

A Study On the Possibility of Implementing Global Quality Control Techniques in the Production Process of Hydrofabs

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Abstract: Quality control refers to the effort put in manufacturing process to ensure that the products so manufactured are up to the quality expected from the stakeholders involved and the defects arising are eliminated. In the manufacturing industry, quality control has gained extreme eminence with the products being expected to meet certain global standards. Due to the high volume of production any defect in the products will be of high cost to the company. Quality control contributes to a manufacturer's reputation and helps improve the company's standards and practices progressively. Quality control helps in streamlining production and assures that the final products meet the quality criteria of the company. When combined with lean manufacturing tools quality control system can bolster the systems. Several methodologies of quality control such as Statistical Process Control, Six Sigma, 5s Methodology and many more are being used globally which are designed to have a positive and direct impact on the products and the production process. The efforts involved in selecting the best methodology to suit the given unit better pays off well overtime. The purpose of this study emphasizes on the implementation and outcome of global quality control techniques in the manufacturing of hydraulic equipments for export in HydroFabs. This research paper studies the impact that global quality control techniques such as Six Sigma will have on the production process and the overall performance and productivity in the company.

Keywords: Six sigma, Lean manufacturing, Quality control, Global quality standards.

1. Introduction

Quality has become an important factor to be incorporated in any product or services. With the high level of competition that exists in today's global market, it has become essential for all the companies to embed quality in all the products and services to serve as a market differentiator. This is an important factor to build a successful business that will provide products to customers that meets or exceeds their expectations. Quality also forms a base for a successful and efficient business which helps to reduce waste and operate at high levels of productivity. When quality control is based on standards that are recognized globally, such as ISO it provides a strong base which helps in achieving operational and marketing benefits. This is why

manufacturers and service providers are on a constant look out for enhancement of quality in their products and services.

Companies adopt quality control for various reasons. Quality control helps reduce the variability of materials. The materials that are bought are never consistent; hence systems need to be put in place to compensate for them. If this is not possible, the quality control techniques help businesses in culling unsuitable items so that they do not end up as final products for consumers. Quality control is an essential element in producing high quality products. When quality control measures are not taken, there will be no wastage which results in disposal of finished inventory. Attention must be paid to every process in the production so that materials which are defective can be identified and saves the time in backtracking. Following a proper designing process ensures quality of products. Quality control makes sure that errors and defects are eliminated from the product or the process.

The benefits that a business can derive by adopting a stringent quality control are reduced scrap and wastage, reduction in maintenance cost due to reduced inspection from quality maintenance, employee awareness and motivation increases, product defects are reduced leading to less variable cost, produce at a longer period of time, customer satisfaction, increased performance and productivity of the business and overall efficiency. Quality management in a company can be achieved through the implementation of quality control techniques. There are several quality control techniques that are used by businesses globally such as Statistical Quality Control, Just in Time, Six Sigma, Pareto Analysis and Five Whys. Six Sigma is an arrangement of procedures and tools for process improvement. Nowadays, Six Sigma is employed in almost all the industrial sectors. Six Sigma tries to enhance the nature of process yields by recognizing and removing the causes of shortcomings/faults and limiting fluctuation in manufacturing and designing process (Kwak and Anbari, 2006).

This study is being conducted in HydroFabs. HydroFabs is a 25-year-old company that deals with hydraulic scissor lifts based in Bangalore, Karnataka. It was established in the year 1995 in Bangalore. Over the years the company has grown

consistently to now become a three-million-dollar enterprise. They manufacture, supply and export a broad variety of scissor lifts that are suitable for all kinds of heavy material handling requirements. They manufacture hydraulic scissor lifts, hydraulic car lifts, hydraulic bike lifts, hydraulic dumb waiter, hydraulic car lift for house, hydraulic scissor lift and h (T. Anbari, May - June 2006) hydraulic goods lift. Their material handling equipment's have a universal application in various industries.

2. Review of literature

- Xie and Goh (1999), the application of quality control technique shows similar pattern of usage in the production stage. Many industries report QC supplication in the post – production stage, meant for finished products. The application of combination of techniques as early in the process as possible will result in better product and process performance. Companies will get maximum benefit by improving both the product and process if they can use the approach right from the design stage.
- Anyanwu (2013), quality control is the use of techniques and activities to achieve, sustain and improve the quality of a product or service. It involves the inspection of products to ensure that product is in line with quality standards set and also that work is being performed correctly.
- Radha Krishna and Dangayach (2007), Six Sigma is a structured problem solving tool used to improve products, processes and services by eliminating quality problems before they occur, which saves valuable corporate resources and improves work. The issue of six sigma has become a main strategy in production management in recent years.
- Montgomery (2005), among various applied quality control techniques in the companies, SPC is the most popular applied techniques. Control chart, check sheet and cause and effect diagram were used in these companies to analyze and interpret the data related to product quality. SPC is not only easy and simple to be used; it provides a collection of powerful problem-solving techniques to achieve process stability and reduce variability and can be used in any process.

3. Research methodology

Under the study on the possibility of implementing global quality control techniques in the production process of HydroFabs, questionnaires were used to collect and analyze the views from the employees of the company. Questionnaire was circulated among the group of n=102 respondents. The sample group consisted of the employees of HydroFabs. The survey consisted of 4 demographic questions and 10 subject related questions.

4. Objectives of the study

- To study the impact that global quality control techniques

will have on the company's production process and the overall performance.

- To study about the awareness and understanding of the employees towards global quality control.

5. Scope of the study

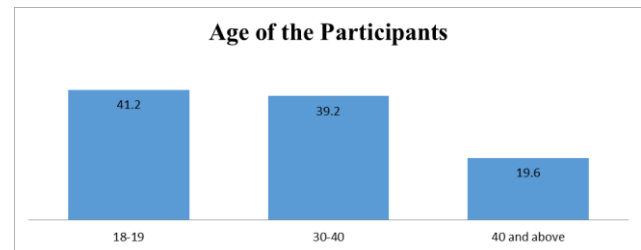
The scope of this study is extended to the impact and effectiveness of quality control in the manufacturing department in HydroFabs. It involves the employees from production department, export department, marketing department and the top level of management of the company who are involved in the event of implementation of this system.

6. Limitations of the study

- Unawareness of the concept of study among a few employees.
- Time constraint also acts as a limitation in the study

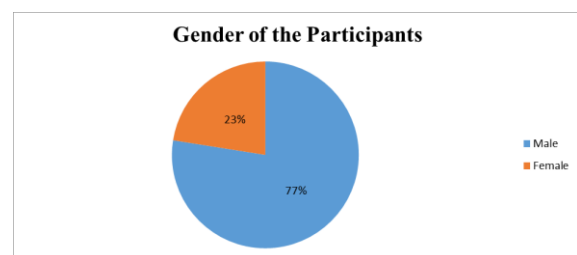
7. Research questions

Chart 1: Age of the Participants



Interpretation: As shown in the graph above 41.2% of the employees are 18-29 years of age followed by 39.2% of the respondents are in the age group of 30-40 years of age. The remaining 19.6% of the respondents are of the age group of 40 years and above. From this we can interpret that the company hires fresh talent to the company to keep up with emerging trends in production and quality control and also there are employees who supervise and bring their experience and expertise on quality control to the workplace.

Chart 2: Gender of the Participants



Interpretation: From the study it is found that the gender of the employees involved in the study. It shows that majority of the employees are males (77%) followed by a very a smaller number of female employees (23%). This is because HydroFabs being a manufacturing company hire more male employees to

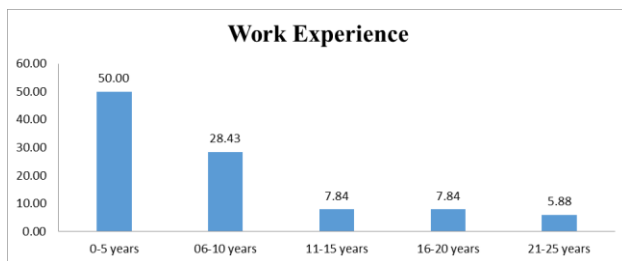
carry out manual work that is pre-dominant in the company. The female employees are mainly located in the Export, Human Resources and Marketing departments.

Chart 3: Qualification of the Participants



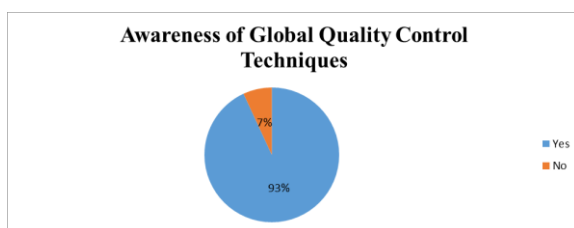
Interpretation: The above graph shows the educational qualification of the employees involved in the study. It shows that 53.9% of the employees are graduates followed by 40.2 % of the employees are post-graduates and the remaining 5.9% of the respondents have done a professional course. This indicates that most of the employees are graduates and very few have professional expertise in fields relating to quality control. Majority of the employees have joined the company completing their graduation.

Chart 4: Work Experience



Interpretation: The graph given above shows the work experience of the employees involved in the study. 50% of the employees have 0-5 years of experience followed by 28.43 % of the employees have 6-10 years of experience. 7.84% of the respondents have 11-15 years and 16-20 years of experience and the remaining 5.88% have 21-25 years of work experience. This shows that the company has retained their experienced employees but has focused on getting in new talent into the workforce. New recruits bring new ideas to the table and have knowledge on the emerging trends in production and quality control.

Chart 5: Awareness of Global Quality Control Techniques



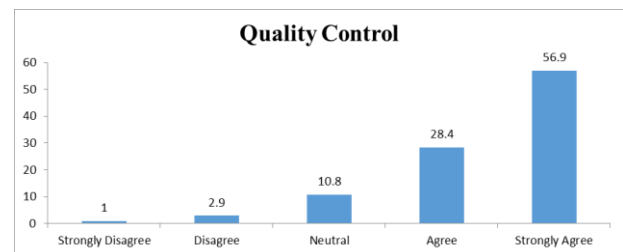
Interpretation: The above analysis shows the awareness of Global Quality Control Techniques that employees have that can be incorporated in the production process. Majority of the employees (93%) are aware of the Global Quality Control Techniques involved in the production process indicating that the employees are well informed about the concepts relating to their job and possess knowledge about the quality control techniques that they can help implement.

Chart 6: Global Quality Control Techniques



Interpretation: The above analysis shows the Global Quality Control Techniques that the employees are aware of. 50% of the employees are aware of Six Sigma Technique involved in the production process followed by 35.3% of the employees are aware of the statistical process control involved in the production process. The remaining 8.8% and 5.9% of the employees are aware of lean manufacturing tools and 5s methodology respectively. Six Sigma is a popular technique for quality control and is known to the employees and they are ready to implement this in the company to increase the quality of the products. These tools can be effectively implemented in all steps of production. They focus on embedding quality right from material procurement to final product delivery.

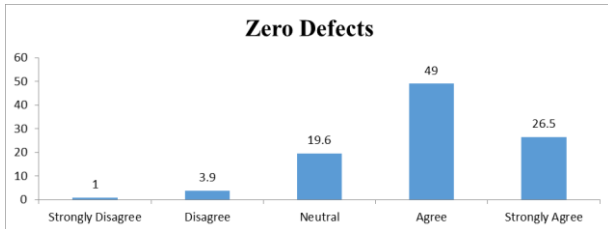
Chart 7: Adoption of a formal procedure, an appropriate process design supported by a suitable technology for quality control for better productivity and organizational performance



Interpretation: The above figure shows the appropriate process design technology for quality control for better productivity and organizational performance. 56.9 % of the employees strongly agree that there should be an appropriate process design supported by a suitable technology for quality control for better productivity and organizational performance followed by 28.4% of the employees agrees that there should be an appropriate process design supported by a suitable technology for quality control. 2.9% of the participants disagree

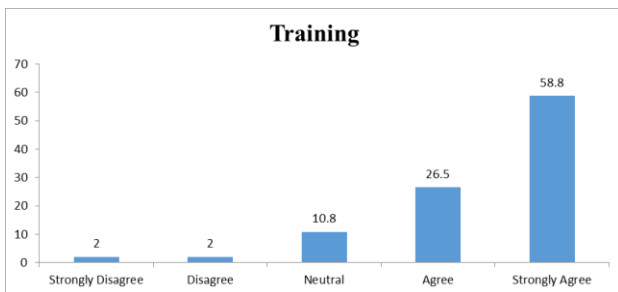
to the idea of having an appropriate process design supported by a suitable technology for quality control for better productivity and organizational performance.

Chart 8: Existence of zero defects when compared to the functioning of the existing process



Interpretation: According to the above graph 49 % of the employees agree that there will be zero defects when compared to the functioning of the existing process, whereas 19.6% of the employees are not sure that there will be zero defects when compared to the functioning of the existing process. Due to the awareness of the concept of global quality control techniques among the employees they feel that the defects in the products could be reduced or made zero if the company adopts a suitable quality control technique such as Six Sigma.

Chart 9: Perception towards providing training to workers in quality control practice affecting the commitment to quality control



Interpretation: The above graph shows that 58.8% of the employees have the perception that training provided to the workers in quality control practice affect the commitment to quality control in the company followed by 10.8% of the employees are not sure about the training provided to the workers in quality control practice will affect the commitment to quality control in the company. From this we can interpret that by providing training programs to the employees their attitude towards quality control can be changed and they can be motivated to adopt and implement changes in the process.

Chart 10: Increase of profitability in the company due to efficient quality control

Interpretation: From the graph we can see that 47.1% of the employees have the opinion that efficient quality control increases profitability in the company followed by 12.7% of the employees are not sure that efficient quality control will

increase profitability in the company. This indicates that when efficient quality control is present in a company it will increase the productivity and performance of the company which ultimately leads to profitability in the business.

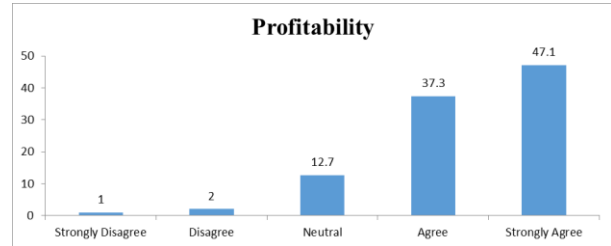
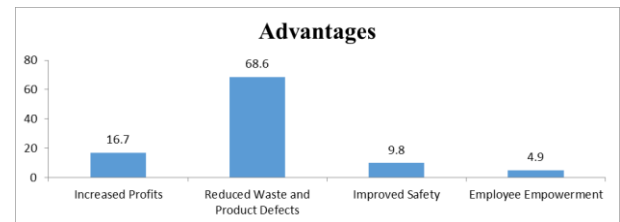
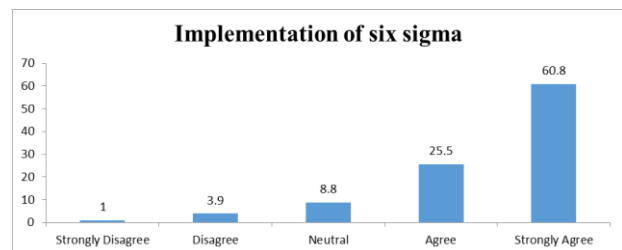


Chart 11: Advantage of implementing global quality control techniques in the company



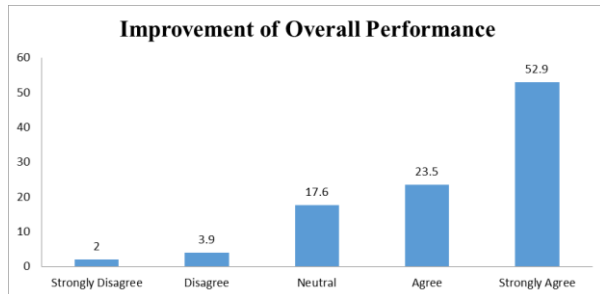
Interpretation: 68.6% of the employees have the opinion that Reduced Waste and Product Defects would be the biggest advantage of implementing global quality control techniques in the company. Reduced waste and product defects would be the biggest advantage because due to the implementation of quality control at every stage of production the wastes produced will reduce significantly at every level and the defects in products can be inspected and monitored before it reaches final stages through the implementation of global quality control techniques.

Chart 12: Perception towards implementation of six sigma in bringing process improvements as well as benefits for years to come



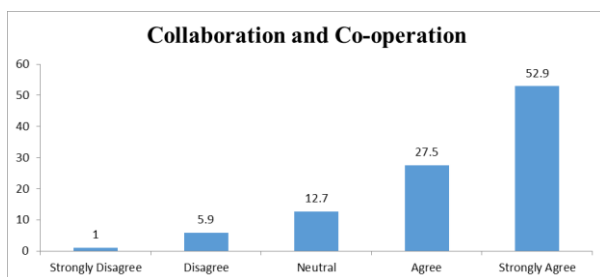
Interpretation: As shown in the above graph 60.8% of the employees strongly agree that implementation of six sigma techniques would bring immediate process improvements as well as benefits for years to come. This is because the implementation of Six Sigma in the production process will strengthen the systems in the company when it is introduced and it will give good results as years pass by due to more efficiency.

Chart 13: Global quality control techniques when combined with lean manufacturing tools will bolster the systems and improve the overall performance and profitability of the business



Interpretation: 52.9% of the employees strongly agree that when global quality control techniques are combined with lean manufacturing tools, it will bolster the systems and improve the overall performance and profitability of the business. From this we can interpret that quality control is more effective when it is combined with other tools such as lean manufacturing tools which also help in quality control.

Chart 14: Without company-wide collaboration and co-operation, from upper management to machine operators, six sigma strategies cannot be used to their full potential unless embraced by all the facets of the organization and become a part of the company's culture



Interpretation: The above graph shows that 52.9% of the employees strongly agree that without company-wide collaboration and co-operation, from upper management to machine operators, six sigma strategies cannot be used to their full potential unless embraced by all the facets of the organization and become a part of the company's culture. This is because quality control is a concept that needs to be taken up by everyone who are involved in the production of the products. When everyone works towards one aim of achieving effective quality control in the company with collaboration and co-operation only then the implementation will be successful.

8. Findings

- Through this study it is clear that majority of the employees are aware about the various global quality control techniques that can be adopted by the company.
- Six Sigma is the technique that most of the employees are

aware of. Statistical Process Control is also familiar to most of the employees.

- The management and employees are open to the adoption of a framework, an appropriate process design using suitable technology that can provide better productivity and performance.
- Defects in the products may become zero or very minimal when compared to the existing process through quality control implementation.
- Providing training to workers in quality control would have a positive effect on the commitment they have towards quality control.
- Employees have the opinion that efficient quality control would increase profitability in the company.
- The main advantage of implementing quality control techniques in the production process will be reduced wastage and product defects.
- Through the implementation of six sigma there will be immediate improvement in the production process as well as benefits in the years to come.
- Global quality control techniques when combined with lean manufacturing tools will bolster the systems and improve the overall performance and profitability of the business.
- Six sigma strategies can be used to their full potential when there is companywide collaboration and co-operation and quality control becomes a significant part of the company's culture.

9. Recommendations

- The company can go ahead with the implementation of Six Sigma in their production process to manufacture better quality products with more efficiency which results in improved productivity and profitability in the company.
- The management may incorporate a framework for measuring and setting standards for employee's performance.
- Training programs and workshops must be arranged for the workers to educate and bring motivation about quality control and the importance of implementing it in the company.
- Company can appoint six sigma black belt professionals for their expertise and handling the complex process.

10. Conclusion

The main rationale of the current study is to understand the implementation of quality control techniques in HydroFabs. The study findings conclude that the implementation would improve the efficiently and performance of the company. This would help build a successful business that will meet or exceed customer expectations and also operate at high levels of productivity. Embedding quality in the processes and products would serve as a market differentiator.

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