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RESEARCH ARTICLE OPEN ACCESS

Implementation of 5S Methodology in a Small Scale Industry

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ABSTRACT
Implementation of 5S in a small scale industry provides significant changes in manufacturing process including minimization of wastes and improvement of working environment. This project aims to develop a small scale industries process improvement with cost reduction, increasing effectiveness and efficiency in the process by sorting, organizing, cleaning and providing standardization of the process in the ground level. Project result shows the different of the workplace between before and after the uses of 5S tools and elimination of wastes in the shop floor, improved productivity, incorporating less human effort, minimization of inventory, improved safety measures and producing good quality products in the most efficient and economical manner.
Keywords - 5S methodology, minimization of waste, productivity, working environment, safety

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I. INTRODUCTION

In the business world, customer needs are always changing, new technologies are continually being developed and generations after generation of new products appear in the market. Meanwhile, sales competition increase each year as companies strive to manufacture more sophisticated products at lower cost. 5S is a technique originated from Japan and it was first developed by Hiroyuki Hirano. The 5S approach is simple and universal. It works in companies all over the world. 5S activities provide essential support to successful improvements of a company such as: Shorter equipment changeovers, Just-In- Time inventory systems, Total Quality Management and Total Productive Maintenance.
The five S are defined as Sort, Set in Order, Shine, standardized and sustain. The two most important elements are Sort and set in order. The success of improvement activities depends upon them.

1.1 Sort

The first pillar of 5S corresponds to the just-in-time (JIT) principal "only what is needed, only in the amount needed and only when it is needed". The Red-Tag strategy is simple method for identifying potentially unneeded items in the factory or warehouse, evaluating whether they are needed and dealing with them appropriately.

1.2 Set in Order

The second pillar of 5S is set in order which means that items are arranged so that they are easy to find, use, and put back. This is important because it eliminates many types of waste in production and clerical activities such as motion waste, searching waste, the waste of human energy, the waste of excess inventory, the waste of defective products. The set in order pillar is the core of standardization. The workplace must be orderly before standardization can be implemented effectively. Visual controls at devices used as set in order to communicate the standards for how work should be done. The first step in implementing set in order is to decide on the appropriate location. Two set of principles are helpful in this decision: how to store jigs, tools, and dies; and the principle of motion economy. The principle of motion economy is help us to minimize waste. While eliminating motion waste is it is also important to analyze very carefully why this motion waste has occurred. This analysis can help us to discover method of manufacturing that approach the zero waste mark. The second step is to identify best locations once they have been decided. The signboard and painting strategies are both used to identify what should be go where and in what quantities. Other tools for identifying best location are the after 5S map the colour coding strategy and the outline strategy.

1.3 Shine

These activities keep everything swept and clean. One of the key purposes of cleaning is to keep all equipment in top condition so that it is always ready to be used. When the third pillar is not well implemented, the problems that arise include: poor employee morale, safety hazards, equipment breakdowns, and an increased number of product defects. There are 5 steps in implementing shine in the workplace. These are 1. Determine shine targets, 2. Determine shine assignment; 3. Determine shine

methods; 4. Prepare shine tools and 5. Implements shine. It is important that workplace cleanliness is the responsibility of everyone who works there. Two of the tools used in the implementation of shine are 5S schedules and the five- minute shine. Daily cleaning and periodic major cleanups are a habit, systematic inspection can be incorporated into the shine procedures. These turns "cleaning" into "cleaning inspection".

1.4 Standardize

The fourth pillar is standardized which is the result of properly maintaining the first three pillars- Sort, Set in Order and Shine. The basic purpose of standardized is to prevent setbacks into the first three pillars, to make them a daily habit and to make sure they are maintained in their fully implemented state.

The first part of implementing the four pillars involves making Short, Set in order and Shine a habit.

Fig.1 5S Process

1.5 Sustain

The fifth pillar, Sustain, means to make a habit of properly maintaining correct procedures over time. No matter how is implemented the first four pillars are, the 5S system will not work for long without commitment to sustain it. To sustain 5S activities in any company, the company management has important rules to play. Part of this role involves creating the condition that sustains 5S activities. Some of the tools to help sustain 5S activities in the company include: 5S slogans, 5S posters, 5S photo exhibits and storyboards, 5S newsletters, 5S pocket manuals, 5S department tours and 5S months.

II. LITERATURE REVIEW

The research papers related to implementation of 5S methodology in manufacturing industries & related research from various international journals have been considered for the review. Some of these are: Priyanka Rai (2016) presented a case study on "Effectiveness of 5S implementation on organizations performance". This paper aims to identifying the effectiveness of 5S implementation on organizational as well employee's performance and their attitude towards 5S. The results show that 5S is an effective tool for improvement of organizational performance, regardless of organization type, size, its production or its service.

Soumya R. Purohit, V. Shantha (August-2015) presented a case study on "Implementation of 5S Methodology in a Manufacturing Industry". This paper highlights the step by step implementation guideline required for successful exercise of 5S as a part of the daily management practices. It shows the method to implement each pillar of the 5S Methodology in the industry in order to bring about an overall improvement in its performance.

Vibhor Kakkar, Vijay Singh Dalal, Vineet Choraria, Ashish S. Pareta, Anmol Bhatia (2015) presented a case study on "Implementation of 5S Quality tool in manufacturing company". This paper presents the implementation of 5S in a manufacturing company & 5S rating system was used to audit all changes in the company. Implementation of 5S enhanced the efficiency of the workers & ultimately the productivity of the company is enhanced to 91%.

Prof. Saad Shaikh,Ansari Noor Alam, Khan Naseem Ahmed, Sawant Ishtiyak, Sayyed Ziaul Hasan (April'2015) presented a case study on "Implementation of 5S Practices in a Small Scale Organization". They described the problems being faced by the small scale industry due to the defects in materials, down time in production, working conditions, housekeeping etc. Their result is considerable in improvements of environmental performance beside with improved housekeeping and health and safety

III. SCOPE OF THE PROJECT

The scope of this project is to implement 5S tools and measure the performance improvement in in a small scale industry at Dewas, Madhya Pradesh, India. 5S is Lean manufacturing tool for cleaning, sorting, organizing and providing necessary ground work for work place improvement.

The scope of this project is:

To eliminate waste, improve productivity, incorporating less human effort, minimize inventory, identify abnormalities and improve safety measures.

IV. METHODOLOGY

Poor workplace conditions may lead to rising of wastes such as time spent in searching for needed items or motion to avoid obstacles. It may also lead to raising an accident. Implementation can be started by establishing good workplace and

housekeeping conditions. 5S is lean manufacturing tool for work place organization and it is fundamental to the implementation of lean strategies. 5S is a reference to five Japanese words which described standardized clean up.

Here auditing methodology is used before and after training and analysis of marks which scored in audit of every S. The analysis gave me the clear picture of the improvement in the system of 5s.

4.1 5S Flow Chart

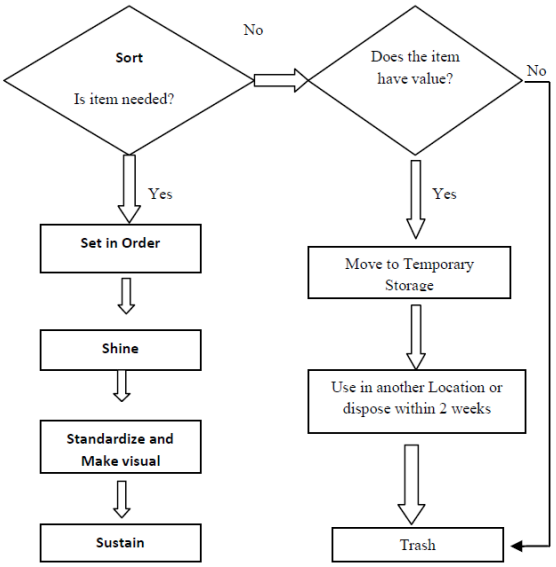


Fig.2 5S Flow Chart

4.2.0 Preparation of phase wise Action plan/roadmap to 5S implementation to achieve the targeted benefits.

Phase-1: Preparation of Diagnostic Study Report (DSR)

Phase-2: 5S training, zone creation, zone leader appointment, First 5S audit & monthly audit of 1S & 2S.

Phase-3: Initiating 3S implementation, creating cleaning standards for machines and zones, also creating check sheet for 1S, 2S & 3S with daily check points.

Phase-4: Initiating 4S and continue the activities for standardized shop floor and eliminating wastes from the process.

Phase-5: Making Standards and SOP's. For sustenance of 5S, regular audit and review mechanism accepted and creating more competitive in the zone, reward programme for 'Best Zone" and "5S person" award initiated.

V. RESULTS

After auditing the 5S, result of 5S score improved from the baseline level of 42% to 75.8%.

Fig. 3 before 5S Implementation

Fig. 4 after 5S Implementation

Fig. 5 before 5S Implementation Finish Goods store

Fig.6 after 5S Implementation Finish Goods store

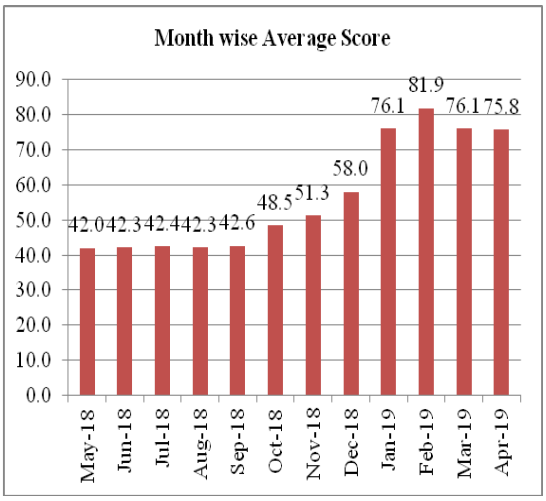
Fig. 7. Stationary and yearly retention records are kept in open self

Fig. 8 Installed separate drawer for keep document safe and clean

Fig. 9 before 5S Implementation

Fig. 10 after 5S Implementation

5.1 5S Housekeeping performance



5.2 5S result

Sl. No.	Description	Unit	Before 5S	After 5S
1	Labour Productivity	Ratio	1.36	1.84
2	Capital productivity	Ratio	0.68	0.98
3	Annual Saving	Rs.	0	15 Lakh
4	5S House keeping	Ratio	42	75.8

Table 1. Showing the result

VI. CONCLUSION

Implementation of 5S methodology has been proved that

a. significant improved in labour productivity
b. Improved capital productivity
c. Reduces wastes
d. Minimize inventory cost,
e. Improved working environment and
f. Identified Abnormalities and improved safety measures.

Implementation of 5S is a continuous process. Top management to shop floor, every person should be involved and for this purpose training on 5S, best 5S zone, best 5S score person may be awarded. Also there is a good scope to introduce Kaizen, Kanban system.

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