Lean manufacturing

Business, Manufacturing

Deming's 14 Points For Implementing Quality Improvement:

1. Create constancy of purpose toward improvement of product and service, with the aim to become competitive and to stay in business, and to provide jobs.

2. Adopt the new philosophy. We are in a new economic age. Western management must awaken to the challenge, must learn their responsibilities, and take on leadership for change.

3. Cease dependence on inspection to achieve quality. Eliminate the need for inspection on a mass basis by building quality into the product in the first place.

4. End the practice of awarding business on the basis of price tag. Instead, minimize total cost. Move toward a single supplier for any one item, on a long-term relationship of loyalty and trust.

5. Improve constantly and forever the system of production and service, to improve quality and productivity, and thus constantly decrease costs.

6. Institute training on the job.

7. Institute leadership. The aim of supervision should be to help people and machines and gadgets to do a better job. Supervision of management is in need of overhaul as well as supervision of production workers.

8. Drive out fear, so that everyone may work effectively for the company.

9. Break down barriers between departments. People in research, design, sales, and production must work as a team, to foresee problems of production and in use that may be encountered with the product or service.

10. Eliminate slogans, exhortations, and targets for the work force asking for zero defects and new levels of productivity. Such exhortations only create

adversarial relationships, as the bulk of the causes of low quality and low productivity belong to the system and thus lie beyond the power of the work force.

11. a. Eliminate work standards (quotas) on the factory floor. Substitute leadership.

b. Eliminate management by objective. Eliminate management by numbers, numerical goals. Substitute leadership.

12. a. Remove barriers that rob the hourly worker of his right to pride of workmanship. The responsibility of supervisors must be changed from sheer numbers to quality.

b. Remove barriers that rob people in management and in engineering of their right to pride of workmanship. This means, inter alia, abolishment of the annual merit rating and of management by objective.

13. Institute a vigorous program of education and self-improvement.

14. Put everybody in the company to work to accomplish the transformation. The transformation is everybody's job.

If a company works hard to implement Dr. Deming's ideas on quality, they are likely to see an improvement in their all around environment. Training employees in order to fill a position skillfully and efficiently, benchmarking to identify areas that need improvement, and rethinking their approach to performance appraisal, are all indications of total-quality management that can result in a successful enterprise for all those involved.

Crosby's name is best known in relations to the concepts of do it right the first time and zero defects. Zero defects means that the company's objective is 'doing things right first time'. This will not prevent people from making

mistakes, but will encourage everyone to improve continuously. He considers traditional quality control, acceptable quality limits and waivers of sub-standard products to represent failure rather than assurance of success. Crosby therefore defines quality as conformance to the requirements, which the company itself has established for its products, based directly on its customers' needs. He does not believe that workers should take prime responsibility for poor quality; the reality, he says, is that you have to get management straight. In the Crosby scheme of things, management sets the tone on quality and workers follow their example; whilst employees are involved in operational difficulties and draw them to management's attention, the initiative comes from the top.

The ultimate goal is to train all the staff and give them the tools for quality improvement, to apply the basic precept of Prevention Management in every area. He also views quality improvement as an ongoing process since the work itself implies a temporary situation. Crosby's Quality Improvement Process is based upon the

Four Absolutes of Quality Management:

1. Quality is defined as conformance to requirements, not as 'goodness' or 'elegance'.

2. The system for causing quality is prevention, not appraisal.

3. The performance standard must be Zero Defects, not " that's close enough".

4. The measurement of quality is the Price of Nonconformance, not indices.

J M Juran sees quality planning as part of the quality trilogy of quality planning, quality control and quality improvement. The key elements in

implementing company-wide strategic quality planning are in turn seen as identifying customers and their needs; establishing optimal quality goals; creating measurements of quality; planning processes capable of meeting quality goals under operating conditions; and producing continuing results in improved market share, premium prices, and a reduction of error rates in the office and factory.

Juran's 'Quality Planning Road Map' consists of the following steps:

1. Identify who are the customers.
2. Determine the needs of those customers.
3. Translate those needs into our language.
4. Develop a product that can respond to those needs.
5. Optimize the product features so as to meet our needs as well as customer needs.
6. Develop a process, which is able to produce the product.
7. Optimize the process.
8. Prove that the process can produce the product under operating conditions.
9. Transfer the process to Operations.

Illustration of Quality Trilogy via a Control Chart:

Juran concentrates not just on the end customer, but identifies other external and internal customers.

There has been a mention of seven deadly sins to total quality management every organization should not deviate from: Flight to nowhere; One size fits all; Substituting TQM for leadership; Inside - Out indicators; Mandatory religion; Quality kept as a separate activity; and Teaching to the test.

Maintaining focus and linking your organization back to the four principles of TQM will assist you in reaching your goals and the vision that you have set forth.

Six Sigma is a management philosophy developed by Motorola that emphasizes setting extremely high objectives, collecting data, and analyzing results to a fine degree as a way to reduce defects in products and services. The Greek letter sigma is sometimes used to denote variation from a standard. The philosophy behind Six Sigma is that if you measure how many defects are in a process, you can figure out how to systematically eliminate them and get as close to perfection as possible. Six Sigma is a corporate quality program, one that emphasizes identifying and avoiding variation. The term " Six Sigma" is a statistical term that refers to 3. 4 defects per million opportunities (or 99. 99966 percent accuracy), which is as close as anyone is likely to get to perfect. A defect can be anything from a faulty part to an incorrect customer bill. Six Sigma teams use extremely rigorous data collection and statistical analysis to ferret out sources of errors and to find ways to eliminate them. In order for a company to achieve Six Sigma, it cannot produce more than 3. 4 defects per million opportunities.

There are two Six Sigma processes: Six Sigma DMAIC and Six Sigma DMADV, each term derived from the major steps in the process. Six Sigma DMAIC is a process that defines, measures, analyzes, improves, and controls existing processes that fall below the Six Sigma specification. Six Sigma DMADV defines, measures, analyzes, designs, and verifies new processes or products that are trying to achieve Six Sigma quality. All Six Sigma processes are executed by Six Sigma Green Belts or Six Sigma Black Belts, which are then

overseen by a Six Sigma Master Black Belts, terms created by Motorola.

Six Sigma proponents claim that its benefits include up to 50% process cost reduction, cycle-time improvement, less waste of materials, a better understanding of customer requirements, increased customer satisfaction, and more reliable products and services. It is acknowledged that Six Sigma can be costly to implement and can take several years before a company begins to see bottom-line results. Six Sigma Consist of 6 parts:

Define: A Six Sigma project teamled by a black beltidentifies a project based on business objectives as well as customer needs and feedback. The team identifies CTQs (critical to quality characteristics) that the customer considers to have the most impact on quality. It also separates the " vital few" from the " trivial many" (the projects that will have the most impact versus those that could stand improvement but are not critical).

Measure: The team identifies the key internal processes that influence CTQs and measures the defects currently generated relative to those processes.

Analyze: The team discovers why identifying the key variables that are most likely to create process variation generates defects.

Improve: The team identifies the maximum acceptable ranges of the key variables and validates a system for measuring deviations of the variables. The team modifies the process to stay within the acceptable range.

Control: Tools are put in place to ensure that the key variables remain within the maximum acceptable ranges over time.

A very powerful feature of Six Sigma is the creation of an infrastructure to assure that performance improvement activities have the necessary resources. In this author's opinion, failure to provide this infrastructure is the

#1 reason why 80% of all TQM implementations failed in the past. Six Sigma makes improvement and change the full-time job of a small but critical percentage of the organization's personnel. These full time change agents are the catalyst that institutionalizes change. The picture below illustrates the required human resource commitment required by Six Sigma.

Master Black Belt

This is the highest level of technical and organizational proficiency. Master Black Belts provide technical leadership of the Six Sigma program. Thus, they must know everything the Black Belts know, as well as understand the mathematical theory on which the statistical methods are based. Master Black Belts must be able to assist Black Belts in applying the methods correctly in unusual situations. Whenever only Master Black Belts should conduct possible, statistical training. Otherwise the familiar " propagation of error" phenomenon will occur, i. e., Black Belts pass on errors to green belts, who pass on greater errors to team members. If it becomes necessary for Black Belts and Green Belts to provide training, they should do only so under the guidance of Master Black Belts. For example, Black Belts may be asked to provide assistance to the Master during class discussions and exercises. Because of the nature of the Master's duties, communications and teaching skills are as important as technical competence.

Black Belt

Candidates for Black Belt status are technically oriented individuals held in high regard by their peers. They should be actively involved in the process of organizational change and development. Candidates may come from a wide

range of disciplines and need not be formally trained statisticians or engineers. However, because they are expected to master a wide variety of technical tools in a relatively short period of time, Black Belt candidates will probably possess a background in college-level mathematics, the basic tool of quantitative analysis. Coursework in statistical methods should be considered a strong plus or even a prerequisite. As part of their training, Black Belts receive 160 hours of classroom instruction, plus one-on-one project coaching from Master Black Belts or consultants. Successful candidates will be comfortable with computers. At a minimum, they should understand one or more operating systems, spreadsheets, database managers, presentation programs, and word processors. As part of their training they will be required to become proficient in the use of one or more advanced statistical analysis software packages. Six Sigma Black Belts work to extract actionable knowledge from an organization's information warehouse. To assure access to the needed information, Six Sigma activities should be closely integrated with the information systems (IS) of the organization. Obviously, the skills and training of Six Sigma Black Belts must be enabled by an investment in software and hardware. It makes no sense to hamstring these experts by saving a few dollars on computers or software.

Green Belt

Green Belts are Six Sigma project leaders capable of forming and facilitating Six Sigma teams and managing Six Sigma projects from concept to completion. Green Belt training consists of five days of classroom training and is conducted in conjunction with Six Sigma projects. Training covers project management, quality management tools, quality control tools,

problem solving, and descriptive data analysis. Six Sigma champions should attend Green Belt training. Usually, Six Sigma Black Belts help Green Belts define their projects prior to the training, attend training with their Green Belts, and assist them with their projects after the training.

Comparison and Contrast of Total Quality Management and Six Sigma

Total Quality Management (TQM) is a structured system for satisfying internal and external customers and suppliers by integrating the business environment, continuous improvement, and breakthroughs with development, improvement, and maintenance cycles while changing organizational culture. TQM aims for quality principles to be applied broadly throughout an organization or set of business processes. Total Quality Management (TQM) programs focus on improvement in individual operations with unrelated processes; as a consequence, it takes many years before all operations within a given process are improved. Six Sigma focuses on making improvements in all operations within a process that produce results more rapidly and effectively. The Six Sigma's Breakthrough Strategy is a disciplined method of using extremely rigorous data-gathering and statistical analysis to pinpoint sources of errors and ways of eliminating them. Six Sigma relies on the voice of the consumer to set the standard of acceptable performance. Six Sigma has a systematic approach to both validate data and to focus on the critical few inputs that will have the greatest potential to effect meaningful improvement. Six Sigma focuses on reducing defects in management and clinical process; it uses statistical analysis to find the most defective part of the process, and rigorous control procedures to sustain improvement. While Six Sigma is a long-term strategy, it is designed to

generate immediate improvements to profit margins too. Compared to traditional quality management programs such as TQM that project three or more years into the future, Six Sigma focuses on achieving financial targets in twelve-month increments. TQM and Six Sigma have a number of similarities including the following:

A customer orientation and focus

A process view of work

A continuous improvement mindset

A goal of improving all aspects and functions of the organizations

Databased decision-making

Benefits depend highly on effective implementation

A key difference between TQM and Six Sigma is that Six Sigma focuses on prioritizing and solving specific problems which are selected based on the strategic priorities of the company and the problems which are causing the most defects whereas TQM employs a more broad based application of quality measures to all of the company's business processes. Another difference is that TQM tends to apply quality initiatives within specific departments whereas Six Sigma is cross-functional meaning that in penetrates every department, which is involved in a particular business process that is subject to a Six Sigma project. Another difference TQM provides less methodology in terms of the deployment process whereas Six Sigma's DMAIC framework provides a stronger platform for deployment and execution. For example, Six Sigma has a much stronger focus on measurement and statistics, which helps the company, define and achieve specific objectives.

Six Sigma is complementary to TQM because it can help to prioritize issues within a broader TQM program and provides the DMAIC framework, which can be used to meet TQM objectives.

Conclusion

Both measurements of quality control within an organization have brought true success to companies who have applied their policies and procedures. The leaders and management teams of any organization will have to evaluate which quality of control tactic is the most beneficial to the growth and improvements of their business. The one way to analyze your business is to establish your goals and vision for your organization and set plans in place to evaluate if Six Sigma or Total Quality Management falls in the realms of what you are seeking. Both processes have taken the best of the best countries and companies from good to great and I personally feel that as long as you have one of these processes in place, you are setting yourself up for success.