



## TenStep Supplemental Paper

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### **Six-Sigma Enters New Arenas!**

In the late 1970's Motorola encountered the problem of poor quality products. Bill Smith an engineer in Motorola's Communication sector undertook a study to understand the causes. On the basis of this study he stated that the reliability of Motorola's products could be improved by preventing defects during the manufacturing process rather than by detecting and fixing them later.

Meanwhile, Mikel Harry, an engineer in the Government Electronics Group of Motorola discovered that an average company that followed traditional quality practices commits 66,800 errors in a million operations. *Statisticians call this a three-sigma error rate.*

Mikel and Bill Smith together set out on the difficult task of reducing the error percentage of Motorola's products to less than 3.4 mistakes in a million. This effort gave birth to the Six-Sigma quality initiative.

#### **Six-Sigma explained**

Six-Sigma is a statistical concept, used to describe the state of zero defects or as close to it as possible. A process with Six-Sigma capability equates to 3.4 defects per million opportunities - not zero, but pretty close.

#### **A misconception**

Six-Sigma is well known for its application in large organizations. However, Six-Sigma is equally applicable in any organization where there is scope for improving an existing process or designing a better process irrespective of its size. This implies that small and medium organizations too can implement it.

Small organizations face certain challenges while implementing Six Sigma. Six-Sigma requires organizations to invest in training, education and team building. Giant organizations can invest in these more easily than smaller organizations. The latter would find it expensive to allocate the resources and time for implementing Six Sigma. However, Six Sigma is like any other investment. If rightly invested, it can generate benefits and returns in terms of reduced cost of quality, increased productivity, lesser product failures and greater customer satisfaction. These benefits far outweigh the cost incurred in the implementation

Moreover, small organizations have an edge over larger organizations when implementing Six Sigma. Teams in smaller organizations are more closely knit. The top management in such organizations is able to closely monitor and drive the progress being made by the Six Sigma teams. Therefore, small organizations are more likely to succeed.

The current article illustrates the path taken by a small company, Ideal Aerosmith to implement Six-Sigma. Ideal Aerosmith is a test equipment manufacturer for aviation maintenance.



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### **About Ideal...**

Established in 1938, Ideal designs and manufactures model simulators, which are used to evaluate different navigation systems and motion sensors. It also provides engineering and assembly solutions for avionics and commercial test equipment.

The 100-employee company was successfully growing, generating good margins and providing remarkable customer service. However, when the market needs change, the priority shifts back to the profits thereby neglecting the long-term initiatives for growth. Despite being an ISO 9001 certified company, Ideal found it hard to meet the continuously changing market needs. As a result it failed to gain any significant quality improvement.

The management consisted of a closely-knit six-member team, headed by the company CEO Lonnie Rogers. This closeness prevented the members of the team from contradicting each other. The team concentrated more on addressing mediocre issues and in the process ignored the larger issues and long term planning. Rogers realized that the approach was wrong. He identified the need for a methodology that would provide guidance for long-term planning and also improve individual accountability.

Rogers thought gained momentum when he heard Jack Welch's inspiring speech talk on Six-Sigma. He immediately determined to implement Six-Sigma in the company's processes.

Having decided to implement Six-Sigma, the company approached a service provider. Together they carried out a 3-hour meeting during which they discussed the advantages and disadvantages of the methodology, the costs to be incurred, and the possibility of success. The management also realized that implementation of Six-Sigma requires substantial investments and a likely diversion from current business. However, at the end of the meeting Ideal decided to implement Six-Sigma.

However, the management realized that employee resistance is a major factor in implementing Six-Sigma. The organization needed to modify its approach if it wanted to improve its performance and retain existing customers and gain new ones. To support the change, Ideal needed a complete buy in from its employees. The next part of this article will deal with other considerations made by the company during implementation of the methodology and the approach adopted.

### **Identification**

At Ideal, the journey to Six-Sigma started with identifying the areas that could significantly benefit the organization. The team initiated steps to measure the performance of the existing processes and identify the gap with their expected outcomes.

Ideal used customer opinion as an important tool to assess the performance. Also included were an evaluation of organizational structure and effective interaction between various internal teams.

The responsibility of conducting this performance analysis was assigned to an external consultancy to ensure an unbiased holistic analysis. The consultancy identified three



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important areas of improvement that could effectively increase the sales of the company by about 10%.

- Project management
- Engineering
- Inventory management

The analysis also brought to light the flaws of existing ISO 9001 Quality Management System. The QMS involved a lot of paper work in terms of documentation. Regular audit checks further increased the paper work. As a result, it failed to yield any significant quality improvements.

Subsequently, the company restructured its auditing schedules, the remedial actions taken and its management re-evaluation procedures. This provided the company, the required basis to sustain and continuously improve the quality of the product and the process. It further aided them in sustaining the benefits achieved by the implementation of Six-Sigma methodology.

### **Increasing awareness**

After successfully identifying the areas of improvement, Ideal formulated a Six-Sigma implementation plan, which worked towards improving the corporate objectives, and the metrics to evaluate its performance. To ensure the proper implementation of the methodology, the company conducted a Six-Sigma employee awareness programme.

### **The Implementation**

After conducting the awareness program, the company took the aid of a Six-Sigma business scorecard. Six-Sigma business scorecard is a management tools that helps evaluate performance. This tool facilitates monitoring the improvements in quality and profitability. Thereby, it provides scope for adjustments if the improvements are not up to the expectations.

The vice president along with the other departmental managers worked towards implementing the business scorecards. There was active involvement from all the departments in the company. The only challenge the company faced was in implementing performance measurement scorecards in the engineering department. Design engineers were against their performance being measured by typical parameters like rate of designing, investments and quality standards.

The business scorecard adopted by Ideal consisted of three basic questions to help evaluate the performance of a process. The first would help define the objective of the process. The second pertained to the expected targets to be met. The third aimed at clearly defining the standards attaining which the process could be considered successful.

Answering the above questions enabled the managers to evaluate the performance of the process within a short span of two months. Reports of evaluations were posted on a common notice board and were also discussed in meetings. Performance of the employees was evaluated and recognized so as to encourage them.



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Annual evaluation of each of these performance metrics was made to establish that the scorecard was yielding results. Ideal modified its business scorecard based on the evaluation and forecasted business trends.

### **Benefits...**

Such an evaluation led to conspicuous benefits:

- The implementation of business scorecard eased the process of Six-Sigma initiation and employee performance evaluation
- Ideal was able to track its performance thus enhancing its accountability.
- Predetermined metrics provided the right kind of guidance for performance improvement.
- The business performance scorecards implemented throughout the organization enabled organization wide performance evaluation.

### **Six-Sigma and later...**

Throughout the implementation stages of Six-Sigma, an external consulting agency guided Ideal. The change observed after the implementation of Six-Sigma was evident in the form of quality of procedures adopted. Engineers and managers were trained for QFD and Six-Sigma green belt certifications respectively.

The company aimed at short term planning activities that included evaluating growth, and margin of the organization at regular time intervals. Use of web based software considerably reduced the paper work thus saving time and costs incurred in documentation. It also enabled the company to share information at various organizational levels without any constraints. Also maintaining the ISO 9001 quality standards became easy. Ideal now has a dynamic quality management system.

Ideal management convened once every week and devised methods/strategies to improve quality by implementing several applicable tools or techniques. For instance Ideal regularly measured and implemented tools to improve its on time delivery rate. The improvement was evident in the form of improved on time delivery rate from 60% to 90% in a span of one year.

Ideal was able to find the root cause of the issues faced and adopted the right tools to resolve them. The performance efficiency of labor in engineering and the production department saw a satisfactory rise of 25%. All these led to a five percent increase in margins obtained by Ideal.

### **Six-Sigma implementation guidelines to small business facilities**

In order to ensure continuous growth, companies need to sustain business benefits achieved through Six-Sigma. Companies desirous of continuous improvement would benefit from the following:



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- Employees need sufficient training before the implementation of the methodology. Training ensures that the employees are easily adaptable to the new methodology, thus overcoming the major challenge of change resistance.
- It is important to keep the employees inspired to implement the methodology continuously rather than limiting it to the initial stages of implementation.
- Continuous performance measurement and evaluation of the reports is critical. It is necessary to have regular conventions as they help to foresee the direction the company chooses. This will further foresee the direction taken by the company. This will ensure that the improvement is in the desired and appropriate direction.
- Whenever needed the metrics for measuring the key performance indicators have to be changed

Ideal Aerosmith therefore proves that any company irrespective of its size can reap the benefits of Six-Sigma, provided it is adopted systematically and evaluated continuously.