

Implementation of Total Quality Management Tools based on Effective System

Pratiksha Manik Sankhe¹, Dr. Arun Kumar²

^{1, 2}Pratiksha Manik Sankhe-Mechanical Department, Mumbai University

Abstract: *In order make changes with the growing markets and to increase the feasibility to improvise the quality. To improve and enhance the quality by implementing tools so to bring a new revolution in production shop floor and to maintain continuous improvement in the firm. To withstand the quality in today's terms of markets by maintaining good relationship between company market and customers so as to fulfill the required conditions of customers by taking into consideration quality and production and also workers satisfaction. All this is possible by overcoming the hindrances and to implement effectively the tools that are abibe to Total quality management to also make profitable to firm and feasible to customers.*

Keywords: *Total quality management, agile manufacturing, new quality tools and JIT techniques.*

I. INTRODUCTION

Total Quality Management is a management approach that originated in the 1950s and has steadily become more popular since the early 1980s. Total Quality is a description of the culture, attitude and organization of a company that strives to provide customers with products and services that satisfy their needs. The culture requires quality in all aspects of the company's operations, with processes being done right the first time and defects and waste remove from operations.

A. Improvements Based On Agile Manufacturing

Agile manufacturing is a term applied to an organization that has created the processes, tools, and training to enable it to respond quickly to customer needs and market changes while still controlling costs and quality. An enabling factor in becoming an agile manufacturer has been the development of manufacturing support technology that allows the marketers, the designers and the production personnel to share a common database of parts and products, to share data on production capacities and problems.

B. Techniques For Quality Improvement

The quality of product or service is ensuring if proper designing process is followed. This designing process needs to be backed by appropriate process design supported by a suitable technology which confirms to requirements of customers. Quality control ensures that defects and errors are prevented and finally removed from the process or product. Therefore, quality control should include; planning, designing, implementation, gaps identification and improvisation. If organization can implement a stringent quality control than following benefits are possible:

- 1) Reducing product defects lead to less variable cost associated with labor and material.
- 2) Reduction in wastage, scrap and pollution.
- 3) Ability to produce quality products over longer period of time
- 4) With quality maintenance needs for inspection reduces leading to decrease in maintenance cost.
- 5) Large pool of satisfied customers.
- 6) Increase in employee motivation and awareness of quality.
- 7) Increase in productivity and overall efficiency.

Above mentioned points are relevant not only for production stage but are equally important for input material, manufacturing process, delivery process, etc.

II. IDENTIFICATION AND RESEARCH COLLECTION.

- A. There is no clear plan or layout for travel of material .
- B. There are helpers to shift material from one department to another which is creating the energy wastes in non value adding activities.
- C. There is no provision to utilize the skills of workers as they are not involved in decision making.

- D. Poor housekeeping.
- E. Tool tips are getting damaged while handling and packing.
- F. Improvement of quality based on reviews.

III. GROUPING OF TECHNIQUES USED TO ENHANCE QUALITY

The affinity diagram is a business tool used to organize ideas and data. It is one of the Seven Management and Planning Tools. People have been grouping data into groups based on natural relationships for thousands of years; however, the term affinity diagram was devised by Jiro Kawakita in the 1960s and is sometimes referred to as the KJ Method. Tools used are based on JIT Maskell technique of improvement change of layout technique. The tool is commonly used within and allows large numbers of ideas stemming from brainstorming to be sorted into groups, based on their natural relationships, for review and analysis. It is also frequently used context as a way to organize and maintain the analysis so as implemented in the firm is mentioned below in table format.

IV. IMPROVEMENT TECHNIQUES TO MAKE EFFECTIVE SYSTEM

A. STEP 1: Identification of Problem Definition

JIT Techniques All these three diagrams relates and helps the employees to manage the shop floor properly.

Secondly employees are well guided to operate the materials from one machine to another so there is no distraction and thus less time consumption and workers do not waste time.

Workers by glancing at the charts or diagrams are well aware of the next coming operations.

Also safety of workers are also well maintained properly so there are less chances of accidents and carefully workers can deal with the same

Arrangements of housekeeping is done properly. Customers feedback to improvise the level of production and make proper changes to enhance the productivity.

B. Step 2: Implementation Of Jit Techniques in TQM

Using the Maskell, model we can make improvements in the quality and production of the firm. The purpose of JIT manufacturing is to enhance the production process thus this goal is achieved by using following methods...

- 1) Change of shop floor layout: This technique of change of layout helps to reduce the movement of materials. Reduction in production set up times so that products can be made in very small batches.
- 2) Synchronizing the manufacturing process so that sub assemblies and components are available just when they are needed and not before.
- 3) Creating mutually beneficial relationships with suppliers, using techniques such as single sourcing, certification and feedback forms.
- 4) Problem solving and quality circles: The purpose of quality circles is to have every employee involved in solving production and quality problems. These programmes have been very successful in many companies because they create an environment of team involvement and common cause, which enables people, who previously had very little opportunity to contribute, to become innovative and resourceful problem solvers.

REPRESENTATION OF REDUCTION OF CYCLE TIME AND INCREASE IN PRODUCTION BASED ON TABLE.

MACHINES	SEPTEMBER (TIME IN SEC)			OCTOBER (TIME IN SEC)			NOVEMBER (TIME IN SEC)			FINAL OUTPUT TIME IN SEC	
	LEAD	LAG	TOTAL	LEAD	LAG	TOTAL	LEAD	LAG	TOTAL		
M1	120	60	180	110	50	160	90	30	120	180-120=60	ACHIEVED
M2	100	30	130	100	30	130	90	30	120	130-120=10	ACHIEVED
M3	30	15	45	30	15	45	30	10	40	45-40=5	ACHIEVED
M4	80	20	100	80	20	100	80	20	100	100-100=0	NOT ACHIEVED
M5	40	10	50	30	10	40	20	10	30	50-30=20	ACHIEVED
TOTAL TIME TAKEN	370	135	505	350	125	475	310	100	410	95	

Table no 1

- 5) *lead time* :time taken when the operation in machines are going on.
6) *Lag Time* : Loading and unloading , Operation while performing from one machine to another machine.
Total time required initially in first month (September) for completion of one job = 505 Sec.
After revised time required in last month (November) for completion of one job = 410 SEC.
Total time lapsed after first and final change in cycle time is 505-410 =95 SEC.
Cycle time loss = $\sum(\text{Ideal cycle time (September month total)} - (\text{Actual cycle time (November month total)})$

C. *Obervation Done Initially.*

Depending upon layout cycle time management for production as follows

Time required for completion if one job

1 job = 505 sec = 8.5mins.

No. of job completed in one hours

1 job = 8.5mins.

X = 60mins.

So we get X=7 jobs (approximately) in one hr. Therefore, in one hour total no of jobs completed is 7 in number.

OBERVATION DONE FINALLY.

Depending upon revised layout cycle time management for production as follows

Time required for completion if one job

1 job = 410 sec = 6.8 that is 7mins (approximately)

No. of job completed in one hours

1 job = 7mins.

X = 60mins.

So we get X=9 jobs (approximately) in one hr.

Therefore, in one hour total no of jobs completed is 9 in nos.

IV. CONCLUSIONS.

Considering the shift of 12 hours

$12 \times 7 = 84$ jobs initially per day.

After change in cycle time with the help of revised layout we get,

$12 \times 9 = 108$ jobs (approximately) per day.

So in prior production we use to get 84 jobs per day , now as per change in cycle time production has increased to more 24 jobs per day extra . Depending on the layouts we have reduced the cycle time and hence with enhancing the seven quality tools like affinity diagram, guidelines of workers have been done so that they become keen in their work and can know about process and operations. Along with that they can also take the machine related decisions easily. This also improvise their interest in their work and also this helps to enhance quality as their dedication towards work also increases and that affects the customers satisfaction indirectly as they are linked with the workers guidelines where quick decisions taken save time and reduces cycle time and thus enhance quality and productivity and thus customers feedback and thus overall development of the industry.

V. ACKNOWLEDGMENT

It brings me immense pleasure to publish this paper based on quality tools that enhances the quality of firm but along with that efforts of some honours cannot be neglected, so I am thankful to our honourable principal sir Dr. Arun kumar for his valuable guidance and support along with that, I would also like to thank our respectable HOD of Mechanical department, Mrs Niyati Raut for her wide support and for our overall development. Last but not the least to all who have supported me to make my efforts to its best.

REFERENCES

- [1] Farish K A1, Anu P Anil 2, Dr. Satish K P3, "Effect of TQM Practices on Financial Performance through Innovation Performance" , International Research Journal of Engineering and Technology (IRJET), Volume: 04 Issue: 07 | July -2017 , pp. 2649 – 265
- [2] William Widjaja and Makoto Takahashi , "Distributed interface for group affinity-diagram brainstorming" Concurrent Engineering: Research and Applications 2016, Vol. 24(4),pp.344-35



- [3] Hamid Moradlou , “Implementation of Agile Manufacturing Principles in Small and Medium Enterprises (SMES)” Journal of Modern Processes in Manufacturing and Production, Vol. 4, No. 3, Summer 2015, pp. 31-44
- [4] Manivelmurlidaran .V “Agile Manufacturing - An Overview”, International Journal of Science and Engineering Applications Volume 4 Issue 3, 2015, ISSN-2319-7560, pp. 156-15
- [5] Osama Q. Abdulla, “Impact of Total Quality Management on Managing and Reducing Total Cycle Time in Manufacturing Projects”, International Journal of All Research Education and Scientific Methods (IJARESM) ISSN: 2455-6211, Volume 2, Issue 11, November – 2014, pp.1-5
- [6] Herzallah,Gutierrez, Munoz Rosas, “Total Quality Management practices, competitive strategies and financial performance: The case of the Palestinian industrial SME’ s”, 2014Vol.25, n.5/6, pp.635-649.
- [7] Ola Ibrahim, “Total Quality management (TQM) and Continuous Improvement as Addressed by Researchers”, International Journal of Scientific and Research Publications, Volume 3, Issue 10, October 2013 ISSN 2250-3153, pp. 1-
- [8] MaziyarNourae, “Study Relationship between TQM on Empowerment and Job Satisfaction,World Academy of Science”, Engineering and Technology International Journal of Economics and Management Engineering Vol:7, No:9, 2013, pp.2638-2640.
- [9] AsiyaGul,SayedAamirSaeedJafery, “Improving employees performance through total quality management”, International Journal of Economics and Management Sciences Vol. 1, No. 8, 2012, pp. 19-24
- [10] RameshwarDubey, “Role of innovative supply chain practices and total quality management (TQM) on performance of Indian cement manufacturing firms”, An empirical study, polish journal of management studies, vol 4 2011, pp. 96-119
- [11] Lunenburg, “Total Quality Management Applied to Schools”, schooling volume 1,number 1, 2010, pp.1-6
- [12] Deepa Pandey, “Inventory Management System and FIFO”, volume 7Issue 2, 2016pp.2499-2501