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**FINAL YEAR PROJECT**

**PROJECT TITLE: IMPLEMENTATION OF 5S TOOLS/ METHODOLOGY IN  
SHOP FLOOR OF ALLIED ENGINEERING PRODUCT SERVICES**

**SUBMIT TO: DR NABEEL AMIN**

# ACKNOWLEDGMENT

I consider it pleasant privilege to express my heartiest gratitude and indebtedness to those who have assisted me towards the completion of my project report.

I owe my special regards to ALLAH, my parents and my elders for their blessings and good wishes.

I am very much thankful to Dr.NABEEL AMIN for making me capable of conducting such a project.

I express my heartiest and sincere thanks to my company guide Mr. Adnan Rauf who have been a constant source of inspiration and encouragement to me in carrying out this project. I would also like to express my gratitude towards.

This project manual is based on Japanese tool 5S which have a basic theme that on shop floor where production and other assembly operations are going on; there should be no unwanted items, wastes, dust, un-sequenced tools, un-required inventory placed before, during and after work. This manual is prepared after doing successful completion and implementation of 5S tool on the shop floor of “Allied Engineering and Product Services (PVT) LTD”. This is a medium scale company which produces multiple (spare parts) products for national and international companies. The condition of this company is too bad before implementation; but after implementation of 5S tool the overall production of departments were increased and accidents, wastes and losing of equipments are in controlled and reduced.

## **PREFACE**

The problem of dirt, waste, rejection in production is one of our major problems. This problem has been troubling our industries ever since decades. One reason for this is the un-knowledge/un-skilled peoples who owned their industries by their style and un-awareness of production issues. To mitigate such problems of our industrial system to some extent, training programs are being introduced. These programs help the owner and un-skill labor to widen their horizon. Training can be done in industries, business-houses, and in labor societies. A training program in industry is to get an overall view and exposure of the industry and its working environment. It enhances the confidence and boosts the morale of the workers preparing themselves to work in industry with new ideas and with new techniques in future. These programs continuously find place in curriculum of management studies for development of the personality of workers and to provide them with a best appropriate and beneficial experience about working in industrial environment.

# **IMPLEMENTATION OF 5S**

This project is submitted to the Institute of Industrial Sciences, University of Management and Technology Lahore, Pakistan as a requirement for the partial fulfillment of the B.Sc.  
INDUSTRIAL ENGINEERING.

**Approved by**

**Project Supervisor**

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**DR. NABEEL AMIN**

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SEIRI

- Orderliness and cleanliness of gate/entrance/lobby areas & first impressions to a visitor.
- Floor area of buildings free of unwanted items.
- Tops and insides of all cupboards, shelves, tables' drawers, etc free of unwanted items (In all locations).
- Items are stored according to frequency of use.
- Notice boards are free of old notices.
- Rules for disposal (Habitual Seiri) & detecting non-moving stocks are evident.
- Clutter free appearance.

SEITON

- Direction indications are available to all facilities from the entrance onwards.
- All machines have identification labels.
- All buildings, rooms, cubicles and similar areas are clearly numbered or named.
- All equipment/tools/files etc. are arranged according to the "can see" "can take out""can return" principle. File index maintained.
- There are "visual control" methods for defects.
- Specific areas are demarcated for garbage/rejects waste etc.
- Switches, fan regulators, controls etc are labeled.
- All cables, wires, pipes, etc are neat.
- Color coding is used effectively for easy identification.
- All fixtures are well maintained with identification.
- There is general appearance of orderliness and ability to find any item/document without delay.

## SEISO

- A Waste bin strategy is implemented.
- Floors, walls, windows etc. are maintained at a high level of cleanliness.
- Use of adequate cleaning tools is evident.
- Storage of cleaning tools well done.
- Machines, equipment, tools maintained at a high level of cleanliness, maintenance schedules displayed.
- Daily self cleaning (min/5 min) is practiced.
- Cleaning responsibility maps and schedules are displayed.
- There is a general appearance of cleanliness all round.

## SEIKETSU

- All 5S procedures are standardized.
- Checklists are used to regularly inspection.
- All labels, notices are standardized.
- All aisles/gangways have a standard size and Color.
- Standard Visual management is evident.
- Fire extinguishers are clearly marked & placed.
- Standard warning signs.
- Pipes cables etc. are color coded according to a standard.
- Standardized checking procedure adopted.
- Innovative visual control methods are implemented.

## SHITSUKE

- There are regular training programs.
- There is a 5S patrol team which regularly reviews.
- There are 5S posters and 5S point of work reminders.
- There is a system of strict discipline and encouragement with 'good point' & 'bad point' stickers.
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# CHAPTER 1

## 5S

### • INTRODUCTION TO 5S

5S is simple methodology that is also extremely useful in practical and realistic life. 5S is a set of actions to be followed through every day activities to advance the operational surroundings and circumstances. 5S is made in order to provide fortification to every personage in diverse profitable and industrialized fields. 5S occupy a list of products including eyewear, ear protectors and safety gears. Look into these different products that make up the significance of an industrialized security supply.

5S represents 5 disciplines for maintaining a visual workplace. 5S is the starting point for improvement activities that ensure our company's survival.

Translated into English, they all start with the letter S. The list describes how items are stored and how the new order is maintained. The decision making process usually comes from a dialogue about standardization which builds a clear understanding among employees of how work should be done.

5S consists of the following sub processes:

- Sort
- Set In Order
- Shine
- Standardize
- Sustain Sometimes there's a sixth S, viz. Safety



Figure #1

- **PHASES OF 5S**

There are 5 phases of 5S:

1. sorting
2. straightening
3. systematic cleaning
4. standardizing
5. sustaining

**SORT:**

This is step 1 in a Five S program: "Sorting" means to sort through everything in each work area. Keep only what is necessary. Materials, tools, equipment and supplies that are not frequently used should be moved to a separate, common storage area. Items that are not used should be discarded. Don't keep things around just because they might be used, someday.

Sorting is the first step in making a work area tidy.

It makes it easier to find the things you need and frees up additional space.

As a result of the sorting process you will eliminate (or repair) broken equipment and tools. Obsolete fixtures, moulds, jigs, scrap material, waste and other unused items and materials are disposed of. The objective of this step is to clean up the work area. Cleaning up not only makes things look nice, it makes it easier to spot maintenance needs such as an oil leak. It improves safety.

It eliminates clutter and confusion. It removes tools, equipment, supplies and waste that interfere with getting the job done.

**IMPLEMENTATION OF SORT**

**Define what is needed**

When considering what is needed in a work area, don't just look at the core equipment and tools used. Consider the materials, supplies, and even the paperwork.

This is also a good time to evaluate the proper quantities of items to keep in the work area.

Defining what is needed in a work area is not something that can be done effectively by one person working alone; use a team representing all that work in the area.

**Define what is NOT needed**

After the team has identified what needs to be in the area, focus on all the other items currently in the work area.

If an item is not needed to make the product, support the operation of the equipment, or for safety reasons, then it probably should not be kept in the direct work area.

**Disposition the items**

Once items that are not needed in the work area are identified, it's time to disposition them and determine where they should be stored.

Tag items to be removed; use a standardized set of usage-based guidelines to disposition items to be removed.

Whenever possible, use data to determine the frequency of use, do not guess. The less frequently an item is used, the farther from the work area it should be stored.

### **Take action**

Once items are disposition, it's time to take action to clear the work area and move tagged items to a temporary holding area.

The holding area should be an accessible place where others not on the team can examine the items, confirm that they do not need to be kept in the work area, or discuss why they think an item is needed in the work area.

### **SET IN ORDER:**

This is step 2 in a Five S program two is to organize, arrange and identify everything in a work area for the most efficient and effective retrieval and return to its proper place.

#### **Commonly used tools should be readily available:**

Storage areas, cabinets and shelves should be properly labeled. Clean and paint floors to make it easier to spot dirt, waste materials and dropped parts and tools. Outline areas on the floor to identify work areas, movement lanes, storage areas, finished product areas, etc. Put shadows on tool boards, making it easy to quickly see where each tool belongs.

#### **In an office:**

Provide bookshelves for frequently used manuals, books and catalogs. Label the shelves and books so that they are easy to identify and return to their proper place.

#### **The objective in this step is:**

A place for everything and everything in its place, with everything properly identified and labeled.

This means there are two important parts to Systematic Organization - putting everything in its proper place and setting up a system so that it is easy to return each item to its proper place. The second part is where good labeling and identification practices are important. Both the equipment/tools and materials you use, as well as their proper storage locations, need to be clearly identified and labeled.

Systematic organization not only refers to individual work areas. Your overall facility should also be systematically organized, including the proper placement of easy-to-understand labels and signs. Piping, valves, control panels, major equipment, doorways, minor equipment, instruments, storage areas, offices and files should all be clearly identified

### **IMPLEMENTATION OF SET IN ORDER**

Effectively establishing designated locations requires knowledge of storage devices and options.

On the surface, designating a location may seem like a simple and straight forward task, and sometimes it is. However, establishing effective "homes" for some items requires insight into their use and knowledge of storage and identification options.

A study of the location, type of storage, and labeling conventions is needed to develop storage systems that help make the work area more effective and productive.

Effective storage is based on a combination of factors such as the frequency of use, the sequence of use, and the bulk or cubic feet occupied by the item stored.

There are numerous forms and types of storage arrangements. It's best to be familiar with the options so that you can select the best mode of storage for a particular item. Modes of storage include:

- The Floor
- Racks and Shelving
- Flow Racks
- Cabinets
- Carts
- Storage Bins
- Portable Equipment
- Custom Storage
- Central Cribs
- Shadow Boards
- Hanging Tools

The use of signs and labels to identify "what is to be stored where" helps employees use storage locations as they were intended to be used.

The information contained on the labels will be easier for all employees to understand if the format for the labels is standardized.

Where storage locations might change slightly, consider portable labels. For example, magnetic labels work extremely well on racking in storage and warehouse areas.

For consumables, another alternative is to use kanban cards mounted in plastic sleeves as the labels. When the reorder quantity is reached, the kanban card can be removed from the sleeve and be used to reorder that item.

### **SHINE:**

Step Three is; once you have everything, from each individual work area up to your entire facility, sorted (cleaned up) and organized, you need to keep it that way. This requires regular cleaning, or to go along with our third S, "shining" things up.

Regular, usually daily, cleaning is needed or everything will return to the way it was. This could also be thought of as inspecting. While cleaning it's easy to also inspect the machines, tools, equipment and supplies you work with.

Regular cleaning and inspection makes it easy to spot lubricant leaks, equipment misalignment, breakage, missing tools and low levels of supplies. Problems can be identified and fixed when they are small. If these minor problems are not addressed while small, they could lead to equipment failure, unplanned outages or long - unproductive - waits while new supplies are delivered.

When done on a regular, frequent basis, cleaning and inspecting generally will not take a lot of time, and in the long run will most likely save time

### **IMPLEMENTATION OF SHINE**

#### **Cleaning the workplace:**

Take the time to plan what needs to be cleaned, what it will be cleaned with, when it will be cleaned, and who will do the cleaning.

### **Maintaining the appearance of the workplace:**

Techniques and practices that contribute to the appearance of a work area include: painting, Lighting, dealing with clutter, dust collection, minimizing spills, and conducting routine maintenance.

### **Using preventive measures to keep the workplace clean:**

Once the work area, tools, and equipment are clean, they need to be kept that way.

Continued housekeeping is one way to keep the work area, tools, and equipment clean. But the better way is to prevent these from getting dirty in the first place

Root cause analysis, mistake-proofing, and the use of preventive measures are important to keep the workplace clean and orderly.

### **STANDARDIZE:**

Step Four is to ensure that the first three steps in your Five S program continue to be effective, the fourth step is to simplify and standardize.

The good practices developed in steps 1 through 3 should be standardized and made easy to accomplish. Develop a work structure that will support the new practices and make them into habits. As you learn more, update and modify the standards to make the process simpler and easier.

One of the hardest steps is avoiding old work habits. It's easy to slip back into what you've been doing for years. That's what everyone is familiar with. It feels comfortable.

Use standards to help people work into new habits that are a part of your Five S program.

Any easy way to make people aware of, and remind them about the standards is to use labels, signs, posters and banners.

### **IMPLEMENTATION OF STANDARDISE:**

#### **In order to standardize:**

Roles and responsibilities must be clear and consistently applied.

Training will be necessary to ensure all know how to apply 5S techniques and "copy exactly," or apply them the same way. And, as with any improvement initiative, the effort must not be allowed to become static but must continuously evolve and grow.

#### **Roles and responsibilities:**

Roles in a 5S effort are straightforward. Leaders must set the tone and lead by example.

Managers and supervisors must commit to the initiative, provide time for the workforce to develop and implement 5S changes, provide guidance with those changes, and support the 5S changes.

Members of the workforce must embrace 5S principles and practices and help implement the 5S's in their work areas

#### **5S training:**

Universal indoctrination in general 5S techniques is needed to help build a common 5S vocabulary and skill base.

As the 5S's are adopted work-area by work-area, each area will develop unique approaches and methods; anyone working in a specific work area must receive training in those work-area-specific methods. And, just like with any new skill, practice makes "perfect."

**Copy exactly:**

Standardization is about creating best practices and then getting everyone to "copy exactly," using the established best practices the same way, everywhere, and every time.

Implementing a "copy exactly" mentality involves establishing standardized rules.

Visual factory techniques including color-coding, checklists, and labeling help reinforce a copy exactly approach.

**Continuous improvement:**

It works best when the approaches used to improve 5S techniques and practices are standardized as well.

For example, if an organization does use a common problem-solving process, time spent communicating new ideas and spreading lessons learned to other work areas will be saved.

**SUSTAIN**

Step Five; the final step is to continue training and maintaining the standards. Have a formal system for monitoring the results of your Five S program. Don't expect that you can clean up, get things organized and labeled, and ask people to clean and inspect their areas every day -- and then have everything continue to happen without any follow-up.

Continue to educate people about maintaining standards

When there are changes – such as new equipment, new products, new work rules - that will affect your Five S program, and adjustments to accommodate those changes, make any needed changes in the standards and provide training that addresses those changes.

**Using 5S Posters and Signs:**

A good way to continue educating employees, and for maintain standards, is to use 5s posters and signs. You can create your own custom 5S posters, allowing you to communicate the specific information that needs to be communicated at each location. Changing work habits can be difficult, and it is easy to slip back into doing things the old, comfortable way. Use custom 5S posters to remind employees of the proper procedures, and of the benefits that come from following a 5s plan.

**IMPLEMENTATION OF SUSTAIN**

Communication is necessary to reinforce the 5S's.

Sustaining requires keeping everyone involved, continually reinforcing what and why the 5S's are important.

Communication becomes the spotlight for a 5S initiative. Keep reinforcing the message and emphasizing roles and responsibilities.

Sustaining the 5S's requires leadership, commitment, and allocation of the time and resources necessary to keep the effort vital.

Recognition for jobs done well becomes the fuel that keeps the effort dynamic.

**Preventing backsliding:**

Audits can serve as on-going checks on 5S activities.

A teamwork approach builds a common effort toward achieving a common goal.

Soliciting ideas for improvement will generate ideas to improve and help sustain the 5S effort.

And reacting immediately to problems is a must or the organization can quickly slide back to old habits.

- **WHY 5S?**

1. To eliminate the wastes that result from “uncontrolled” processes.
2. To gain control on equipment, material & inventory placement and position.
3. Apply Control Techniques to Eliminate Erosion of Improvements.
4. Standardize Improvements for Maintenance of Critical Process Parameters.

## **BENEFITS OF 5S**

The 5S process is one of the most fundamental and widely applied components of lean manufacturing. Its application is simple, involving basic common sense; however, the advantages cannot be underestimated due to its simplicity. Once implemented a 5s system can be the stabilizing force underlying a lean manufacturing strategy.

### **The following are its advantages:**

1. Increases in productivity:

- Reduces lead times thereby improving product delivery times.
- Reduces equipment downtime, maintenance and cycle time.
- Improves daily and shift startup times and reduces changeover time.
- Reduces the amount of time wasted searching for tools and equipment.

2. Increases in quality:

- Improves quality by reducing the amount of errors/defects.
- Implements standardization thereby achieving output consistency.
- The pleasantries of the simplified work environment increases employee morale.

3. Reduction in cost:

- Provides cost-savings by reducing inventory, storage fees and space requirements.
- Improves safety thereby reducing the cost of worker injuries.
- Reduces the amount of scrap thereby reducing production cost.

4. The system as a whole minimizes waste and improves efficiency by ensuring that workers are spending time doing productive task rather than looking for misplaced tools, sorting unnecessary through stacks of waste material or rearranging the work environment at the change of shifts.

5. Improves the safety of people, equipment and their environment thanks to simple rules which have been established and validated by those who have to apply them.

6. Improves the motivation of the members of your staff, who will feel much better in a safe, organized and efficient working environment.

One of the great aspects of implementing a 5s system is that it can be done today and everyone can participate. Furthermore, all businesses and all departments can benefit from the 5s system. Manufacturing and industrial plants have the greatest applications; however, its use is not limited to production areas. Office and administration areas, information or dataflow hubs, retail space and service delivery systems can also achieve productivity gains from its implementation.