Implementation of Total Quality Management Tools for Developing Effective System

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Abstract- *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 Total quality management to also make profitable to firm and feasible to customers.*

Keywords- Total quality management, agile manufacturing, JIT and quality tools.

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.

1.1 IMPROVEMENS BASED ONAGILE 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.

1.2 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:

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

1) There is no clear plan or layout for travel of material .
2) There are helpers to shift material from one department to another which is creating the energy wastes in non value adding activities.
3) There is no provision to utilize the skills of workers as they are not involved in decision making.
4) Poor housekeeping.
5) Tool tips are getting damaged while handling and packing.
6) 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

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)			FINALOUTPUT 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=0	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

LEAD TIME : Time taken when the operation in machines are going on.

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 = ∑(Ideal cycle time (September month total)- (Actual cycle time (November month total)

OBERVATION DONE INITALLY.

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 DURING PROCESS.

AS the layout was in process we observed very minor changes so we neglected it & focus entirely on the final output as the layout gets completed.

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.

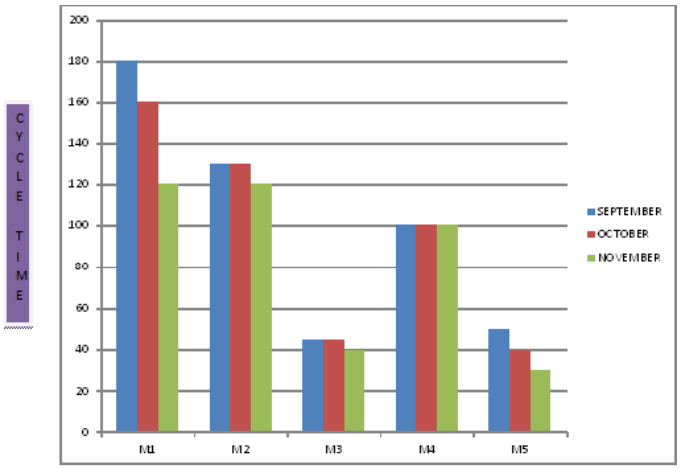
X = 60mins.

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

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

GRAPHICAL ANALYSIS.

The above shown graph shows how the machines M1 to M5 works as per layout and maintains the quality and increase in production and reduction in cycle time from the initial month September and final to November.



Affinity diagram shows the actual functioning of the overall system based on final layout and improvements techniques using the quality tools. All the details of the systems considering the agile manufacturing as the base are listed together to show the proper functioning of system in order to maintain the legacy of quality among the workers and employees. Affinity diagram is an inductive method where you break up qualitative data from user research or design activities into small chunks and then organize those chunks into groups of related information that highlight particular themes. The flow of the affinity diagramming process from generating raw data to organizing the data into related clusters and finally, labeling the clusters with a name that captures the theme of the clusters.

The types of data associated with affinity diagram include:
he groupings of ideas into groups and sub-groups.
The number of groups and sub-groups
The names associated with groups and sub-groups.
A list of prioritized items.
The themes based on the groups and sub-groups.
A diagram showing the structure and relationships among the groups and subgroups.
Records of discussions about the affinity diagram.

V. CONCLUSION

Reduction of cycle time causes to produce: 9-7=2jobs more as compared to earlier production in one hour.

RESULT & SCIENTIFIC DISCUSSION

Considering Shift of 12 hours

12 x 7 = 84 jobs initially per day.

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

12 x 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.

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