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PRODUCTIVITY IMPROVEMENT BY USING 5S RATING REVIEW

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Abstract— In order to obtain competitive level of productivity in a manufacturing system, efficient machine arrangements and laminar production flow are of considerable importance. 5S is a systematic technique used by organizations comes from five Japanese words; Seiri (sort), Seiton (set in order), Seiso (shine), Seiketsu (standardize), and Shitsuke (sustain). This system helps to organize a workplace for efficiency and decrease wasting and optimize quality and productivity via monitoring an organized environment. This strategy involves the study and change in the work place of a manufacturing industry post implementation of 5S. This strategy helps in minimizing the time of manufacturing and also increases the area of work place. The main purpose is to assess the implementation of 5S and development of the 5S Activity Checklist in manufacturing companies. The 5S study covers the following areas: identifying problems, looking into critical success factors, their outcomes and recommendations. 5S consists of five phases or activities provide a basic foundation for any organization's Lean initiative for continuous improvement. The study also assesses its own approach, recommends alternative strategies for this project in the future and makes recommendations for expanding the scope of this exercise to other areas of the company and serves as a platform for achieving tangible and quantifiable gains in productivity.ECT management decided to get an integrated facility which can cater all the model varieties and their respective demand in a very productive way. This was aimed for a substantial savings in Head count (HC) deployment, savings in Power & fuel, savings in material handling space and improvement in throughput time.

Keywords: Productivity, 5S development, Lean Strategy, Packing line.

I. INTRODUCTION

One of the most common practices carried in modern manufacturing facilities is the implementation of 5S philosophy. 5S, Japanese improvement ideology, is a lean manufacturing tool directed at improving the overall efficiency and consistency. The study was based on a Final Packing line. Due to increase in volume of demands in recent year, the work stations were not fully organized as desired, resulting in loss of productivity, time, and quality to some extent. This research study was aimed at improving the Production line flow by using effective and efficient lean manufacturing tools (5S in particular), thereby resulting in increased productivity, run time, quality, and adapting to the 5S culture as a means for continuous process improvement. The objective is to minimize some criteria such as the total investment cost, total number of workstations, cost of operations (tool, men power, energy, etc.), or the cycle time [1]. Today, it is increasingly recognised that 5S management techniques enhance productivity and competitiveness. In order to become a World Class Benchmark, an organisation has to go through a continuous and systematic process to:

- Identify, reduce and eliminate waste.
- Enhance teamwork.
- Enhance operation effectiveness in a better working environment.
- Form the basic advanced model for Productivity and Quality Improvement.

The aim of this paper is to implement 5S methodology and measure the performance improvement in Emerson Climate Technologies (India) Ltd. Company deals with manufacturing various types of compressors. Company faces high manufacturing cost and loss of quality due to bad working environment and inefficient process flow. Company makes plans to reduce manufacturing cost and increase productivity. Manufacturing division mainly faces material handling and transportation problems due to improper placement of material, man and machines. Company cannot meet customer's demand and works inefficiently, because everyone in the company is not used to a clean working environment and all inventory interrupts the process flow; therefore the major objective of this study is to help Emerson Climate Technologies Ltd to rearrange and reset the working environment and enhance the process flow by using 5S tools.

1.1 PROBLEM STATEMENT

Today's industries are experiencing a competitive environment and striving hard to find methods to reduce manufacturing cost, waste and improve quality. The manufacturing infrastructure in plant has zigzag operation process flow; layout is suitable only for batch type productions. Emerson Company's manufacturing division mainly faces material handling, and transportation problems due to improper plant layout. Company has difficulty in meeting customers' demands because of time consuming, and non-efficient process flow. The problem company has is tools and components are set without being categorized. The result is personnel have poor workplace surroundings, Transportation and this makes the company experience lower efficiency, decrease in productivity and makes it hard to reach their customers' demand.

1.2 5S STRATEGY

5S is used by five different Japanese words which are Seiri, Seiton, Seiso, Seiketsu and Shitsuke and these focuses on effective workplace and work procedure.

i. Seiri

Seiri, which is sort in English, helps the company or any organization to distinguish the items into two different categories: used and non-used.

ii. Seiton

Seiton means set in order and it is focusing on making efficiency in the workplace by rearranging all items in the company which will promote work flow.

iii. Seiso

Seiso means to clean and clear. This step focuses on to clean and clears any item and working environment.

iv. Seiketsu

Seiketsu means standardize. To keep the first three Ss as the standard all the time and extend to personnel's daily working.

v. Shitsuke

This final S typically stands for self-discipline or sustains [2].

2.1Types of Waste

a. Overproduction

• Producing more than the internal or external customer needs

• Producing sooner than the internal or external customer needs

Why is it waste? Overproduction results in obsolescence, handling damage and undetected defects. It requires extra handling, extra space, extra interest charges, extra machinery and extra labour.

Causes: Lack of communication, inappropriate reward system, focus on keeping busy rather than meeting customer needs

b. Delays (waiting time)

• People waiting for: Machinery, Tooling, Raw Materials, Maintenance, etc.

• Machinery waiting for: Maintenance, People, Materials, Tooling etc.

Causes:Inconsistent work methods, long changeover times

c. Transportation

• Moving materials or people over long distances can double or triple handling

Causes: Poor layout, lack of co-ordination of processes, poor housekeeping, poor workplace organization, multiple storage locations

d. Processes

• Unnecessary or inefficient processing e.g. removing burrs caused by dull tools

Causes: Inappropriate tooling or equipment, poor tooling maintenance, failure to combine operations

e. Inventories

• Inventory hides problems and causes extra handling, extra paperwork, extra space and extra cost

Causes: Long changeover times, unreliable equipment, unbalanced flow, incapable suppliers, inaccurate forecasting, large batch sizes

f. Motions

• Any motion of people or machines which does not add value to the product or service

Causes: Lack of workplace organization, poor layout, inconsistent work methods, poor machine design

g. Defective products

• Scrap, rework, customer returns, customer dissatisfaction

Causes: Incapable processes, insufficient training, lack of standardized procedures

[5].

3. Methodology

Methodology to be adopted for identification of waste elimination area and key metric improvement plan is

1.5S Rating Method the process and identify key manufacturing lines for 5S implementation

- Identify process waste elimination area
- Productivity of man and machine
- Quality, floor Space utilization

2. Establish a foundation of improvement 5S+1.

3. Identify areas for KAIZEN –Continues improvement for cost reduction, quality improvement, inventory reduction.

4. Root Cause Analysis of problems that find on the Final Packline.

3.1Action plan

Existing line contains following action plan:

Table 1 Action plan

Sr. No.	Activities	Observation	Effect on line	Action Taken to
1	Existing line observation done with discussion done on station wise ongoing process.	Many unwanted material on the line	Causes material handling problems	Seiri action to be taken for conveyor line. Material sorting unwanted material and required material to be categorized. Cleaning schedule and materials required planning
2	Existing line observation done with Collection of Cycle time, operation time and visual data.	Workstation having material is not properly ordered .	Requires more time to find tools and material.	
3	Preparation of mechanical time plan for dismantling, shifting & assembling of machines and conveyor system at new location	Over all system found full of dust	Malfunctioning of logic and Jamming of conveyor rollers	
4	Line time ,throuput time and TAKT time collection	Line rate is not uniform	Bottlenecks are there	By time Study remove it by proper methodology
5	Checking of conveyor chain tension. Tightening of turn table plates, locking cylinders, pop units, tightening of rollers. Par alley electrical wiring and programming	Some sensors were not working in logic	This will affect the logic by creating malfunctioning and would also cause accidents and damaged of system	Taken into working and needed logic checking and system units once in a month

S4 Shikestu (Standardize) Rating:

Shiketsu Rating=Sieri Rating+Seiton Rating+Seiso Rating/3

S5 Shitsuke (Sustain) Rating:

Shitsuke Rating: Sieri Rating+Seiton Rating+Seiso Rating+ Shiketsu Rating/4

Conclusion

The present paper will demonstrates the implementation of 5S. Lean manufacturing is one of the options to reduce non value-added activity (wastes) and improve operational efficiency of the organization. The efficient implementation of 5S technique leads to subsequent improvement in productivity of the manufacturing plant. The 5S improves environmental performance and thus relate primarily in reduction of wastes in manufacturing. It promotes neatness in storage of raw material and finished products.

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