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## 5S methodology implementation

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### ABSTRACT

*5S is one of the most widely adopted techniques from the lean manufacturing toolbox. It is an environment that has a place for everything and everything in its place. When you need it. 5S gives you a workplace that is clean, uncluttered, safe, and organized. People, processes and products begin to flow at the drumbeat of the customer.*

**Keywords:** 5S, Workplace, Toolbox

### PROBLEM STATEMENT

The workplace is populated with a lot of clutters and non value adding items and tasks. There is a lot of problem in workers to find a proper storage for the final products in the dispatch area and they tend to place it where ever they find a void space.

### OBJECTIVE

To create a work environment which is safe, healthy, productive, high quality, comfortable for employees to work, use only the required sources, easy to manage as well as profitable. Also, Accident\Incident Prevention, Pollution Prevention, Productivity Improvement, Cost Reduction Energy Conservation, Downtime Prevention, Working Atmosphere as well as motivation in employees is being considered as the main focus.

### LITERATURE REVIEW

Japanese Term	American Term	Definition
Seiri	Sort	Sort through materials, keeping only the essential items needed to complete tasks. (This action involves going through all the contents of a workspace to determine which are needed and which can be removed. Everything that is not used to complete a work process should leave the work area.)

Japanese Term	American Term	Definition
Seiton	Set Order	Ensure that all items are organized and each item has a designated place. Organize all the items left in the workplace in a logical way so they make tasks easier for workers to complete. This often involves placing items in ergonomic locations where people will not need to bend or make extra movements to reach them.
Seiso	Shine	Proactive efforts to keep workplace areas clean and orderly to ensure purpose-driven work. This means cleaning and maintaining the newly organized workspace. It can involve routine tasks such as mopping, dusting, etc. or performing maintenance on machinery, tools, and other equipment.
Seiketsu	Standardize	Create a set of standards for both organization and processes. In essence, this is where you take the first three S's and make rules for how and when these tasks will be performed. These standards can involve schedules, charts, lists, etc.
Shitsuke	Sustain	Sustain new practices and conduct audits to maintain discipline. This means the previous four S's must be continued over time. This is achieved by developing a sense

Japanese Term	American Term	Definition
		of self-discipline in employees who will participate in 5S.

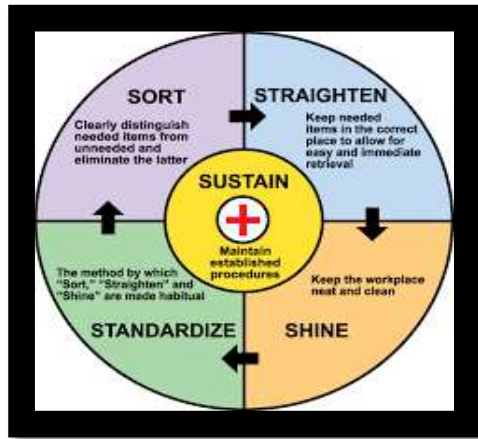


Fig. 1: 5S circle

The 5S implementation should be carried out by means of a Kaizen activity. A team should be established, whose purpose should be to implement the first 3Ss on the machining tool, with the most reduced cost and time, and respecting the 5S concept. The first rule is “step-by-step” implementation, namely never proceeding to the following “S” without meeting all of the previous “S” requirements.

**Need of 5S in industry**

In contemporary competitive environment, industry has to increase its demand without increasing the sale price of their product. This has forced the manufacturing and service organisations to improve the effectiveness of production and other related operations to improve the bottom line by reducing their costs. Thus to achieve the aforesaid targets, there is an emergent need of holistic adopting 5S principles in the industry. 5S has emerged as an effective foundation for various lean manufacturing improvement drives for eliminating waste from the manufacturing process and improve the organisation’s bottom line by affecting sustained improvement in organisational functions. Success factors for implementing 5S methodology

- Top management participation can create an environment that supports the implementation of 5S. Without the support of management, hesitation and resistance will kill the initiative. Proper understanding, commitment and active involvement of the top management are needed for implementation of 5S.
- There should be proper training (internal and external) for the entire workforce from top to bottom of the organisation. This provides motivation to the employees for continuous improvement.
- There should be culture for team work, functional team and autonomous improvement of the team. Autonomous culture develops a habit of doing one’s work by him.

**METHODOLOGY**

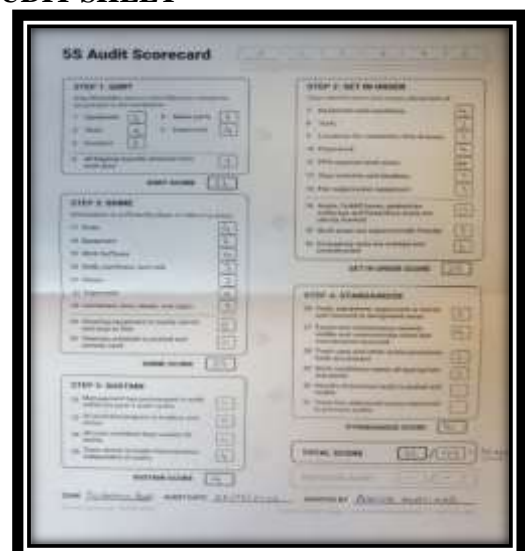
- A 5S internal audit was conducted at all the workstations. The problems detected during the 5S audit were mapped. Improvement measures were proposed. A plan of the work to be done was drafted.

**DATA COLLECTION AND ANALYSIS**

The table given below shows the problems identified as well as the possible solutions for the same.

Problems identified	Possible solution	5S STAGE
Unused and unnecessary items kept at production cell	Application of red tags is necessary for these items.	1S
Plastic containers scattered near the injection moulding machines	If no use, it can be eliminated.	1S
Fire extinguisher was not placed in its proper place	Proper positioning should be done and on high priority as safety is first.	2S
No proper place for moulds of injection and blow moulding machines	Rack and compartment system can be used.	2S
Unused racks are kept in the dispatch area	If no use, it can be eliminated.	1S
Raw material is found in the middle of dispatch area which is covering the trolley way.	Proper sorting should be done in the raw material storage area.	2S
Injection moulding finished products are not sorted properly in the dispatch area.	Compartments can be provided to segregate the final products and proper labelling should be done.	2S
Mould lifting crane is kept in improper position	Layout needs to be modified.	2S
Tool tray has no proper place and no cleaning equipment were found.	Proper area can be provided and shadowboard can be made for ease.	3S

**5S AUDIT SHEET**



## IMPLEMENTATION OF 5S METHODOLOGY IN PRODUCTION CELL

### (1S) SORT- step 1

In this first step, workers sort everything in a workspace into what is and what is not needed. Some use a system called “red tagging” in which every item not necessary for a process gets red-tagged during the sort phase. These items are set aside and evaluated later. Workers store seldom used items nearby, but not at the workstation. They discard unsafe items and clutter.

We need to eliminate non-essential workplace items

- Reduce workplace clutter
- Red Tagging
- Disposing unused items

5S Sorting involves five steps mainly:

#### 1. Cleaning

Purpose of sorting is to identify unnecessary items and eliminate it from the workplace, to do this cleaning is required in the workplace.

#### 2. Classifying

As you are cleaning up you’ll find tools, equipment, materials and supplies which we need to classify as scrap or in use items.

#### 3. Ownership

In some cases, as items are found or classified their ownership may be obvious. For example, pallets might be collected in one area so they can be returned to the shipping department.

#### 4. Red tagging

If an item cannot be identified or classified, or if ownership cannot be determined, the it should be red tagged.

#### 5. Recycling

Red tagged items not claimed after reasonable amount of time, such as 30 days, may be recycled, disposed of, or if they are still useful they can be recycled.

## AUDIT OBSERVATIONS AND POSSIBLE SOLUTIONS

While conducting the audit, corrugated boxes were found near most of the injection moulding machines.

- a) These boxes were blocking the operator’s area of work. No proper place was provided for storing these unused boxes.
- b) These boxes can Red tagged and stored or can be eliminated if not in use at any point of time.

- Unused steel racks were kept in the dispatch area

- a) If these racks have no proper use they can be just eliminated from the workplace.



Unwanted corrugated box lying near the workplace area



Unused steel racks were kept in the dispatch area

POSSIBLE SOLUTION:



Example of red tagging

### 2S SET IN ORDER- step 2

Set in Order, follows the advice: “A place for everything and everything in its place.” Workers position items based on use, with frequently needed items kept closer at hand. Every item that made it through the Sort stage is given storage space. In some cases, workers can use color-coded labels to easily identify storage spaces.

The Set in Order phase creates an ergonomic, organized and uncluttered workspace where employees have what they need close at hand and know where every item is stored. This creates a less stressful work environment.

## AUDIT OBSERVATIONS AND POSSIBLE SOLUTIONS

- Fire extinguisher was not placed on proper location
  - a) Proper positioning of such items should be done and on high priority as safety is first.
- No proper place for moulds of injection and blow moulding machines
  - a) Rack and compartment system can be used.
- Raw material is found in the middle of dispatch area which is covering the trolley way.
  - a) Proper sorting should be done in the raw material storage area.
- Injection moulding finished products are not sorted properly in the dispatch area.
  - a) Compartments can be provided to segregate the final products and proper labelling should be done.
- Mould lifting crane has been given no proper space.
  - a) Layout needs to be modified.



No proper place for moulds of injection and blow moulding machines



Mould lifting crane has been given no proper space



Fire extinguisher was not placed in its proper place

POSSIBLE SOLUTION:



Example of sorting using shadow board

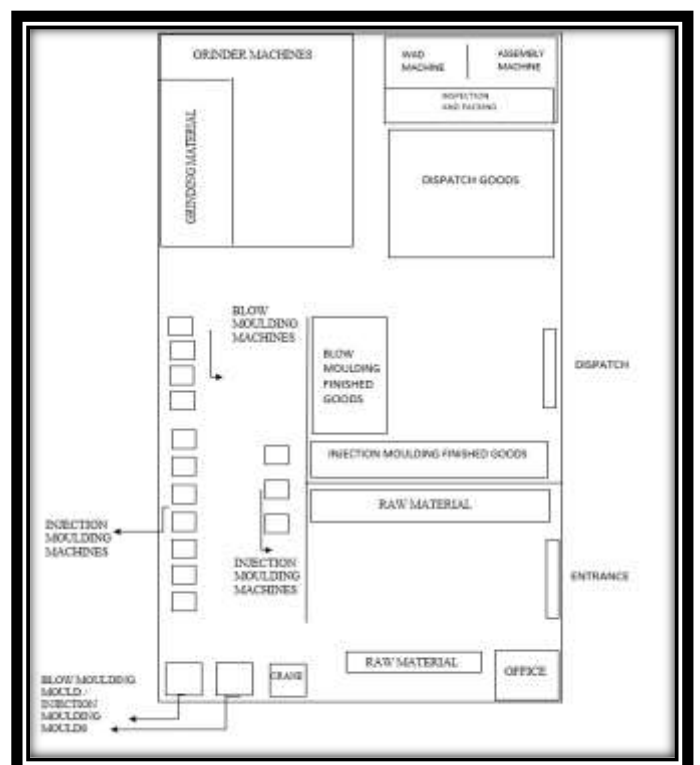


Raw material is found in the middle of dispatch area which is covering the trolley way

COMPANY LAYOUT CAN BE MODIFIED AS GIVEN BELOW:



Injection moulding finished products are not sorted properly in the dispatch area.



**(3S) SHINE- step 3**

With the clutter gone and storage space organized, it's time to clean. After a thorough initial cleaning, workers clean the station every day (sometimes twice a day). This maintains the gains made in the Sort and Set phases. Cleaning includes storage areas, machines, equipment, tools and work surfaces. The Shine phase creates a more pleasant environment for employees, who no longer have to combat dust, dirt and clutter. Cleaning the area every day also leads to a higher level of employee buy-in for the 5S method.

**AUDIT OBSERVATIONS AND POSSIBLE SOLUTIONS**

- No cleaning equipment were found near the production cell
- a) Proper place can be provided and shadow board can be made for ease of access to cleaning equipment.
- Machines were found coated with dust and oil stains which were not cleaned by the operator or any cleaning staff.
- a) During periods of work stoppage, everyone can spare ten minutes make the workplace and machines shine.
- Faded and dirty floor lines were spotted
- a) Redraw or the faded floor lines to avoid accidents



*Machines were found coated with dust and oil stains which were not cleaned by the operator or any cleaning staff*



*Faded and dirty floor lines were spotted*



*. No cleaning equipment were found near the production cell.*

**POSSIBLE SOLUTION**

5S Shine phase in application



*Shine phase in application 1*



*Shine phase in application 2*



*Shine phase in application 3*

**(4S) STANDARDIZE- step 4**

**(5S) SUSTAIN- step 5**

In Sustain, the goal is to stick to the new rules. Workers keep the new standards in place and practice the first three steps every day until they become automatic and the accepted way of doing things. This final step often proves the most challenging. However, without sustaining the new system, all the cost and effort that went into creating it will prove pointless.

5S audits should be taken after frequent intervals and the process should be institutionalized. Participation of each and every worker and employees must be mandatory for successful implementation and visible outcome of this methodology.

**CONCLUSION**

When the suggested work and organization processes will be increasingly executed, the operators' performance and productivity can be enhanced. This is a direct consequence of workers being able to find everything faster, without making mistakes, in a more ergonomic and safer manner, thus executing their tasks more effectively. The result of these changes will be reflected in minimum levels of waste material,

as well as in reduced labour and times which, in turn, will lead to a greater reliability of delivery dates and, ultimately, customer satisfaction.

Through these improvements, one can also observe higher levels of morale and pride in the workers. There will, furthermore, be a visible improvement in the work environment and in internal communication/human relations. The existence of more room, better storage organization, as well as several other changes, all will contribute to making the workstations safer by limiting the chances of accidents. It is undeniable that all of these aspects are essential to everyone's sense of wellbeing. There is great relevance in highlighting that these parameters are of great importance in a philosophy of continuous improvement: only by having motivated staff can one possibly hope to achieve positive results. One must also highlight the importance of promoting training activities to discuss these Lean techniques with operators; this is fundamental to the process since workers are, unquestionably,

the drivers of change. It is also expected that in the future, through discipline and a compliance with the proceedings for the 4S and 5S stages, the company will achieve a greater capacity to criticize and organize, so that the cells will not return to their previous state of neglect.

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