- linking of resources and devices with log records
- cross-data analysis between different online sensors/analyzers
- high level of time segment analysis using smart tracking algorithms
- automatic pattern recognition enabling on-line monitoring of plant yield, process understanding, and total product quality control at all stages
- capture of an extensive range of data, including moisture and density, production flow/line-speed, material temperature, in-line environmental humidity and temperature, and other data that may be required, such as machinery status and laboratory/financial information using LX-INS interface units
- integration with SDS/ESDS-20 tools (developed by GreenVision Systems, a Malcam sister company), unique, expert statistics data-sharing system software package, or any other generic on-line database platform
- creation of multiple scenarios and allocation of multi-SDS/ESDS-20 stations

The INS-20 integrates with Malcam SDS/ESDS platform, a unique, expert statistics data-sharing system software package providing an easy, user-friendly way to access and manage data collected by Malcam's MMA™ system. Linking to the local area network or any other communication platform, it operates under Windows NT, 2000 or XP using the standard Windows graphical interface, keyboard, functional keys and mouse.

This integration of the INS-20 with the SDS/ESDS platform is at three incremental levels, including site and corporate levels, representing three different levels of managerial access to the INS-20 server. This enables MMA™-compatible real-time mail boxes (RTMBs) to seamlessly transfer messages to the relevant managerial level, without interfering with plant organization IS platforms.

The ESDS-20 provides users with on-line statistical data collected in the monitored database. For MMA™ WinBale applications, it also enables users to check information such as product characteristics; material moisture and standard deviation; material product type and weight; and product quality for total inspection tasks, and includes the date and time of inspection. This data can be displayed in different graphical and statistical formats, organized and printed in reports, and also exported to Excel.

The ESDS-20 also features a report generator that is applicable to various data collection applications in numerous fields. The user-friendly interface and flexibility of the tool make it both powerful and easy to use.