

Implementation of 6S in Manufacturing Plant

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Abstract: In the manufacturing industries we have to persistently upgrade the technology of production processes to attain better results. In these days, there is very high competition in the manufacturing industry to produce high quality products. In these days, quality is not only one issue in manufacturing sector but to achieve a high performance, raw material utilization, complete utilization of machines and tools, save production time, providing better work environment to the workers and safety of workers etc. are also big challenges in the manufacturing industry. To eliminating these challenges of manufacturing industry we have to use latest technology and methods to attain a desired goal. The 6S methodology is one of modern and latest method to gain a desired goal in the manufacturing industry. The 6S methodology resolves all problems that affect our manufacturing industry. The 6S methodology rearranges all resources, every operation in a sequence and full utilization of each resource.

Keywords: 6S implementation, elimination of waste, quality improvement, safety.

1. Introduction

The 6S is most common technique used to increase the productivity and safety of any enterprise or group. The 6S method can be executed in all type of manufacturing industries like small size, medium size and large size industries etc. The 6S is a unique method for eliminating all problems comes in manufacturing industries in these days. The 6S method fully utilizes all resources in the plant or industry. Doing things exactly and stay them reliable^[1,2]. The 6S method attains desired results in a manufacturing industry.



Fig. 1. Pillars of 6S

Term of 5S:

SEIRI (sort): Sorting out of necessary equipment's and materials in useful and non-useful items.

SEITON (set in order): This step consists of putting everything in its designated place so that it can be retrieved swiftly as well as returned in that same place speedily.

SEISO (shine/clean): It consists of wiping up the workplace and giving it a 'glitter'.

SEIKETSU (standardize): It defines the degree by which personnel must estimate and maintain neatness.

SHITSUKE (sustain): This final step is about 'Discipline.' It perpetuates orderliness and to execute the first 4S as a way of life.

2. 6S methodology

The 6S methodology utilizes the all resources and manpower in an efficient way to attain desired results in the manufacturing industry. This is a powerful method to increase the individual performance as well as overall performance in the manufacturing industry. The 6S technique is providing a new standard to a manufacturing plant. All safety equipment and devices are available in the plant. This method improves the quality and safety of work environment in the manufacturing industries. Figure 2, shows the conditions before and after implementation of 6S methodology in a manufacturing industry. Figure 2, shows the condition of machines, floor and work environment of a manufacturing plant.



Fig. 2. Before and After implementation of 6S methodology in a manufacturing industry

The 1S rule proceedings

A) In the first stage one should answer to so-called Control Questions

- Are non-essential things causing the mess in the workplace?
- Are non-essential excess of materials thrown anywhere in the workplace?
- Do tools or extras of materials in production lie on the floor

(in the workplace)?

- Are all essential things categorized, classified, traced and possess the own place?
- Are all calibrating tools properly classified and kept?



Fig. 3. Seiri (Sort)

Keeping the answers of the above questions in mind, it is possible to estimate the position of the workplace in terms of the 1S rule which displays the higgledy-piggledy workplace. If any question answers in affirmative, one should execute categorizing of things which are in the workplace.

B) On the second stage one should performed the review of all things which are in the workplace and group them according to the definite system. According to carried out sorting it should execute the elimination of the things from the workplace, which were found “unnecessary”

C) The permanent usage of the 1S rule is called “Red Label”. It means giving the red label to things, which operator will recognize as useless.

Benefits:

- Improved process by costs reduction
- Stock minimizing
- Better utilization of the working area
- Lesser chances of losing tools

A. SEITON

Set in order is the way to make items and tools arranged in a sequence that reduces the searching time of the tools and items [4]. If the company does not set all items in order, it will be very difficult and time consuming to look for the items. It is the second step of 6S, which means the company should do sort first then set in order. Set in order is to keep everything that you have sort in first step in the right place [5]. For example, set in order in size, weight and the rate of utility. The company has more space because in the sort step they throw out all unneeded and waste material from the workplace. But the items are not present in the right place. Manufacturing companies have many tools and items, so set in order is very important for them to reduce process time and searching time [6]. For example, put all the same size drills and mills together. Distinguish all different sizes of drills and mills separately. Hang the handle tools on the wall so that everyone can see them clearly. The

most important step in set in order is to tag the name of tools and items so that everyone will know where the tools and items are present for that they are looking without wasting time.



Fig. 4. Seiton (Set in order)

Implementing the 2S rule:

In the 2S scheme, one should perform the segregation of things and imprint the places of their storing. Used things should always be categorized in the following manner:

- In near access (1st degree sphere)
- Accessible (2nd degree sphere)
- In the proximity of hands (3rd degree sphere)

While estimating the workplace in terms of the 2S rule that is setting things in order serves the following Control Questions:

- Is locale (location) of the prime passages and places of Storing distinctly marked?
- Are tools segregated on these to constant uses and on specialist tools?
- Are all transport palettes hoarded on the accepted heights?
- Is anything kept in the area of devices resistant to fire?
- Has the floor had any irregularity, cracks or causes, other Hurdles for the operators’ movement?

Things used frequently and seldom should be on the workplace but outside the direct using sphere. Their displacement and locale from the place of work should depend on the frequency of using these materials or tools. Places of storage should be imprinted in the manner making possible their prompt identification. It can be done by using colored lines, signs and tool boards.

Benefits:

- Process ameliorated (increasing of effectiveness and Efficiency),
- Shortening the seek time for necessary things,
- Safety enhancements

B. SEISO

This is a concept to make everything in the workplace neat, shiny and clean. For longer life of items and to make better working condition, corporation should ask the personnel to do the cleaning after off duty before they leave the company [7]. Wipe and clean the machines such as the panels of INJECTION MOULDING machines. The floor area should be sweep to have a better and clean workplace. The all tools need to clean

personally for their better use and long life in the company. Put everything back in the correct place after cleaning [8].



Fig. 5. Seiso (Shiny clean)

Benefits:

- Machine's efficiency is strengthened
- Maintenance of device's cleanliness
- Efficiency
- Keep the working platform clean, neat and tidy. Quick alarming about damages (potential sources of damages).
- Betterment of the working environment, elimination of reasons of accidents.

C. SEIKETSU

Managers give some instructions to the workers to implement the first three steps regularly. Standardization is the way to help the company to set some rules and instructions to implement the first three steps daily in the company [9]. The rules may be regularly changed for to make better working condition. When the company has the criteria, it is easy for the new workers to get involved when they first come and try to be familiar with the new structure of the company and it is easy for old workers to lead the new workers.

D. SHITSUKE

This step is to implement the all previous four steps daily in the company. The company should make a checklist to help the manager to make sure that everyone follows this step [10]. Once the company runs the first 5S, the staff in the company knows the benefits of 5S and implements it in the daily routine in the company

Trained employees are disciplined for practicing 5S system regularly so that the habits of 5S and safety within the organization. The leader directs the task here. The directors should describe the importance of 5S to the personnel through various trainings and the knowledge of the workers about 5S should be kept up to date through the 5S notice boards to be formed at the workplace. To maintain the standards and keeping the facility in safe and efficient order month after month, year after year. It is also vital to understand the need of doing the routine inspections of usage the 5S rule.

E. Safety

This is the main step of 6S in the companies in present time. This is additional feature to the 5S method. The safety is the

state of being safe or to reduce the chances of accidents in the company. This is very important for making workplace safer for workers [11]. The companies use many safety policies and equipment to make workplace safe for working. The companies give safety helmet, safety jackets, safety gloves etc. to the workers for their personal safety at the workplace. Much safety equipment like fire extinguishers etc. is installed at the workplace in the company [12].

Fire Extinguisher present in Manufacturing Plant



Fig. 6. Safety devices present in a manufacturing plant

3. Conclusion

This study presents an industrial application of 6S methodology. Main motivations to initiate this activity in the company to do away with excessive inventory, improve process flow, organize work and make work climate healthy. Before the activity the plant was the combination of dirty machines, excess materials, scraps spread all over the shop floor, creating a plenty of flow complications, space limitations and production problems.

The main approach is to make all staff aware of the problem they are suffering and understand the negative impacts. This produced a self-motivation and helped the activity finalized successfully. It was not possible to implement any lean techniques, apply quality systems under those conditions. Moreover, without 6S; no operation can be standardized. Without standardized processes; a company cannot define the technological needs, cannot evaluate any innovative implementation correctly. This activity aimed to clean, identify and streamline the operations. A practical 5S methodology implemented as a task.

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