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A Plan for the Implementation of 5S in an Assembly Department

Fernando MBSR* and Prabodanie RAR

Department of Industrial Management, Faculty of Applied Sciences, Wayamba University of Sri Lanka

* sam.ruvi@gmail.com

ABSTRACT

This research was carried out as a 5S implementation plan for an Assembly Department with the objective of improving housekeeping and productivity. This study was conducted in a sewing machine assembly department. Process analysis was used instead of data analysis. Information was gathered by observing and inquiring. It was found that there was no proper layout in the assembly department. There was no proper labeling or storing method. So accidents could happen. Difficulty of finding items and uncleanliness of the department were the problems that were often encountered. This study basically, investigated the need of a good housekeeping method. The suggestions for a plan of 5S implementation were given through this research. Feasible suggestions were given under each 'S' of 5S. Disposing unnecessary items, keeping necessary items systematically, keeping a clean environment, standardizing 5S methods were some main suggestions to implement 5S. Further, labeling methods were suggested. Measures for sustainability were also proposed. These suggestions can be implemented step by step to improve good housekeeping. Then the efficiency and effectiveness of the Assembly department will be improved.

KEYWORDS: 5S, Housekeeping , Layout, Productivity, Suggestions

1 INTRODUCTION

5S is a housekeeping method which provides a foundation for implementing other management tools. Since 5S was introduced by Takashi Osada in the early 1980s, it is believed that applying 5S technique could considerably raise the environmental performance in all fronts of any organisation especially housekeeping, health, safety etc. 5S is the acronym of five Japanese words which stand for

- Seiri (organization),
- Seiton (neatness),
- Seiso (cleanliness),
- Seiketsu (standardization) and
- Shitsuke (discipline) (Ho, 1997; Sui-Pheng and Khoo, 2001).

Further, 5S implementing opportunities were studied and suggestions were given to implement 5S to the Assembly department. 5S is a solution for unclean, unsafe environment and improper layout and wrong way of arranging things.

This study was carried out in a leading sewing machine manufacturer of Sri Lanka which had not implemented any housekeeping methods before.

2 LITERATURE REVIEW

5S is a management tool from Japan that focuses on establishing a quality environment in an organization, ensuring adherence to standards and in the process, fosters the spirit of continual improvement. It focuses on five management techniques that are the foundation for any organization's competitive initiative (Kumar & Kumar, 2012).

Before a company implements the 5S, they should know 5S and benefits of 5S. People do not need a high education to run 5S. Employees in any position in the organization can certainly do it. Everyone in the company should understand and practice 5S (Skaggs, 2010).

2.1 Sort

First, divide all tools or materials into specific areas for sorting: cannot be used,

unlikely to be used, and tools or materials that can be used (Hirano, 1995). Company can divide the tools or materials into categories: rarely used items, occasionally used items, and frequently used items. In sorting, criteria results should obviously be seen:

1. What items needed and not needed.
2. Red- tag targets, frequency, and responsibilities and
3. Disposal procedure (Dennis, Pascal, Shook & John, 2007)

2.2 Set in Order

This means preparing the necessary items neatly and systematically. During the set in order stage employees place all the tools and supplies in locations where they are needed (Landry, 2010). The items can be set into three different categories: (1) low usage, (2) medium usage, and (3) high usage. The items that are defined as low usage can be kept at a far off work area. The medium usage items can be set in a place nearby. For the high usage items, they should be kept closest to the main working place (Smith, 1977).

2.3 Shine

Shine is the process of cleaning everything in the area and checking all the machines or tools (Landry, 2010). Cleaning must be done not just after working, but on a regular schedule to remove dirt and dust from the workplace (Skaggs, 2010).

2.4 Standardize

Standardizing is the process of keeping everything in its place (Landry, 2010). This should be done at the end of every shift and then tools and supplies will not be missing. This will allow anyone to access the tools or supplies as needed. Breyfogle (2008) describes that, "working manners, tools and identification markings are standardized and recognizable throughout the factory. 5S methods are applied consistently in a uniform and disciplined manner".

2.5 Sustain

This is the hardest step of 5S. Sustain is the most difficult step because it requires continued diligence (Paulsen, 2010). The checklist helps everyone in the organization to maintain and continue all actions with first four Ss to improve work (Breyfogle, 2008).

This S can be achieved by building awareness of the importance of 5S through retraining, reward and recognition of the efforts of staff and use of techniques / approaches / strategies to sustain activities. This S requires self-discipline without which it is impossible to maintain consistent standards of quality, safety and cleanliness. (Kumar & Kumar, 2012).

Kumar & Kumar, (2012) stated some of the salient benefits in their research such as workplace becomes cleaner and better organized, lead-time reduced, changeover time reduced by streamlining operations, breakdowns and minor stops eliminated on production lines, defects reduced by mistake proofing, clear methods and standards are established, space usage is improved, and customer complaints are reduced.

3 METHODOLOGY

This research focused on implementing 5S in the assembly department. 5S implementing opportunities were studied and feasible suggestions were given through the research study.

Primary data collection methods; observations and interviews were used. Charge Hand (CH) and Quality Controller (QC) were asked questions to gather information. Assembly department was visited and observed to notice the important things.

Current process analysis was done by using the Process Flow chart of System Engineering. Further suggestions were given under each S of 5S for easy reference.

4 PROCESS ANALYSIS AND RESULTS

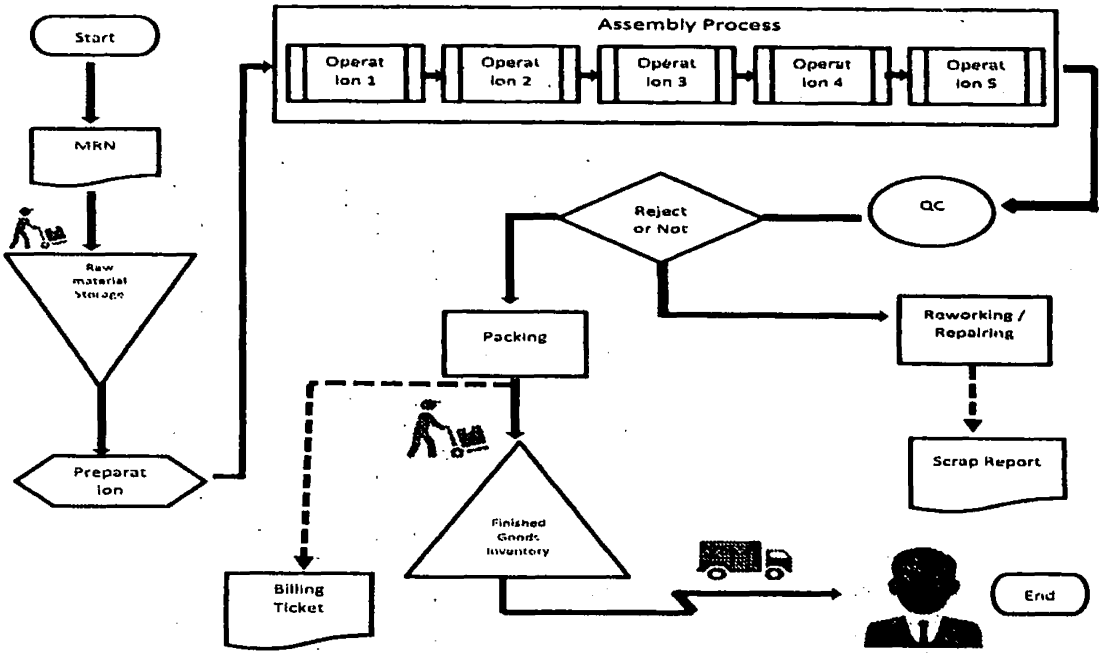

Figure 1: Process Flow Diagram

Assembly line starts the process according to the order given by Singer Sri Lanka PLC. That order is given for once a month.

After the Material Requisition Note (MRN) was prepared by the accounts department, stores issue raw materials. Then plan is prepared by the CH for assembling process by considering available human resource. Whole assembling process was divided to separate no. of operations. Quality checking was done after all the operations were completed.

During the operations, machines which had some errors were kept on the floor. Some problems were caused when transferring these machines for the relevant operation.

Machines were sent to the packing process after QC's acception. Then the company collected those finished machines.

Rejected items were sent to the reworking/ repairing area.

All the documents were in one file. Tools and supplies were missing sometimes and could not be found easily.

Layout of the department was not efficient which was shown in Fig. 2.There was no enough space within the assembling areas [1], [2], [6]. And packing materials and raw materials were stored on the ground not in a specific area [7].

regifoam cases and cardboard boxes were stored in the packing area [5]. Due to that, main entrance and entrance of the assembling area were covered and accidents could have happened. That place was not suitable for the packing area. There was a storing room which was not being used properly. The Rejected items storing area [9] was not used since there were no more rejected items. There were machine holding racks [10] in that area without arranging.

Reworking/ repairing area was also full of many items to be repaired. So due to those items and storing items, walking path was covered many times.

There was no any proper cleaning method and no proper method to dispose garbage of this department. So cardboard, polythene, cloth pieces and metal pieces were dropped everywhere. And also there were oil and grease spills on the floor. CH

and other responsible persons were not careful about the cleanliness, neatness, and other factors.

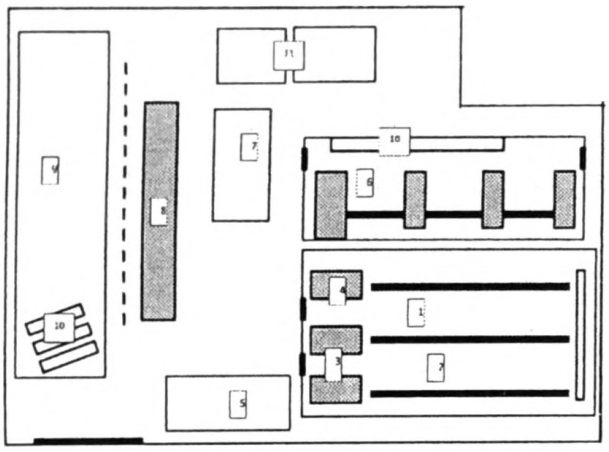

Figure 2: Layout of the Assembly Department

The basic and the most suitable solution is to implement 5S to the Assembly department

The proposed layout is shown in Fig. 3. Vacant places in the department will be used. The area where rejected machines are kept is used as a reworking area. A small space is allocated to hold rejected items [10]. Then the packing area is shifted to reworking area. Now both assembling areas can be expanded or QC table can be shifted out of the assembling area.

According to the new layout, there will be free spaces to walk through without having any accidents.

Accidents which were shown in the Table 1 will be minimized and safe working environment will be built.

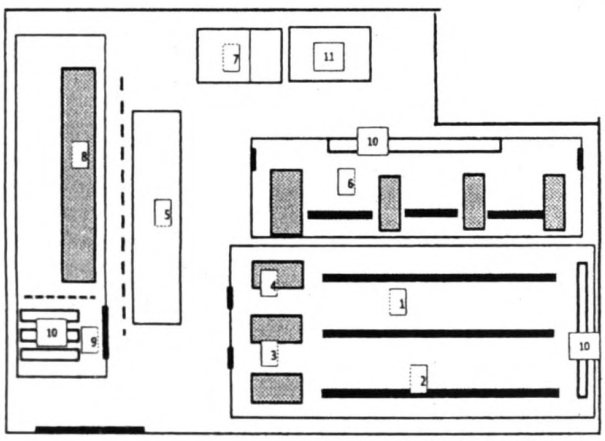

Figure 3: Proposed Layout of the Assembly Department

Table 1: Details of Accidents

Type of Accident	No. of Occurrence
Overexertion	11
Fall on same Level Surfaces	6
Bodily Reaction	3
Struck by Object	18
Struck against an object	12
Repetitive Motion	3

4.1 Sort

It is needed to dispose unnecessary things. Company can introduce their own method. Disposal items having some sales value can be tagged in yellow colour, items that do not have sales value and that are easy to dispose can be tagged in green colour and items having no sales value and costly to dispose can be tagged in red colour and moved items can be tagged in blue colour.

4.2 Set in Order

Packing materials and machine components can be divided like high usage, medium usage, and low usage. Then most frequently used items can be stored near the entrance, the items which are used occasionally in the middle and rarely used items in the corner of the store room [7]. It is essential to label all the component sets and packing materials of each machine type. Small tool boards can be kept in each operation and main tool board can be kept in the department. Separate files should be kept to store important documents and those documents can be stored in a sequential order.

4.3 Shine

Company can use garbage bins with separate colours. They can use a green color bin for dirty clothes, blue color bin for papers, and yellow color bin for polythene and so on. Secondary containers can be used to store grease and machine oil. It is better to

assign casual employees to clean the department.

4.4 Standardize

Labeling method should be used continuously. It is very useful to find things without spending much time. Employees are asked to keep tools and other things in their reserved places. This should be done at the end of every shift. In this way tools and supplies will not be missing. Time for searching will be reduced because of the labeling method.

4.5 Sustain

And also once 5S is implemented, it should be continued to gain maximum benefit. Employees will be trained on the importance of 5S. Employees can gain rewards and recognition when they practice 5S.

More responsibilities can be assigned to the CH and QC of the department to check whether 5S is carried out by the employees. Training program can be held thrice a year and improvement of employees can be considered.

5S strategies can be displayed within the department. Then these displayed things will be seen by the employees every day and their motivation will be increased.

5 DISCUSSION AND CONCLUSION

This research is about a plan to implement 5S in the Assembly department. 5S is the driver for the success of quality tool applications. After implementing 5S, the company will be able to reduce accidents, improve efficiency and effectiveness. This research is the path to that target.

According to this research, layout of the Assembly department should be changed to minimize accidents and dirtiness. So the attitudes and behaviors of the employees in the company should be changed. Improper layout, not having proper labeling method and a storing method, not having proper cleaning system and disposal of unnecessary things are the main reasons for the problems in the department.

Finally, it can be concluded that many benefits can be gained after implementing 5S and this research helps to solve problems of the Assembly department.

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