
UNIT 7 HOUSE KEEPING (5 S CONCEPTS)

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7.1 INTRODUCTION

Everyone appreciates a workplace that is free of clutter and facilitates effective, efficient and safe work. Think of a Wall Mart store where you step into and find all sorts of items neatly stacked and arranged in an organized manner making it just as simple for a customer to pick and choose as it is for the store account manager to bill the product. In contrast, think of traditional grocer's shop running in a 10 × 10 room which is more like a store house and he alone knows what item is kept where. Some of the items may be stored well beyond the expiry date of unpackaged goods which may have been attached by rodents or further still, wrong items may be stored together like unpacked food grains with liquid phenyl or mothballs. So now you understand the context of our discussion in this unit. Similar concept applies to workplaces. The system of 5S focuses on putting everything where it belongs and keeping the workplace clean, making it easier for people to do their jobs without wasting time as or risking their safety in any manner.

Objectives

After the studying this unit, you will be able to:

- appreciate the need and importance of 5S system in workplaces.
- describe Value Stream Mapping (VSM).
- describe the meaning, methods and benefits of 5S. and

- discuss the role of management in implementing 5S effectively.

7.2 5S: THE CONCEPT

5S is amongst the first and fundamental steps implemented by an enterprise towards the path of accomplishing Total Quality Management and continuous improvement at the operation level. 5S is a process designed to organize the workplace, keep it clean, maintain effective and standard conditions. It instills the discipline required to enable everyone to achieve and maintain a world-class working environment.

Over time, the 5S methodology led to many benefits that included, reduced costs, higher quality, increased productivity, greater employee satisfaction and safer work environment. And most importantly, it introduces standard operational practices to ensure efficient, repeatable and safe ways of working.

The use of this tool was started in the 1920s by Henry Ford in the United States as the CANDO program: Cleaning up, Arranging, Neatness, Discipline and Ongoing improvement. The technique was popularized as ‘Japanese 5S’ in 1980 by Hiroyuki Hirano.

Many enterprises have practiced the 5S and derived significant benefits from it. This technique has been widely practiced in Japan. Most Japanese 5S practitioners consider 5S useful not just for improving their physical environment, but also for improving their thinking processes. In Japan it is also called ‘workplace management’.

7.3 NEED FOR 5S

5S is needed if the workplace is messy and unorganized. It is also needed if employees spend extra time in searching for tools, papers, information, etc.

Basically to implement 5S you will have to find out the following eight wasteful items/procedures and eliminate them.

- **Over production** – Producing more than required or producing faster than the downstream processes can lead to over production. One should produce according to need.
- **Excessive Inventory** – This can be a direct result of over production or it could be due to poor purchasing practices. Over purchasing supplies because we got a great deal sometimes is no deal at all. Excessive or unneeded inventory can propagate other forms of waste.
- **Inappropriate or Non Value Added Processing** – Waste is incurred through use of the wrong tool, performing needless operations or not using the most efficient processes or tools for the job. The right process and the correct tools can reduce waste in your process.
- **Waiting** – Time and resources are wasted when waiting for parts, supplies or information. One should try to ensure a steady supply of the required material in order to avoid wastage.
- **Transportation** – Excessive travel or movement of materials is waste. Proper planning and process layout can help reduce or eliminate excess

transportation. The use of value stream mapping can help the team visualize exactly how much of the material is travelling. (Let us briefly understand what Value Stream Mapping (VSM) means. Also known as 'material and information flow mapping,' it is a lean management method/tool that helps in visualizing the steps needed from product creation to devlivering to the customer. VSM helps in better understanding of one's organization and analysis thereby bringing about improvement in processes of an organistion.)

- **Unnecessary Motion** – Any movement or motion performed by the operator that does not add value is waste. During the 5S exercise one needs to examine the motions required to perform the task. One has to organize the workstation so that all tools and supplies are easily located and are within easy reach. In some cases, re-sequencing certain process steps can reduce excessive and redundant movement or motion by the operator. Safety must be the first consideration by reducing or eliminating the waste of excess motion one is also creating a more ergonomic workstation. Always consider safety first. Economics is the process of designing or arranging workplaces, products and systems so that they fit the people who use them. This branch of science studies about human abilities and limitations and then apply this learning to improve people's interaction with products, systems and environments.
- **Defects** – This form of waste is one of the worst of all. Producing non-conforming parts or assemblies increases scrap, reduces process efficiency, wastes machine-time, process or assembly time and causes non-value added tool wear. Defects can also create additional waste in the form of wait time when the downstream operations run out of usable parts.
- **Untapped Employee Creativity (potential)** – Many companies are now realizing that their best asset is their employees. Companies must create an atmosphere where exchange of ideas is encouraged. Some of the most successful organizations have created a culture where employee's ideas are really heard and evaluated. When their good ideas are implemented, the employee is recognized and rewarded. One never knows where the next great idea is going to come from.

SAQ 1

- a) Name the 8 forms of waste usually found in industries.
- b) Describe the concept of 5S.
- c) What is the need of 5S in Industry?

7.4 THE CYCLE

5S is the acronym for five Japanese words: Seiri, Seiton, Seiso, Seiketsu and Shitsuke and they represent the five steps for a systematic technique for good housekeeping. The 5S cycle is represented in Figure. 7.1.

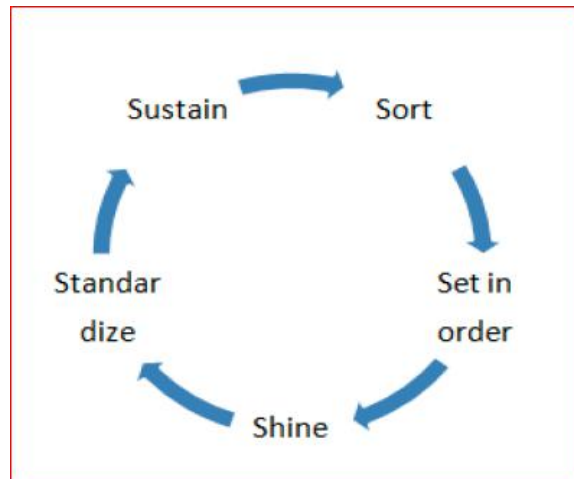


Figure 7.1: 5 S Cycle

The five steps and their corresponding actions are as indicated in the table 7.1 and Figure 7.2 shows the Five Steps of Japanese 5 S.

Table 7.1: The five steps of Japanese 5 S

Step	Corresponding action
Seiri (Sort)	Distinguish between necessary and unnecessary items. Remove the latter.
Seiton (Set in order)	Enforce the dictum ‘a place for everything and everything in its place’.
Seiso (Shine)	Clean up the workplace and look for ways to keep it clean.
Seiketsu (Standardize)	Maintain and monitor adherence to the first three Ss. Standardise the way of maintaining cleanliness.
Shitsuke (Sustain)	Stay committed to practicing the 5S daily make it a way of life.



Figure 7.2: The Five Steps of Japanese 5 S

7.5 IMPLEMENTATION OF 5 S

7.5.1 Benefits of the Practice of 5 S

The general concept of the 5S is that they are intended to eliminate waste (Osada, 1993). Working in disorder (Figure 7.3) is neither productive, nor safe. 5S is a simple and practical method to instil a quality culture at the workplace. It is relatively easy to undertake and requires minimal additional resources. The first and small investment made in time and effort pays off in a much bigger manner when the results are realized and maintained.

Among the main benefits of implementing 5S are:

- the workplace becomes cleaner, safer, well-organized and more pleasant
- floor space utilization is improved
- workflow becomes smoother and more systematic and non-value-added activities are reduced;
- time for searching tools, materials and document is minimized;
- machine breakdowns are reduced since clean and well-maintained equipment breaks down less frequently and it also becomes easier to diagnose and repair before breakdowns occur, therefore extending equipment life;
- errors are minimized leading to making defect-free products;
- consumables and material wastage are minimized;
- the morale and satisfaction of employees improves; and
- the productivity of the organization improves together with the quality of products and services.

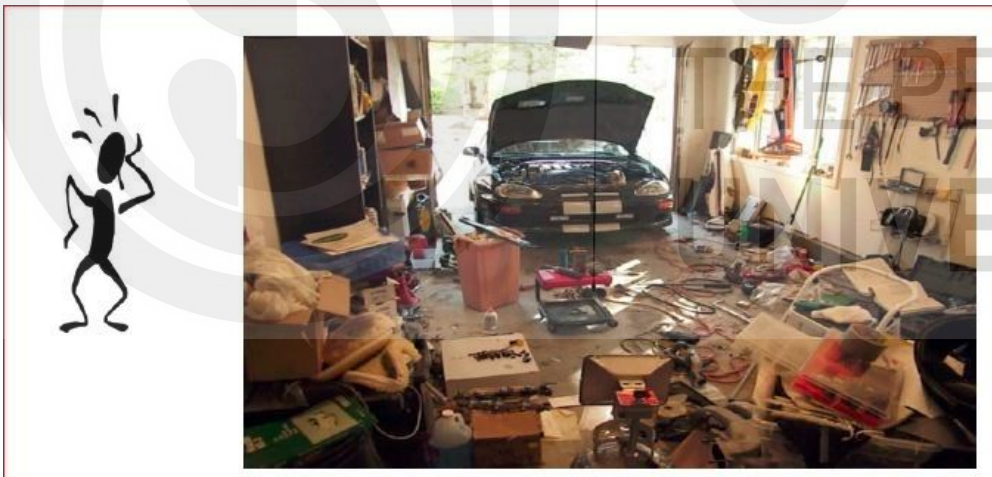


Figure 7.3: Disorder is neither Productive nor Safe

Each step of the 5S is further explained below

7.5.2 SORT – SEIRI

The emphasis of Seiri (Figure 7.4) is on being able to spot the unwanted and unnecessary items/equipment/processes in a workplace before they become problematic.



Figure 7.4: Sort – Seiri

Meaning	Methods	Benefits
<p>This means distinguishing or sorting out between ‘wanted’ and ‘unwanted items’ at place of work and removal of unwanted items.</p>	<ul style="list-style-type: none"> ➤ First decide what is necessary and what is unnecessary. To find out unnecessary items you should not only check the floor but also shelves, lockers, storehouse, stairs, roofs, notice boards, etc. The best people to provide information on unnecessary items are the people working in that area. ➤ Put a red tag on unnecessary items and keep them in a separate area. ➤ Discard or throw those items which have not been used in the past one year. ➤ Things used once in 6 to 12 months may be stored at a distance from the workstation. ➤ Things used more than once a month should be available at a central point in the workplace. ➤ Things used hourly/everyday/once a week should be near the work station or may be worn by or kept in the pocket of your workman there. 	<ul style="list-style-type: none"> • Your useful floor is saved. • Your searching time for tools ,material s and papers is reduced. • You have better flow of work. Your inventory cost is reduced.

7.5.3 Set in Order – Seiton

Seiton in essence can be defined as neatness, having things in the right places or set up so that they are readily available for use, eliminating the need to search. Once everything has a right place so that it’s functionally placed for quality and safety, it can then be deemed that the workplace is neat (Osada,

1993). While Seiri helps you to decide what items are needed, Seiton helps you to decide the way things are to be placed.

Meaning	Methods	Benefits
<ul style="list-style-type: none"> • Arranging items in such a manner that they are easy to use. • Labelling them so that they are easy to find and put back. This means a place for everything (necessary) and everything in its place. No more homeless items. 	<ul style="list-style-type: none"> ➤ If necessary, reassign spaces, racks, cabinets, etc. ➤ Decide the right places for everything. ➤ Put all materials and equipment at a place allocated to them with proper label or signalization. Use alerts or indications for out-of-stock situations. ➤ Use floor paint marking to define working area, path, entrance/exit, safety equipment, cart/ trolley locations, etc. ➤ Use standard colour coding for pipelines for steam, water, gas, drainage, etc. ➤ Use display cautions, messages and instructions, written clearly at proper places and at a proper height. 	<ul style="list-style-type: none"> • You take things out and keep things back easily. • You make lesser mistakes. • You reduce searching time. • Your work environment becomes safe.

7.5.4 Shine – SEISO

Seiso places emphasis on cleaning so that things are clean; in other words, carrying out cleaning as a form of inspection i.e. getting rid of waste, and foreign matter. It is important to note that depending on the circumstance, with higher quality, higher precision and finer processing technologies, even the minute details may have the greatest ramifications, hence it is important to carry out cleaning as a form of inspection.

Meaning	Methods	Benefits
<ul style="list-style-type: none"> • This means removing dirt, strain, filth, soot and dust from the work area. • This includes cleaning and care for equipment and facilities and inspecting them for abnormalities. • In a way it also includes primary 	<ul style="list-style-type: none"> ➤ Divide the total area in zones and allocate responsibility for cleaning of each zone. ➤ Decide on cleaning points, order of cleaning, type of cleaning, cleaning aid required, etc. ➤ Display cleaning schedule. ➤ During cleaning look for defective conditions 	<ul style="list-style-type: none"> • Your workplace becomes free of dirt and stains which is the starting point for quality. • Your equipment life span will be prolonged, and

<p>maintenance of equipment.</p> <p><i>Note: Cleaning is not polishing to make the piece of equipment more beautiful, its more about the condition and fitness for use.</i></p>	<p>(loose bolts, vibrations, excessive sound, high temperature, fallen tools, etc.) and solve the problem.</p> <ul style="list-style-type: none"> ➤ Allocate space for storage of cleaning aids and consumables for cleaning. 	<p>breakdowns will be less.</p> <ul style="list-style-type: none"> • Creates a pleasant work environment. • Prevents accidents.
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7.5.5 Standardize – SEIKETSU

This aspect of the 5S focuses on standardization, making the first three S’s, Seiri, Seiton, and Seiso a constant routine. The emphasis here is on visual management, an important aspect to attain and maintain standardized conditions to ensure the individuals always act quickly.

Meaning	Methods	Benefits
<p>This calls for systematizing the above 3S practices. This means ensuring that whatever cleanliness and orderliness is achieved should be maintained.</p> <p>This requires that you should develop a work structure that will support the new practices and turn them into habits. The purpose of standardization is to make sure that everyone in the company follows the same procedure, the same names of items, the same size of signalization/floor marking, shapes, colours, etc. Standardizing also helps to do the right thing the rightway every time thus improving product quality spending lesser time and money.</p>	<ul style="list-style-type: none"> ➤ Document procedures and guidelines for sorting, set in order and shine. ➤ Make a checklist for each section and train your people in using them. ➤ Carry out periodic evaluation by using the above check list. ➤ Use visual management to act quickly, for example putting/using: <ul style="list-style-type: none"> – Open and shut directional labels on switches, etc. – Temperature and safety labels – Zone labels on measuring metres (normal zone, danger zone, etc.) – Put ‘OK’ or hold marks on product. – Put transparency control – Make transparent covers of drawers. – Put inspection windows in themetal covers. – Use location maps with 	<p>Your activities will be simplified.</p> <p>You will have consistency in the work practices.</p> <p>You will avoid mistakes.</p> <p>With better visual transparency management of work and efficiency will improve.</p>

	emergency exits, fire fighting equipment, etc. visible from a distance.	
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7.5.6 Sustain – SHITSUKE

Shitsuke places emphasis on being able to forge a workplace with good habits and discipline. Demonstrating to others what needs to be done and encouraging practice amongst them. This is mainly a management responsibility.

Meaning	Methods	Benefits
<p>Sustain also means ‘Discipline’.</p> <p>It denotes your commitment to maintain orderliness and to practice first 3S as a way of life. This also requires that your employees show positive interest and overcome resistance to change.</p>	<ul style="list-style-type: none"> ➤ Create awareness and publicize the system. For example develop 5S News, 5S Posters, 5S Slogans, observe 5S Day, etc. ➤ Create a structure of how and when 5S activities will be implemented. ➤ Formulate guidelines for audit/evaluation of 5S implementation. ➤ Provide management support by providing resources and leadership. ➤ Reward and recognize best performers. 	<p>Promotes habit for complying with workplace rules and procedures.</p> <p>Creates healthy atmosphere and a good workplace.</p> <p>Helps you to develop teamwork.</p> <p>Provides you with data for improving 5S.</p>

SAQ 2

- a) Why should we implement 5S?
- b) What is SEIRI and what are the benefits an industry can derive from practicing it?
- c) What does SEITON mean and what are the steps in SEITON?
- d) Explain SEISO and its benefits.

7.6 ROLE OF MANAGEMENT IN IMPLEMENTING 5S

It is important to note that the implementation of 5S concerns and benefits everyone in the organisation. Figure 7.5 and 7.6 shows Before Implementing and after Implementing respectively. 5S Like any other initiative, management has the important role to facilitate and support the process by:

- Acknowledging the importance of 5S for the organization;
- Allowing employees time for 5S;
- Providing resources and infrastructure for 5S implementation;
- Personal involvement in implementation of 5S;
- Creating tangible and intangible rewards and recognition for improvements; and
- Promoting the ongoing 5S efforts



Figure 7.5: Before Implementing 5S



Figure 7.6: After Implementing 5S

7.6.1 Additional Guidelines for Implementing 5S

The methods of implementing each of the 5S have been indicated in the tables above. An ITC diagnostic tool is included in Annex I to enable you to assess and score the implementation of your 5S. It would be advisable to start the implementation with one selected area in the organisation and then after getting positive results to extend gradually to other areas. However, for effective implementation, it would be important to:

- Sensitize the management and all employees concerned about the importance and benefits of 5S and get their commitment;
- conduct a status audit with photographs 'as is state'. The diagnostic tool given in the appendix may be used;
- measure throughput, time in materials handling, floor space, flow distance, rack storage, engineering cycle times, annual physical inventory time, and defect ratios before and after the 5S implementation.
- develop an implementation plan, with clear responsibilities and deadlines, in consultation with management and all employees concerned;
- implement the 5 S plan;
- take photographs after the implementation and assess the difference;
- share the experience and extend the implementation to other areas;
- conduct periodic 5S Internal Audits with ratings to monitor progress.

SAQ 3

- a) Which aspect of 5S does SEIKETSU deal with? Describe in detail.
- b) What do you understand by SHITSUKE? What are the benefits of practicing SHITSUKE?
- c) Why is it important to measure throughput, time in materials handling, floor space, flow distance, rack storage, engineering cycle times, annual physical inventory time, and defect ratios before and after the 5S implementation?

7.7 LET US SUM UP

There is no shortage of workplace organization and improvement methods available today, but few are better known and more proven than 5S. This system has been around as a formal system for decades and has been proven effective at improving virtually every aspect of nearly any business across all industries.

5S gets its name from the five Japanese words, Seiri, Seiton, Seiso, Seiketsu, and Shitsuke, which translate in English to Sort, Set in Order, Shine, Standardize, and Sustain. Anyone who is looking for a way to cut waste, improve efficiency, improve product quality and generally improve the way everything is done in the workplace, will benefit from the 5S methodology.

7.8 KEY WORDS

5S gets its name from the five Japanese words, Seiri, Seiton, Seiso, Seiketsu, and Shitsuke, which translate in English to Sort, Set in Order, Shine, Standardize and Sustain.

5 S: is a process designed to organize the workplace, keep it clean, maintain effective and standard conditions.

Seiri (Sort): Distinguish between necessary and unnecessary items.

Remove the latter.

Seiton (Set in order): Enforce the dictum 'a place for everything and everything in its place'.

Seiso (Shine): Clean up the workplace and look for ways to keep it clean.

Seiketsu (Standardise): Maintain and monitor adherence to the first three Ss. Standardise the way of maintaining cleanliness.

Shitsuke (Sustain): Stay committed to practicing the 5S daily make it a way of life.

7.9 ANSWER TO SAQs

SAQ 1

- a) The 8 forms of waste usually noticed in the industries are,
- i) Over production
 - ii) Excessive Inventory
 - iii) Inappropriate or Non Value Added Processing
 - iv) Waiting
 - v) Transportation
 - vi) Unnecessary Motion
 - vii) Defects
 - viii) Untapped Employee Creativity (potential)
- b) 5S is amongst the first and fundamental steps implemented by an enterprise towards the path of accomplishing Total Quality Management and continuous improvement at the operation level. 5S is a process designed to organize the workplace, keep it clean, maintain effective and standard conditions. It instils the discipline required to enable everyone to achieve and maintain a world-class working environment.
- c) 5S is needed if the workplace is messy and unorganized. It is also be needed if employees spend extra time in searching for tools, papers, information, etc.

Basically to implement 5S you will have to find out the following eight wasteful items/procedures and eliminate them.

- Over production
- Excessive Inventory
- Inappropriate or Non Value Added Processing
- Waiting
- Transportation
- Unnecessary Motion

- Defects
- Untapped Employee Creativity (potential)

SAQ 2

- a) We should implement 5S because it is a simple and practical method to instil a quality culture at the workplace.

Among the main benefits of implementing 5S are:

- the workplace becomes cleaner, safer, well-organized and more conducive for working
- floor space utilization is improved
- workflow becomes smoother and more systematic and non-value-added activities are reduced
- time for searching tools, materials and document is minimized
- machine breakdowns are reduced since clean and well-maintained equipment breaks down less frequently and it also becomes easier to diagnose and repair before breakdowns occur, therefore extending equipment life
- errors are minimized leading to making defect-free products
- consumables and material wastage are minimized
- the morale and satisfaction of employees improves
- the productivity of the organization improves together with the quality of products and services.

- b) The Japanese word 'SEIRI' means sorting. It is basically identifying and categorising the necessary and unwanted items/equipment/processes in a workplace.

Benefits of practising SEIRI in an industry are,

- Useful floor space is saved.
- Searching time for tools, materials, and papers is reduced.
- Flow of work is better.
- Inventory cost is reduced.

- c) SEITON means set in order. While Seiri helps one to decide what items are needed, Seiton helps to decide the way things are to be placed.

Following are the steps to be taken to implement SEITON

- If necessary, reassign spaces, racks, cabinets, etc.
- Decide the right places for everything.
- Put all materials and equipment at a place allocated to them with proper label or signalization. Use alerts or indications for out-of-stock situations.
- Use floor paint marking to define working area, path, entrance/exit, safety equipment, cart/ trolley locations, etc.
- Use standard colour coding for pipelines for steam, water, gas, drainage, etc.
- Use display cautions, messages and instructions, written clearly at proper places and at a proper height.

- d) SEISO means shining, but not in the literal sense. It is cleaning as a form of inspection i.e. getting rid of waste, and foreign matter.

The benefits of SEISO are,

- The workplace becomes free of dirt and stains which is the starting point for quality.
- The equipment lifespan is prolonged, and breakdowns are less.
- It creates a pleasant work environment.
- It prevents or minimises accidents.

SAQ 3

- a) SEIKETSU deals with standardisation, making the first three S's, SEIRI, SEITON, and SEISO a constant routine. This means ensuring that whatever cleanliness and orderliness is achieved should be maintained.

That is one has to develop a work structure that will support the new practices and turn them into habits. The purpose of standardisation is to make sure that everyone in the company follows the same procedure, the same names of items, the same size of signalisation/floor marking, shapes, colours, etc. Standardising also helps to do the right thing the right way every time thus improving product quality, spending lesser time and money.

- b) SHITSUKE means discipline. It places emphasis on being able to forge a workplace with good habits and discipline. Demonstrating to others what needs to be done and encouraging practice amongst them. This is mainly a management responsibility.

The benefits of practising SHITSUKE are,

- It promotes habit for complying with workplace rules and procedures.
- Creates healthy atmosphere and a good workplace.
- Helps to develop team work.
- Provides data for improving 5S.

- c) To assess the benefits of 5S in cognisable terms we need to measure throughput, time in materials handling, floor space, flow distance, rack storage, engineering cycle times, annual physical inventory time, and defect ratios before and after the 5S implementation.

This will provide an impetus to all concerned from the top management to the workmen to strictly adhere to practising 5S. The workmen will find a better working environment, get less fatigued during work and a safer workplace. This in turn will improve product quality, decrease rejection and machine down-time and increase productivity.

By keeping records of throughput, time in materials handling, floor space, flow distance, rack storage, engineering cycle times, annual physical inventory time, and defect ratios before and after the 5S implementation the effects of 5S can be shown to the management in tangible terms. The improvement in the company bottom line will induce the management also to follow 5S.

7.10 REFERENCES AND FURTHER READINGS

[1] <https://safetyculture.com/topics/5s-lean/>

[2] [https://en.wikipedia.org/wiki/5S_\(methodology\)](https://en.wikipedia.org/wiki/5S_(methodology))

