

A CASE STUDY: KAIZEN AND 5S IMPLEMENTATION IN SMALL SCALE INDUSTRY

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ABSTRACT

In India many small & medium scale industries are present. Lack of productivity, greater lead time, processing time, stock out situation are major problems faced by industry. In order to solve the faced problem, we make a pin point on two major methodology are Kaizen and 5S. Kaizen implementation focuses on reducing the lead time of production by means of which the productivity of industry will be improved & 5S implementation is emphasize on most effective use of space, time, money, energy, and other resources their organization..This Technique reduces problems and bottle neck in the work flow. 5S and kaizen techniques in the small scale industry have been analyzed and implemented in a case study of the machine shop. On the basis of the case study, we can bring great changes in the organization by introducing the 5S and kaizen techniques

I. INTRODUCTION

Globalization has brought world closer, especially through a common medium like the economy or job sharing. In this process, most of the developed nations like USA, Japan outsource their workloads especially in manufacturing to low cost countries such as India, China etc. Thus, the people in the developed nations get the benefit of cheap products available at high quality; whereas the people in the low-cost countries get the benefit of more jobs creation in their country. In addition, the customers are very knowledgeable, informative and they demand the highest quality product. They constantly seek the products in the market this has the highest quality. The company which fails to adopt new change would either lose their market share or sell at less profit. Therefore, the company should produce its product at high quality, in minimum cost to the customer and meet customer demand on time. Kaizen and 5S are those techniques used to organize, standardize and continuously improve the work area. This is the best efficient technique and tools of the lean manufacturing for the continuous improvement and development of the organization.

II. LITERATURE REVIEW

Lean manufacturing is a systematic method for waste minimization ("Muda") within a manufacturing system without sacrificing productivity. Lean also considers waste created through unstandardize ("Muri") and waste created through non uniformity in workloads ("Mura"). Lean manufacturing makes emphasize on what adds value, by reducing which is not adding value. Waste is defined as any activity that does not add value from the customer's

point of view. In lean manufacturing, generally seven types of wastes are considered:

1. Over-production against plan
2. Waiting time of operators and machines
3. Unnecessary transportation
4. Waste in the process itself
5. Excess stock of material and components
6. Non-value-adding motion
7. Defects in quality

KAIZEN

The purpose of Kaizen is not only simply improvement in productivity. When correctly implemented, the process humanizes the workplace, eliminates hard work, and teaches people how to spot and eliminate waste in business processes. Kaizen generates small improvements with coordinated continuous efforts by all employees. Kaizen events bring together a quality circle that includes process owners and managers to map out an existing process and identify improvements that are within the scope of the participants.

Kaizen activities cover improvements in many areas, including:

1. Quality – Bettering products, service, work environment, practice and processes.
2. Cost – Reducing expenses and manpower, and use of material, energy and resources.
3. Delivery – Cutting delivery time, movement and non-value-added activities
4. Management – Improving procedures, training, morale, administration, planning, flow, information systems, and documentation and reporting.
5. Safety – Decreasing hazardous situations, unsafe working conditions, chances of resource depletion and damage to the environment.

THE 5 S

There are five 5S phases: They can be translated from the Japanese as "sort", "set in order", "shine", "standardize", and "sustain".

1. Sort (Seiri) : Sorting, keep the necessary in work area, dispose or keep in a distant storage area less frequently used items, unneeded items are discarded.
2. Set in Order (Seiton) : Systematic arrangement for the most efficient and effective retrieval. A good example of Seiton is the tool panel. Effective Seiton can be achieved by painting floors to visualize the dirt, outlining work areas and locations, shadow tool boards. Seiton saying would be: "A place for everything and everything on its place."
3. Shine (Seiso) : After the first thorough cleaning when implementing 5S, daily follow-up cleaning is necessary in order to sustain this improvement. Cleanliness is also helpful to notice damages on equipment such as leaks, breakage and misalignment.

4. Standardize (Seiketsu) : The 3 first S are often executed by order. Seiketsu helps to turn it into natural, standard behavior. Once the first three S have been implemented, it should be set as a standard so to keep these good practice work area. Without it, the situation will deteriorate right back to old habits. Have easy-to-follow standards and develop a structure to support it. Allow employees to join the development of such standards.

5. Sustain (Shitsuke): Finally, to keep first 4 S alive, it is necessary to keep educating people maintaining standards. By setting up a formal system; with display of results, follow-up, the now complete 5S get insured to live, and be expanded beyond their initial limits, in an ongoing improvement way; the Kaizen way.

III. STUDY OF EXISTING SYSTEM

1. LAYOUT DETAILS

It consists of the following machines

Lathe machine, Drilling machine, Grinding machine, Balancing machine, Hydraulic machine.

2. LABOUR

The company consists of 18 employees working in the company. Out of which one is an engineer one in an accountant and remaining are the workers. These 16 workers have 4 skilled operators who are being having wonderful experience in their work field. 2 to 3 are the helpers which help to make the flow of the material into the machine shop.

3. COMPONENT FLOW

Following is raw material flow rate:

1. The raw material is 1st inspected at the entry of the raw material.
2. The accepted material in the flown through the above process from various machines by the helpers by hand.
3. The finished component in the inspected and the rejected component are sent to the rejected and scrap area and the final components which are accepted by inspection are packed and sent to the vendor.

4. QUALITY CONTROL

Quality Control Devices are used to check on-line different process parameters of the raw material, components. Following are the inspection devices used :Height gauge, Bore gauge, Micrometer, Gauge block, Depth gauge, Vernier Caliper.

The instruments are stored in the racks which are adjoining to the machines, or in the common racks.

5. AREA DISTRIBUTION OF THE INDUSTRY.

	Total area	4000 square feet
Office		400 square feet
Parking		600 square feet
Machine area		500 square feet
Raw material storage		100 square feet
Finished component storage and packing area		170 square feet
Rejected component and scrap		150 square feet
Remaining floor space (pathway, unused area)		2080 square feet



Fig. Area Distribution of Industry

IV. PROBLEM DEFINITION

- 1.Improper flow of raw material: In present condition in process inspection and final inspection is difficult to carry out because no proper space is available due to improper machine shop layout.
- 2.Improper material handing: Low proper use of material handling technique so the material flow is not streamlining it hampers the production rate.
- 3.Improper floor space utilization: The current layout of the industry has not much utilized. The plant layout gives more space for the unproductive areas like the parking, office, less to the productive area for machine, inspection equipment's, storage space, etc.
- 4.Low production rate and productivity: Material handling time, improper flow of raw material & misplacing of equipment's these causes hampers the productivity.
- 5.Electrical Problem: The power supply to the company is taken from local commercial line, there was no any special transformer for the company which resulted in to frequently breakdown of the electrical problem
- 6.Target are not achieving in time: Because of above causes the production targets are not achieved.

V. IMPLEMENTATION AND RESULTS

SORT (SEIRI)

The first **S** that is Seiri focuses on eliminating unnecessary items in the workplace. At the beginning of the implementation of the 1st S many of the items in the workplace were red Tagged. The red tagging indicates that the item is not needed or else it was placed at wrong place. After all the red-tagged items and equipment are moved out of from the department, extra space is generated in the store. These areas are then utilized for smoother materials and traffic flow.

Benefits

- 1.Increased Productivity – The purpose of individual work areas will be more apparent, leading to a highly efficient workflow.
- 2.Workers will be more satisfied with their environment Employee morale would increase as junk items or materials that are potential health hazards are identified and removed.

SET IN ORDER (SEITON)

The 2nd S focuses on setting them in an proper location and in proper order. Here the items marked with red are removed and remaining are placed at the proper place which helps to easy finding of it and clearing mess to remove.

Benefits

- 1.Process improvement (increasing of effectiveness and efficiency).
- 2.Shortening of the time of seeking necessary things.
- 3.Safety improvement.

SHINE (SEISO)

In order to maintain a clean and organized work atmosphere, cleaning supply shadow board are used. Several areas in the work station have problems keeping things clean. By creating the cleaning supply shadow boards and locations for those supplies, everyone knew where to get them when needed and where they belong after the completion of work

Benefit:

- 1.The benefits of a clean workplace are readily apparent after a short period of time.
- 2.Employee morale increases, and the most productive time can be dedicated to the most important tasks.

STANDARDIZE (SEIKETSU)

Standardize In order to standardize achieved, the workers from the department have agreed upon that everyone should contribute to daily clean-up of the working place. Moreover, in the end of the working week a more detailed clean-up is performed, the performance of which is controlled by a dedicated employee on a week-clean up duty.

Benefit:

- 1.Safety increasing and reduction of the industry pollution.
- 2.Working out the procedures defining the course of processes

SUSTAIN (SHITSUKE)

After the successful implementation of the 5S process, the discipline to sustain is of the most importance. Proper awareness, correct structures and procedures, support from worker and management, adaptability to 5S is vital for continuous improvement. In order to achieve that, a 5S observation sheet is prepared to aid in the implementation of the 5S process. The observation was done on a monthly basis and the results are analyzed.

Benefits:

- 1.Increasing of the awareness and morale.
- 2.Decreasing of mistakes quantity resulting from the inattention.
- 3.Proceedings according to decisions.
- 4.Improvement of the internal communication processes.
- 5.Improvement in the interaction of human relations.

For the above theory to fulfill improvement we use plant layout. By the given layout we will get the above benefits like above mentioned points. This plant layout fulfills the improvement & the layout is shows proper space utilization. The plant layout is given below.

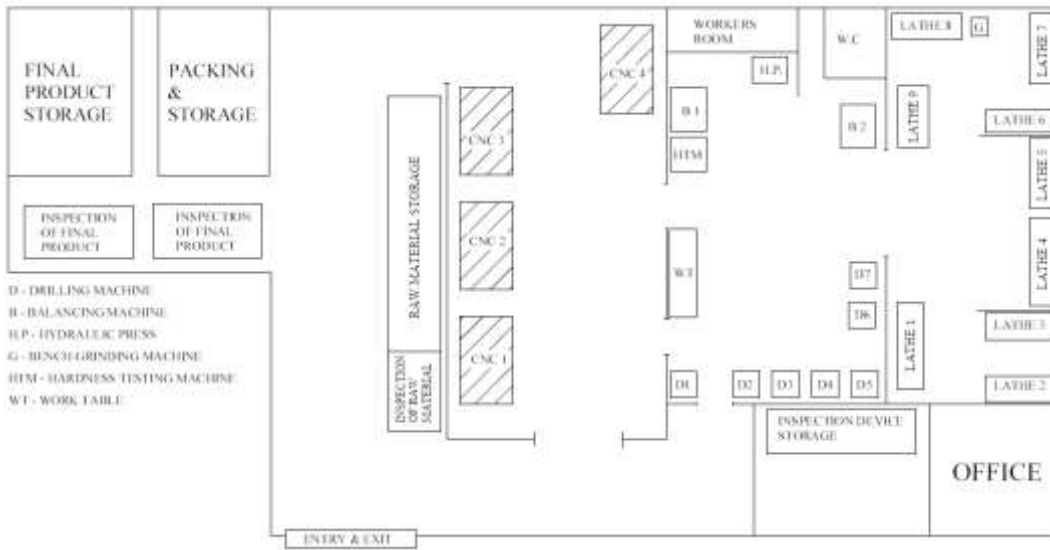


Fig. Developed Layout of Industry

VI. CONCLUSION

Due to implementation of 5S & Kaizen, we achieved better space utilization, employees safety, less scope of error, improvement in productivity and inventory system. This also helps in increasing machine's utilization, maintenance & the cleanness of devices, to maintain the healthy workplace, easy to check, quick informing about damages (root cause of defect), eliminates the possibility of accident's in the company. Awareness of the LEAN concept indirectly improved the morale of employees with better working environment.

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