

5S

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1. Introduction

5S is a simple and effective lean methodology that helps organizations simplify, clean, and sustain a visible and productive work environment (Hill, 2010). Translated from five Japanese words that begin with the letter “S,” the closest English equivalents normally used are Sort, Set in order, Shine, Standardize, and Sustain. The Japanese characters for 5S are (Chu, 2009):

整理・整頓・清掃・清潔・躰

The following list is a combination of many 5S variants¹ along with a short description of each one:

- **Sort** (separate, scrap, sift) – Separate the necessary and unnecessary items and get rid of the unnecessary items.
- **Set in order** (straighten, store, simplify) – Organize the work area and put everything in its place.
- **Shine** (scrub, sweep) – Sweep, wash, clean, and shine everything around the work area.
- **Standardize** – Use standard methods to maintain the work area so it is visible, clean, and in a constant state of readiness.
- **Sustain** (systematize, self-discipline) – Ensure that all 5S policies are followed throughout the entire organization by means of empowerment, commitment, and accountability.

5S has become a standard lean manufacturing practice in North America and Europe. It has also become a popular methodology in healthcare, government, and financial services.²

¹ Grout (2009) humorously comments that “there are as many 5S (lists) as there are 5S consultants.

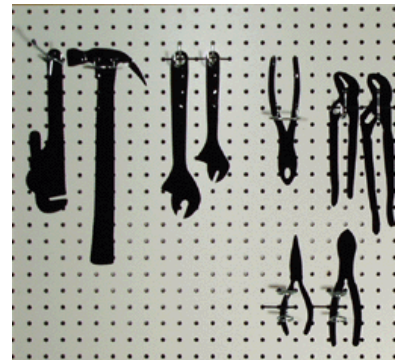
²The following video shows a rather disturbing example of the application of 5S in an American branch office of a Japanese firm: <http://online.wsj.com/video/cluttered-cubicles-go-lean-with-5s-rules/08C6384E-D821-4E06-8D3C-7127672621CF.html>

The remainder of this paper is organized as follows. Section 2 provides a more detailed description of each of the five steps in a 5S program. Section 3 lists the benefits of a 5S program. Section 4 explains how to implement a 5S program. Section 5 provides an example of a 5S program for a crash cart in a clinic. Section 6 concludes the paper. The appendix presents a scorecard for a 5S audit.

2. Detailed description of the 5S program

Sort (*Seiri*) – *Sort* focuses on eliminating unnecessary items from the workplace. An effective visual method to identify these unnecessary items is called “red tagging.” A red tag is placed on all items not required to complete the job. These red tag items are then moved to a central holding “red tag” area for evaluation. Items in the red tag area are sold to employees, sold to another party (possibly for scrap value), used in another work area, recycled, or thrown away. Sorting is an excellent way to make the work area more visible, free up valuable floor space, and eliminate such things as broken tools, obsolete jigs and fixtures, scrap, and excess raw materials. *Sort* “clears the deck” for the 5S process.

Set in order (*Seiton*) – *Set in order* focuses on efficient and effective storage and workplace organization methods and can be summarized with the old adage, “A place for everything and everything in its place.”³ Questions to ask include: What is needed to do this job? Where should this item be located? How many of each item is needed? Strategies for effective *set in order* include labeling shelves, creating tool holders, painting floors, outlining work areas and locations, making shadow boards⁴, and setting up modular shelving and cabinets for needed items such as trash cans, brooms, mops, and buckets.



Shine (*Seiso*) – *Shine* focuses on cleaning the work area. After the first two steps eliminate clutter and locate the necessary items, the shine step thoroughly cleans the work area. One of the main benefits of the shine step is that workers develop a sense of pride and ownership in a clean and organized work area. Another benefit is that workers can more quickly see issues such as leaks, contamination, vibration, fatigue, breakage, and misalignment.

Standardize (*Seiketsu*) – *Standardize* concentrates on standardizing best practices in each work area. Employees are often a valuable source of information for the development of these standards. McDonalds, Pizza Hut, UPS, Blockbuster, and the United States Military are good examples of the value of good work standards.

³ According to the website www.phrases.org.uk/meanings/14400.html, this phrase goes back well before the year 1827.

⁴ A shadow board is a holder for tools with outlines of tools to show where they should be stored.

Sustain (*Shitsuke*) – *Sustain* focuses on defining a new status quo and new standard for workplace organization. *Sustain* is widely regarded as the most difficult “S” to implement. Many organizations find themselves with a dirty, cluttered shop only a few months after a 5S project. The tendency is to return to the old way of doing things. One key practice is to make sure that standard work for supervisors includes checking to ensure that the 5S discipline is being followed.

Some lean practitioners add a sixth “S” for Safety. They use this “S” to establish safety procedures in and around the process. However, most organizations include safety as a normal part of the *set in order* step.

3. Benefits of a 5S program

Indications of the need for 5S

Indications that a work area needs a 5S program include the following:

- Workers waste time looking for things.
- Most horizontal surfaces are covered.
- Space is crowded with parts, tools, paper, etc.
- Excess inventory.
- Excess equipment and tools.
- Work area (shelves, floor, equipment, etc.) is dirty and dusty.
- The floor is covered with wires and unused items.
- The status of the work area is hard to discern because the work area is not visible.
- Efforts to organize and clean do not seem to last very long.

Benefits of a 5S program

The benefits of a 5S program include the following:

- Improved visibility of problem conditions.
- Improved safety.
- Reduced waste.
- Improved morale.
- An increased sense of ownership of the workspace.
- Improved productivity – Less time spent searching for tools, materials, etc.
- Lower setup times.
- Improved quality.
- Improved maintenance.
- Shorter leadtimes.
- Better impression on customers.
- New sense of discipline and order that carries over to all activities.

Chu (2009) presents a 5S framework to summarize these benefits:

- Sales – Increased sales (market share).
- Savings – Decreased costs.
- Safety – Safer working environment.
- Standardization – Standardized operating procedures.
- Satisfaction – Satisfied employees and customers.

Grout (2009) emphasizes that a 5S program supports a visual work environment that is:

- Self-explaining
- Self-ordering
- Self-regulating
- Self-improving

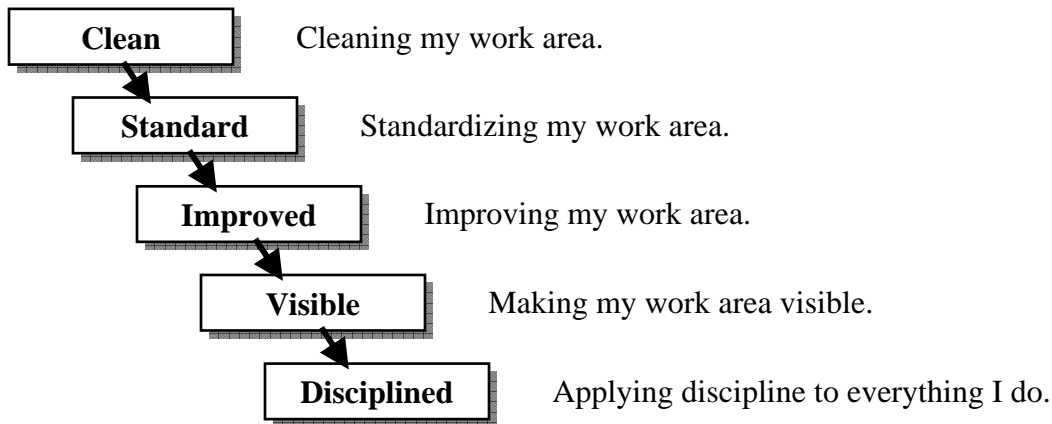
5S creates an environment where what is supposed to happen actually does happen on time, every time, day or night, because of the visual clues available in the work area.

Five stages of understanding the benefits of a 5S program

Understanding the benefits of a 5S program tends to go through five stages, as depicted in Figure 1 below. These five stages are described as follows:

- **Clean** – People often assume that 5S is just cleaning up the work area. Cleaning a work area is a good practice, but this is only the beginning of understanding a 5S effort.
- **Standard** – People soon learn that 5S is about making this improved work process a standard work process and keeping it standard. This makes it easy to find things because everything has a place and everything is always in that place. However, clean and standard is just the beginning of understanding 5S.
- **Improved** – People then understand that 5S is about improving the standards for how work is done. 5S challenges people to always be looking for better ways to organize their work to make the work simple, visible, error-proof, and wasteless. When a better way is found, it becomes the new standard. However, 5S is more than just clean, standard, and improved.
- **Visible** – People understand that 5S is about making work more visible so that workers can focus on their work and so that anything out of place “screams” for immediate attention. A visual work area provides cues⁵ that help workers and supervisors immediately know the current status of the system and quickly identify if anything needs immediate attention.
- **Disciplined** – People finally understand that 5S is about developing and practicing a highly disciplined mindset for how work is done. In this stage, workers wholeheartedly embrace the concept and find that this discipline carries over into everything they do.

⁵ A cue is a visual signal, prompt, or reminder. Cues are often used in plays to remind actors to say or do something. The words “cue” and “clue” have very similar definitions.

Figure 1. Five stages of understanding the benefits of a 5S program

Source: Professor Arthur V. Hill

Grout (2009) argues persuasively that 5S is a good starting point for process improvement. He argues further that if an organization cannot do 5S, it cannot keep its work areas clean, cannot get people to agree on the process design, and cannot implement standards. This suggests that the organization does not have the discipline needed for any other process improvement activity.

4. Implementation guidelines for a 5S program

This section suggests a number of practical steps for implementing each step of a 5S program.

Implementing the sort step

- **Take photos before you begin** – Before implementing a 5S program, it is a good idea to take photographs to document and encourage improvement.
- **Identify low value items** – Identify all excess items from work areas, including scrap, old parts, unneeded supplies, duplicate supplies, personal items, and duplicate tools, instruments, and equipment. A good rule of thumb is to identify and eliminate any items that have not been used in the last three months. Recycle or throw away all items that clearly have no value.
- **Create red tags** – Create a red tag for all items of possible value that are no longer needed. The red tag usually includes the current date, number of items, and the category. Common red tag categories for a manufacturer include:
 - Raw materials
 - Work-in-process
 - Finished goods
 - Tools or fixtures
 - Equipment
 - Maintenance or MRO supplies
 - Office equipment or supplies
 - Other
- **Move red tag items to the red tag area** – Move red tag items into the red tag area to be evaluated.

- **Evaluate and dispose of red tag items** – If items in the red tag area are not claimed or sold after a month, discard or recycle them. Some firms use a green tag to indicate that the item should definitely be kept and a yellow tag to indicate that no decision has yet been made.

Implementing the set in order step

Remember that the key idea here is “a place for everything and everything in its place” and that the goal is to make the work area simple, visible, error-proof, wasteless, and standard.

- **Organize the physical layout** – Start by organizing the physical layout of the work area to improve visibility and workflow and reduce wasted steps and motion. This might include removing unnecessary doors, walls, and other barriers that inhibit visibility, movement, or travel. For example, removing doors from cupboards is often a good way to improve visibility and save time. Lay out the storage area along the wall to save space. 5S generally requires that almost nothing touch the floor other than table legs and equipment supports.
- **Make proper use of carts, containers, and holders** – Use carts, containers, and tool holders to organize, move, and store tools, jigs, and measuring devices. Design storage areas with a wide entrance and shallow depth. Do not stack items together. Use racks and shelves when possible. Use small bins to organize small items. Use see-through/transparent covers and doors for visibility.
- **Locate items to reduce walking and motion** – Move tools, supplies, materials, and reference materials as close as possible to the point of use and make sure that the items used most often are closest to the point of use. Store similar items together and different items in separate rows.
- **Make the area safe** – Identify safety issues and mitigate all significant risks.
- **Make the area standard and visible** – Clearly label items, shelves, and other areas to improve visibility. Use colors to quickly identify items. Use shadow boards for tools. Paint the floor to indicate where larger pieces of equipment should be stored and where people are to walk and not walk.

Implementing the shine step

In this author’s experience, it is often better to do the *shine* step before the *set in order* step. This is because it is often better to clean and shine before putting things back in the work area.

- **Clean** – Sweep, wash, clean, and shine everything around the work area, including the floor.
- **Arrange cleaning materials** – Practicing 5S means that all employees should have their cleaning materials in a standard place close to the work area.

Implementing the standardize step

- **Create the standard for the work area** – This includes listing the items and the number of items allowed in storage. This standard will be the basis for 5S audits.
- **Implement across all units** – This new standard should be implemented across all units.

- **Create a standard cleaning procedure** – The standard cleaning procedure should include a cleaning checklist and should be posted close to the work area. It should also define how often the area will be cleaned.
- **Be quick to revise the standards** – It is important to not only have a standard, but to update it as often as needed.

Implementing the sustain step

- **Take and post “after” photos** – One simple way to encourage participation and improvement is to take photographs to document the improvement.
- **Schedule regular audits** – These audits should be done to provide accountability. Many organizations make it “standard work” for supervisors to “scorecard” work areas at least once per week. See the appendix for a suggested simple 5S scorecard.
- **Learn from mistakes** – When an area is found to be out of compliance with the 5S standard, ask “why” five times to address the system of causes for the problem. For example, people might have a bad habit of putting tools and papers on a table or desk when they should instead immediately put them away.
- **Empower people to change to a new standard as needed** – With respect to quickly changing standards, Bodek (2009) quotes Ohno, the former Vice President of Production at Toyota Motor Corporation, “Something is wrong if workers do not look each day, find things that are tedious or boring, and then rewrite the procedures. Even last month’s manual should be out of date.” One healthcare worker reported that “Our exam room was 5S’ed and they removed things that we need to keep in the room. I’d like to bring the items back in, but I know that violates the 5S concept. I wish I knew who to talk to about this.” This quote highlights the need to have involvement of the people in the “gemba”⁶ to create the standard, one person who visibly “owns” the standard, and a simple process for this person to change the standard as needed.
- **Develop the culture** – Ensure that 5S goes beyond just keeping the work area clean. Begin to develop a disciplined culture of keeping the work area up to 5S standards at all times. This involves developing the habit of always putting things back in the proper place, making sure that everything is always in the right place, and removing items of little or no value.

⁶ *The “gemba” is the place where the real work takes place.*

5. Crash cart example

One good example of the application of 5S is a crash cart in a clinic or hospital. Crash carts are moved to the patient in an emergency such as a “code blue” when a patient is experiencing a respiratory or cardiac event. Having the right items and the right number of items may be a matter of life and death. Crash carts must have exactly the right number of all critical components on them (e.g., syringes, critical medications, respiratory supplies, etc.). It is just as critical that the crash cart not have too many of any one item or any unnecessary items. Those items just get in the way.



The crash cart should have a standard list on it that clearly defines what items should be on the cart. This list should be reviewed periodically to make sure that it is correct. No one should be allowed to change this list without proper authority.

The 5S discipline of keeping the cart up-to-date requires regular audits to make sure that it meets the standard. Every time it is used, items should be replaced to bring the stocking levels up to the prescribed standard levels.

6. Conclusions

5S is a simple and effective lean manufacturing methodology that helps organizations simplify, clean, and sustain a productive work environment. The 5S methodology originated in Japan and is based on the simple idea that the foundation of a good production system is a clean and safe work environment. The closest English equivalents normally used are Sort, Set in order, Shine, Standardize, and Sustain.

5S is far more than just keeping a work area clean. It is really about developing a culture that insists on employees thinking and acting in a disciplined way to keep their work areas organized and visible. This disciplined thinking requires that people put away a tool when they are done with it, keep their work areas highly visible, and not procrastinate in deciding what to do with unneeded items.

The results of a good 5S program include improved visibility, safety, morale, cost, cycle time, quality, and labor productivity, along with reduced waste, and an increased sense of ownership of the work area. Ultimately, a good 5S program will result in lower cost, increased revenue, and increased profit.

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Appendix – 5S Scorecard

Area	
Date/time	
Auditor	

5S SCORECARD			CORRECTIVE ACTIONS		
Step	Measurement	Score	Corrective actions for this scorecard	Owner's initials	Completion date
Sort	Number of unnecessary items currently in the work area.				
Set in order	Number of items not stored in clearly labeled areas.				
Shine	Number of items on the cleaning checklist that are not clean.				
Standardize	Number of missing scorecards and checklists.				
Sustain	Number of incomplete corrective actions from the last scorecard.				
Total score:			Zero is a perfect score.		

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