



Implementation of 5S in Small Scale Screen Printing Industry: A Case Study

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Abstract:

A Small-Scale enterprise (SSI) assumes an essential part in Indian monetary system. 5S has the effective devices of Lean production to enhance the productiveness in small scale businesses. In certain decided locations 5S might be joined with different tools for example, Kanban, Kaizen, Total Preventive Maintenance and Total Quality Management. The paper represents an Implementation of '5S' technology in the production department of screen printing at Dept. of Printing, Stationery and Publications, 8th Mile, Mysuru Road, Bengaluru. It is one of the service-oriented department of the state government body. Which is mainly printing and supply for the Karnataka State Government, such as Forms, Letter Pad etc. The greater part of the little scale enterprises is uninformed about the lean production instruments. By following the 5S system, it demonstrates huge enhancements to security, profitability, productivity and housekeeping. 5S can enhance the quality, productiveness and running situations in Production plant.

Keywords: 5S, 5S implementation, Lean Manufacturing

I. INTRODUCTION

Screen printing method is absolutely distinctive from various printing strategies. The mesh is always stretched over a frame and a stencil is used to define a picture in an effort to be produced. A squeegee is utilized for applying a strain to exchange the ink through the mesh. Five types of inks and wide assortment of substrates are utilized as a part of screen printing [1]. A SSI (Small Scale Industries) constitute a vital portion of the Indian financial system as some distance as their commitment of industrial production, exports, employment and making of an entrepreneurial base [2]. The approach of 5S inside the business enterprise will facilitates to hold the company simplify, clean and constantly enhance an efficient work environment. 5S isn't essentially a housekeeping and it is one of the securely working tools of Lean production. 5S is a framework to decrease waste and Optimize profitability through keeping up a systematic working environment and utilizing visual prompts to accomplish more predictable operational outcomes [3]. This strategy "clean up" and sorts out the working environment essentially in its current arrangement, and it is normally the primary lean approach which organizations implemented. 5-S repesents to the acronym for five Japanese words Seiri implies Sort, Seiton implies Set in Order, Seiso implies Shine, Seiketsu implies Standardization and Shitsuke implies Sustain. 5S has been added in Japan in particular within the production and service oriented industries. The organization of Toyota is the real assembling of cars and furthermore it is one of the leading firms who got the 5S norms. The japanese accept as true with that 5S Principles are not only precious at their places, as well as meliorate their cognitive sense. Osada alludes to the 5S as the five columns to settle and keep up an aggregate complete fine environment in an organisation [4]. The paper represents an Implementation of '5S' technology in the

production department of screen printing at Department of Printing, Stationery and Publications, 8th Mile, Mysuru Road, Bengaluru. It is one of the service-oriented department of the state government body. which is mainly printing and supply for the Karnataka State Government, such as Forms, Letter Pad etc. The principle goal of the 5S implementation in the organisation is to enhance the productiveness, safety, performance via effective place management.

II. LITERATURE REVIEW

5S device has experienced developmental development and progressions amid the most recent decades. Inside the publised literature numerous investigations results comes about have been accounted for. On this part, some of the 5S research performed over the years were revisited, highlighting the applications and methodologies used. Gupta and Jain [5] 5S and Kaizen applications are adopted in the small scale production enterprise. Usage of 5S and Kaizen brings about enhanced productivity and effectiveness in the procedures, enhanced visibility of the procedure, enhanced morale and protection of the workers, decreased delays, seeking time and unsafe conditions. With a specific end goal to make effective 5S and kaizen framework most vital elements are participation, commitment and support from top level administration. Swapnil Patil et al. [6] The Paper represent that the each issue is a chance to enhance the procedure and surrounding environments. 5S which are extraordinarily easy and less expensive strategy to overcome from this problem. The approach used in this paper is, divide every S in five steps having one point for each, according to the performance of each worker factors has been given and analysis achieved weekly. Labeling process is utilized for sort. The final results is the execution of 5S and performance calculation of employee. The paper suggests a way to preserve 5S with the aid of preserving continuity of employees. Urban and Mazurek [7] did their studies in Bianor,

aplish producing organization and found that the utilization of the 5S strategy for all intents and purposes without huge budgetary invest has allowed the advent of a smooth and clean working environment. It contributed to the advent of the enterprise's new manner of questioning and new values. The organisation has made a vast step toward perfection. Employees cooperated willingly in developing the brand new policies and standards, and therefore, their attention of the importance of maintaining order in the place of business has increased appreciably. R. S. Agrahar et al. [8] The execution of 5S system in the small scale enterprise is deals in this paper and following the 5S gadget, it shows considerable enhancements to protection, productivity, efficiency and home tasks. The improvements before and after 5S implementation is shown by snap shots in the paper. Arash Ghodrati et al. [9] this examine goals to review previous research approximately the benefits of 5S implementation and its efficiency in organizations. Indian agencies are informed approximately quality improvement necessities, even though disciplined approach isn't yet in area and improvement efforts are not enough to remove weak point in quality. The study of research concludes that, 5S can help the goals of company to reap continuous development in performance and productiveness. On the ultimate barriers in 5S implementation are underlined. J. Michalska et al. [10] the primary point of this paper is demonstrating the 5S procedure and within the frames of personal studies it has been analyzed and implemented the 5S policies in the production method. Research obviously appeared, that extremely essential training about the 5S rules are required. The important element is to divide processs on a few most important steps and to maintain the non-stop improvement are the main matter.

III. METHODOLOGY OF 5S

5S is the one of the fundamental strides in motion and achieve a thriving Lean culture. The 5S method is a best program to perform standardization within the work surroundings for better productivity and general business enterprise cleanliness. While the whole thing has a place and there may be a function for all matters, a 5S application will serve for supporting a clear image of the work environment.

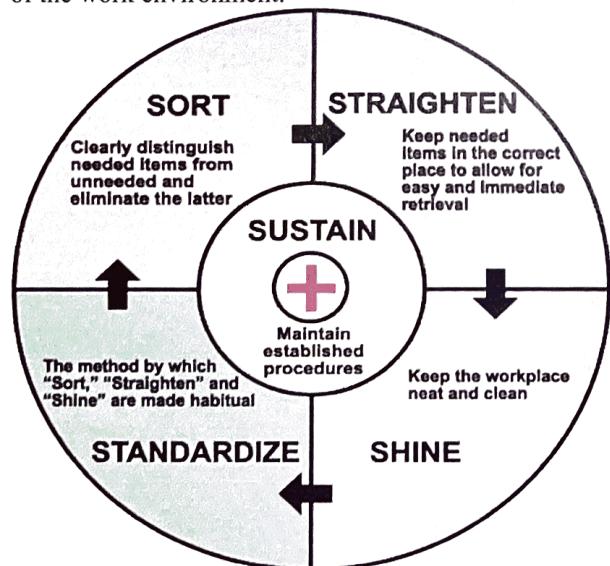


Figure.1.The Schematic Diagram of 5S Methodology. [Online]. Available: <https://goo.gl/images/wsRKp4>

It consists of absolutely everyone within the organization from the top stage to the lower stage. The advantage of 5S technique are development in productiveness, high-quality and safety. 5S terms are given below:

1. **SEIRI** (Sorting) is the purposes of the evacuation all undesirable, pointless and irrelevant things, devices and materials from the working zone.
2. **SEITON** (Set in order) is Putting the entirety in an assigned area so that it can be accessed fast as well as returned in that identical location quickly.
3. **SEISO** (Shine) comprises of cleansing up the working environments and workstations, giving it a shine.
4. **SEIKETSU** (Standardize) main goal is preparation of standard methods to continue to follow the first '3s' effectively in the organization.
5. **SHITSUKE** (sustain) The main aim of the Sustain is maintaining the implemented 5S system effectively in the process areas.

The Japanese advanced this easy and easily understandable phrases religiously practiced the philosophy of 5S in each factor of their existence and have made it a global-wide recognizable system. Explained 5S in detail are as follows [4]:

SEIRI: The principal of first pillar is mainstay of the visual working environment which centers around wiping out and expelling every single superfluous thing from the work environment that are not required for present production tasks. Sorting the things is according to three classes together with beneficial, useless and unknown. The useless things are disposed without delay due to the fact they just jamming the working area result in loss of time. For items unknown, the frequency of using them not clear, they can be kept with monitoring in order to make a decision by red tag strategy. Via an appropriate sorting it may be identify the materials, tools, equipment and essential information for realization the tasks. A proper name and one location storage should be assigned to each and every item in order to reduce confusion, resulting in maximum efficiency.

SEITON: Set in order can be define as essential material and items are prepared with the intention to decrease wasted employee motion, walking and material motion. Except that, set in order specializes in developing efficient and powerful storage techniques for you to arrange the objects and parts of process in order that they're easy to apply. Forming an everyday work area, avoiding time loss while attempting to find material and so improving the performance are the primary goals.

SEISO: Once the litter at work areas is removed and last items and parts are organized nicely, the next footstep is to very well clean the work area. It's far the element that emphasizes the elimination of dirt and dust from the location of work area. Cleaning ought to turn out to be each day activity and Work place vicinity ought to be wiped clean at normal intervals. Cleaning have to be accomplished by all the people inside the company, right from top management to the lowest.

STANDARDIZE: It referring to the practice of standardizing in the working region by creating strategies keeping in mind the end goal to keep up the achievements of the initial three. The workers need to guarantee their effort to clean, organize, clean

the work territory and newly discovered discipline are not gradually lost. Regular 5S reviews should be done and score against every S should be shown. Shows via photos should be stimulate. The emphasis is on visible management and 5S standardization.

SHITSUKE: It intends to promote, communicate and training in the 5S to guarantee that it is a piece of the organization's corporate culture. Until the point that the practicing of 4S activities become a habitual, it should ideal to keep continue practicing. On the basis via various trainings and the knowledge of the personnel the directors should explain the 5S importance. 5S board sheets to be confined at the workplace to update the 5S. This method allows to make a worker to be disciplined. 5S device has been executed in the association in the method for enhance the profitability, security and productivity. The 5S methodology can be applied out to maximum location scenarios in a least time period due to its easy nature. The photographs are taken before and after for implementation of 5S strategy in an association [11].

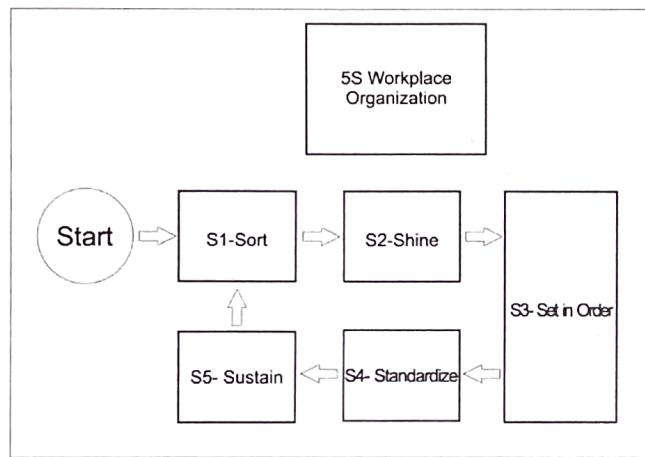


Figure.2. 5s methodology

IV. CASE STUDY

Small scale screen printing industry count on a vital part in Indian monetary. It has emerged as a powerful device in supplying relatively larger employment subsequent to agriculture. It generates 33% of the income of the Industry. Thus, for this study we have chosen the Government Central Press, 8th Mile, Mysuru Road, Bengaluru. This comes under Department of Printing, Stationery and Publications. It is one of the service-oriented department of the Karnataka state government body, which is mainly printing and supply for the Karnataka State Government, such as Forms, Letter Pad etc. After observing of the present situation in the organization, we have watched a few issues identified with the conditions, usage of different resources and unawareness of employing to higher productivity and so on. This Organization is facing some major problems. These major problems as follows:

1. Improper utilization of storage space for crude material, containers and completed items.
 2. The additional time required for the search and select instruments and equipment's.
 3. Low productivity happens, because of the time loss in searching down tools and materials.
 4. Improper place management.

5. Useful storage space being acquired by the unwanted materials.
 6. No very much well-defined space for storing the undesirable or rejected material.
 7. Improper communication between worker and top-level management.
 8. Unaware of the worker of various innovative techniques.

Before starting in Government Central Press, we scheduled the plan for this work. So first we started with literature review within 20 days we completed literature review. On the basis of literature overview, we began to search the place where can be 5S implemented in enterprise. We studied the company's layout and found out the area of implementation. Then we studied the 5S methodology and the whole study of 5S methodology was completed. Once, after studying 5S methodology we started implementing the methodology for 5S implementation. There were five stages in which first stage 1S: Seiri was implemented, 2S: Seiton was implemented, 3S: Seiso was implemented, 4S: Seiketsu was implemented followed by 5S: Shitsuke which was implemented. To complete the implementation work of 5S it took around 30 days. In Government Central Press we started our surveying first in which place raw materials are stored at the screen printing production unit. We surveyed the floor, communicated with the floor or plant in charge about the functioning of the production plant. Then we started the work by following the rules of 5S with step by step.

A. *Sorting*

The below figure shows the organization scraps, where all scraps are stored, but this scrap occupies the most space. The scrap items consist of Handmade Boards, Waste sheets, broken parts, and other waste.



Figure.3. Before sort

In sorting, distinguished the useful and un-useful items. Then all the scrap items were kept aside at one spot, which is just located beside the entrance of the Production Unit. Ultimately, we've separated the scrap and saved it besides the main doorway

vicinity and named it as a scrap yard. In this scrap yard we placed all the scrap at one time.



Figure 4. After sort

B. Set in order

After removing scrap, we set the useful materials according to order their respective sizes. We differentiated Screen frames, Squeezes, Inks, Solvents etc. according to the sizes colors and usage property.



Figure 5. Before set in order

Most of the time of worker is wasted in the tool and material sourcing and selecting. By this set-in order process, we have eliminated almost 05-15 % time of the worker. We made the different arrangement for the placing for tool and raw materials. The following fig shows the arrangement of the tools and materials.



Figure .6. After set in order

C. Cleaning

Cleaning is a third method of 5S technique; we implemented this method as we were proceeding with the sorting method.



Figure .6. Before floor cleaning

As we were proceeding the sorting, we were differentiating used & not used items and then we cleaned the whole place, then after this we reached every rack & then cleaned every rack for cleaning method. For cleaning, we removed all the items from their racks and cleaned racks. In this step, we clean all places in the industry. This step has been going to the neatness and shine in the industry.



Figure 7. After floor cleaning

D. Standardize & sustain

Standardize main goal is preparation of standard methods to continue to follow the first '3s' effectively in the organization. People need to practice standardize by starting with their own personal neatness in their work area. People need training to detect abnormalities and to correct them immediately. Standardize everything possible:

1. Establish guidelines for the team 5S conditions teams become knowledgeable.
2. Make the standards and 5S guidelines visual posted at process locations.
3. Maintain and monitor those conditions weekly 5S quick checks at process locations.
4. Maintained Production process sheet in which we kept the record of all the production and wastage occurrence for our reference. In daily routine, if worker notice unwanted thing at the workplace then a red tag is pasted on it and decision is taken for action. Maintain the record of it for one month. Thus, from the record we found out that the number of productivity increase and decrease the waste day to day.
5. Recommend the standard method for stacking or storing of the material which save the cost of storage.

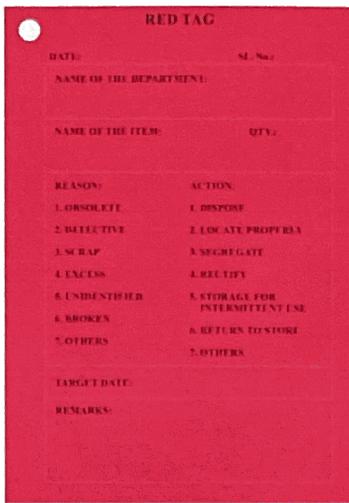
The fifth S stands for sustain, sustain is about the intellectual and physical disciplines required to keep the other 4S objects. It can achieve only with the help of co-operation between Assistant directors, Department managers, Machine operators and helpers.

E. Methods used in the audit

5S rating, calculates the efficiency and improvement in implementation. Simple 5S rating in this, we just list the questions related to 5S and give them a rating among 1 to 5. Red tag system in this we create a one format for all types of processing. It contains number of parameters which gives a thought regarding undesirable materials from the work environment, they are sited in the red label region and in red tag card all scrap details are noted down. Maintaining of daily production sheet in which we kept the record of all the red tags for our reference. In Daily production work, if workers observe the unwanted things at the workplace then immediately paste a red tag on its and actions are taken. From the maintain of one-month record of it, we found that unwanted things are reduced day by day.

Table .1. 5s rating

S O R T	No .	Check Items	Description	Score				
				1	2	3	4	5
	1	Material or broken part	Include any unneeded material or broken parts?					
	2	Machines or other equipment	Are there is unused machines or equipment's?					
	3	Tools or Solvents & Emulsions	Are there unused tool or Solvents around?					
	4	Unneeded items	It is obvious which items have been red tag.					
			Sub Total					

**Figure .8. Red tag card****Table.2. Check list of daily production sheet**

DAILY PRODUCTION SHEET						Job Type:	Docket No.:
Department & Product Family:						Finishing Specification	
Quantity:		Print Specification:				DATE:	Finishing Specification
Sl. No.	Docket No.	Docket Date	Department Name	Quantity Drawn	Quantity Dispatched	Wastage Accounted	Any Particulars of the Job
1.							
2.							
3.							

V. CONCLUSION

By executing 5S, enhance the quality, productiveness and efficiency of organization. The 5S is an effectiveness to manage apparatuses and materials which can enhance housekeeping, ecological conditions and wellbeing and safety standards and quality. This paper shows the 5S implementation at the small-scale screen printing industry. This implementation leads to the improvement of the productivity of the organization in many small things such as the reduction wastage; reduce production time, set standard in small scale, cleanliness, proper arrangement of the organization. This Japanese technique that's implemented within the industry creates cognizance about discipline and self-responsibility among all level of the business enterprise. Further implementation of lean apparatus to enhance productiveness, efficiency and control by computerized era.

VI. FUTURE SCOPE

To provide a cost-powerful and ecologically sound way of handling press waste via decreasing the amount of waste generated, maximizing the life of products with the aid of reusing each time possible. Reusing every single worthy material, arranging just what is fundamental and purchasing reused items. In future we can add the automatic machineries and Delivery System, Quality control Equipment's, Vertical Racks for Storage, AC and Drying systems in Production Department. From this we can reduce the Employees, improve the productivity and reduction of Wastage. Further implementation of lean apparatus to enhance productiveness, efficiency and control by computerized era.

VII. ACKNOWLEDGEMENT

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