

## TOOLS AND METHODS OF QUALITY MANAGEMENT: TOOLS FOR COMPETITIVENESS

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**Abstract:** With tools and methods of quality management, a company can better understand their methodology, optimize work processes, make changes and make better decisions. This study aimed to identify quality management tools used by the company's traditional line of building materials in Ourinhos SP. The company implemented a quality program and since then, undergoes modifications, from management to operational processes. The methodologies used were literature research and case study through an interview with open questions to commercial the director supervisor and the company's quality supervisor. It's concluded through the study that the company has been successful with the implementation of some tools and methods of quality management and, therefore, should introduce new tools

**Key-words:** continuous improvement. processes. decision making. optimization.

### 1 Introduction

The importance given to quality led to changes in business worldwide. In today's society these changes are increasing and it is resulting in a greater competition between companies. The market requires investment in quality from organizations and the use of management tools, it becomes, then, essential for processes improvement, thus justifying the study that has as aim to analyze such instruments in an active company in the field of building material since over 55 years in the town of Ourinhos, SP.

Quality is a term used in common sense. For Marshall et al. (2005, p17) is "[...] a spontaneous and intrinsic concept in any situation using something tangible, to the involved relationships in providing a service or perceptions associated in products of intellectual, artistic, emotional and experience nature", therefore, it is also, present in the business world. In a most simplified way, Juran and Gryna (1990) defined the term as 'suitability for purpose', which means that, the product or service has quality when it meets the requirement of the consumer.

Since the 20s, with the appearance of mass production, the concept is used by companies in several segments. During this period, the control was based on inspection of the

product, in an evaluation of checking one by one, without an appropriate methodology (Marshall, 2005). In 1931 new techniques for monitoring and evaluation of the production were created. Statistical techniques were used and sampling to evaluate part of the manufactured lot (Slack, 1996).

But it was after the Second World War that the quality has gained prestige in the organizational environment. To rebuild the country after the war period, Japan introduced in its economy, as a form of prevention, quality or guarantee assurance. For this, in addition, to using statistic, programs and systems of quality, four elements were considered: quantification of costs, total control, reliability engineering and zero defect (Marshall, 2005).

However, in the 50s, TQM - Total Quality Management was introduced by several quality gurus such as W. Edwards Deming, Joseph M. Juran, Armand V. Feigenbaum, Kaoru Ishikawa, Philip B. Crosby that contributed, each one, in their own way, for the Total Quality Management (Marshall, 2005).

The TQM in the vision of Brocka and Brocka (1994) is a philosophy that searches the continuous improvement in all operational levels in all functional areas, with all the available financial and human resources. As said Slack (1996, p. 653) is the change of focus "the quality of an activity purely operational [...] in the responsibility of the entire organization," therefore, a holistic view of the organization is necessary.

For this improvement to be possible, Juran (1991) established a sequence of planning for TQM: to set goals, objectives, actions to achieve the goal; provide responsibilities for all to fulfill the actions taken; acquire adequate resources; give trainings; develop performance analysis, performance evaluation and awards after achieving goals. However, to verify the effectiveness of continuous improvement project in the enterprises, it is necessary to use methods and tools of quality to show quantitatively, the processes that have anomalies in their structure (MATA-LIMA, 2007). The main tools are:

Diagram of Cause-Effect also it is known as Ishikawa diagram or fishbone that allows identification, exploration and graphical display of all possible causes of a condition as a way to discover the true root of a problem (MATA-LIMA, 2007).

Histogram, a graphical representation that shows the distribution and frequency of a certain period in the form of data bars and it has a great utility in the study of changes in process (PALADINI, 1997).

Check sheet, tabulation of the accumulation of data as events that occur in the process used to identify patterns and trends of a particular area at a predetermined period of time (MARSHALL 2005).

Pareto diagram or chart that came with the study of the inequality in the distribution of wealth it has come to the conclusion that only 20% of the population owned 80% of the wealth, while the rest of the population had only 20%, so, there are only a few reasons which cause most part of the problem, while many reasons influence on a smaller scale (MATA-LIMA, 2007).

Flowchart, picture of the process, allows the group to identify the sequence of used procedures. It can be simple and it shows only the required information, or it can be detailed and illustrate all actions and decisions taken by graphic symbols (PALADINI 1997).

Control chart monitors and controls the performance of the process over a period of time. It is considered chronological because it also indicates the range of variation included in the system. And the Dispersion Graph, which in turn, shows the relationship between more than one variable and the intensity of each, said Scholtes (2002).

In addition to the tools, some methods are also used to improve the processes. They are:

Loss zero created by Crosby, to eliminate any waste, because in this process, mistakes are not accepted. For Prazeres (1996) is to do it correctly from the first time to eliminate costs in rework.

The Cells of production, small isolated processes within the organization, for specific work that ensure quickness and flexibility (PALADINI, 1997), together with *kanban*, Japanese term which eases the productive process and makes production line to send a permit card when you need materials (PRAZERES, 1996).

The Total Productive Maintenance is the method that involves equipment operators. They should perform equipment checklist that they will use and make sure that it is in agreement with the specifications, so in addition to maintaining the good functioning of the equipment, it also does not waste the company time and money (PALADINI, 1997).

The Circle of Quality Control is a small group that meets once a week, it discusses the quality of the product or service of the company and it decides the goals and ideas for improving the processes (ISHIKAWA, 1993).

The *Jidoka* is a method that allows the autonomy of the employee, because it admits that the employee stops the processing always any abnormality is detected (PALADINI 1997).

The quality in the source controls and evaluates the production process, from raw materials to the production process, ensuring that all used material have good quality (PALADINI 1997).

In addition, some tools are considered newer, they are related to optimization process and analysis of strategies for specific situations, explains Paladini (1997). Below is following the diagrams:

The matrix diagram identifies the relationship between a set of information, the matrix data of analysis checks the most significant profile of data and the dependency diagram shows the data that are related to each other. (PALADINI, 1997).

The narrow diagram is a representation of the sequence of tasks, its interdependences, the critical paths and the existing clearances and the tree diagram is the mapping of tasks that allows identifying in a methodical and detailed way, all the ways to achieve a particular goal (Marshall, 2005).

The diagram of similar allows the data of analysis by similarity or affinity. According to Marshall (2005, p. 105), this diagram "contributes to the formation of intuitive and spontaneous clusters generated by the group", which enables analysis less logical and more creative. And the programming Diagram of decision shows what can happen when a decision is not efficient, it provides risk situations and avoid its occurrence (PALADINI, 1997).

However, the quality management differs according to the kind of business. In the case of service companies, it is important to consider all involved in the administrative chain, as employees and consumers, because there isn't how to separate the production process from service delivery. The quality in these companies is perceived by the satisfied customer, in other words, the employee's responsibility is much greater in this kind of enterprise in term of its direct contact that they have with the consumer (PALADINI, 1997).

## **2 Methodology**

It was used bibliographic research to underst the multiple aspects that involve the subject and the case study to Yin (1989, p.23) "[...] it is a way of doing empirical social research to investigate a current phenomenon within its real-life context, where the boundaries between the phenomenon and the context are not clearly defined [...]", through an interview of open questions with the commercial director J. C. A. and the quality supervisor L. H. L.

Because it is a case study, for analysis effects, it was applied what Alves-Mazzotti and Gewandsznajder (1998) denominated 'unit of analysis' which corresponds to a study located in this case, the company building materials, active for more than 55 years in the construction field.

### 3 Results and Discussion

The researched company, founded 55 years ago, has grown over time and the quality was not the same at the beginning of the activities. Then it felt the need to invest in quality programs with the aim to better serve its customers and to differentiate from competition. Thus, the strategic planning of the organization began to have the quality management as a priority, according to the interviewees.

At the beginning, the company found several obstacles for the implantation and use of tools because people are resistant to changes, especially if their work is reached. The awareness of the group, therefore, is very important at this time and should be a priority of the company that searches balance and business success. As there wasn't this concern, some problems arose, such as lack of motivation, discussions between sectors and insecurity of employees who didn't know how to deal with new activities.

The understanding of the quality program for every company is very important, explains Sholtes (2002). In the interview, it was noted that the company in question understood the truth of this statement during the implantation of new way of management. At this time, new strategies were created as training, awareness program and a program of opportunities for gains which goal is to encourage financially the employees that contributed in the improvement of certain process.

The tools used at the beginning of the project were considered traditional by Paladini (1997) that verify and analyze the processes. For the company, all the tools are important, but the preference is given to the Graph of Pareto, due to ease of application and good feedback in the answer. According to the interviewees, "Pareto is efficient because it analyzes the process and recognizes 80% of the problems and the other 20% are actions that can be taken, so these problems can be solved", thus, it is clear that the company makes use of the tool in a correctly way, which contributes to the continuous improvement of the organization's activities.

In addition to this tool, the company also uses the flowchart that helps in standard process. However, it should centralize the flowcharts, because, currently, there is no control of the direction of the company in relation to the use of the tool in each department. It is known that the instrument is used, but it is unclear at what processes they are being used or for what. It is observed that the company is still in search of the best tools, the Graph of Pareto and the flowchart are great resources and meet the objectives, but there are other options that the company can use in optimizing it processes.

Currently, each department of the company has a responsible person for monitoring tasks, for the processes in the industry, and for all information discussed in the meetings. According to Ishikawa, such activities are characteristics of the Circle of Quality Control, which is the method used in quality management to discuss, to decide and to approach increasingly of improving processes.

The company, according to interviewees, spread between its employees the idea "could be better", in other words, the continuous improvement. This sentence is similar to the method of Loss Zero of Crosby that doesn't accept mistakes and requires always the best (Prazeres, 1996). What indicates that the company is on the right way for continuous improvement, consequently, of sales increase and market growth.

When asked about the perceived improvements since the implantation of the methods and tools of quality management, the interviewees said that the processes become more agile, the decision taking is based on reliable information and the studies of the problems are more punctual and exacts, therefore, there is the importance of the quality instruments within an organization and readiness of the results that they allow that entails less costs and more profit for the company. It is suggested the use of Histogram, a tool that allows studying the changes and that it would be useful in the analysis of the implantation of the quality system.

It is suggested that the organization uses other tools and other available methods, in addition to those already mentioned, such as the fishbone in searching for reasons for existents problems, the total productive maintenance with the execution of checklists of the used equipment that will ensure the proper functioning of equipment and the saving of time and money, the *jidoka* that allows the autonomy of the employee, the arrow diagram that shows the sequence of tasks and the critical ways and existents clearance, the tree diagram that exposes all the ways of achieving a certain goal and the programming diagram of decision which provides risk situations.

There are many instruments, however, each one has its specific usefulness and don't need to be used together. The important thing is to have as affirm Brocka and Brocka (1994), the involvement of all employees and the perceived need of the tools and methods of quality management in several business levels, in the processes that involve scope of the company and also in decision making.

## 4 Conclusion

With globalization and the increasingly fierce competition, the companies need to find ways to keep in business. Quality is a specific property of a product or service, and should be taken into account in current need of satisfying the customer, which is only possible through continuous improvement processes of products and services offered by the company. In this study, the company researched recognized this need and it has already taken the first steps. The beginning was turbulent, but the situation was resolved and the results are showing. The efficiency of the processes, the problems resolution and security in decision making are examples of positive implications from the implantation of some tools and some methods of quality management. However, new times are coming and the company will need to prepare for what is to come. It is suggested, therefore, the experimentation with other instruments of quality. There are many options and certainly, the company will find the best that fits in its needs.

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